HEALTHY STEPS℠

Healthy Steps: The First Three Years

The Healthy Steps for Young Children Program National Evaluation

Women's and Children's Health Policy Center
Department of Population and Family Health Sciences
Johns Hopkins Bloomberg School of Public Health

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Prepared
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Healthy Steps: The First Three Years is the final report of a seven year evaluation of the Healthy Steps for Young Children Program. In one sense, it began with a request from The Commonwealth Fund for proposals to evaluate the program and a team of researchers huddled at a conference table weighing a decision to respond. But its origins were actually earlier in the vision of Margaret E. Mahoney, Karen Davis, Kathryn T. McLearn, Barry Zuckerman, Steve Parker, and Margot Kaplan-Sanoff. They believed that a new whole-child, whole-family model of child health care could be developed and could help to fill a void in the lives of young children and their families. Foundation leaders in concert with physicians and administrators at the Healthy Steps sites shared this vision and steadfastly worked to make it a reality.

A similar commitment was evident in the evaluation. Whether participating in the program or in the control group, families, clinicians, and practice staff alike contributed equally to the evaluation. Mothers and fathers filled out questionnaires and completed interviews. Physicians, nurse practitioners, nurses, medical assistants, receptionists, administrators, Healthy Steps Specialists, foundation leaders, and other individuals involved in initiating and/or implementing the Healthy Steps program at their sites participated in interviews, completed questionnaires, and/or filled out forms. It is through the willingness of all respondents to contribute their time to the evaluation and to share openly their experiences, both negative and positive, that allowed this report to be written.

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Nancy Hughart and Janice Genevro

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Introduction

1. INTRODUCTION

The Healthy Steps (HS) program, a universal practice-based intervention, served more than 4,000 families with newborn children at 24 sites throughout the United States since it began in 1995. The program emerged in response to concerns about (1) addressing the developmental needs of young children through better pediatric practices and (2) meeting the needs of parents given the changing demands of society.

Healthy Steps was particularly innovative because it incorporated a new developmental specialist into pediatric practice. This and an array of developmental services for mothers, fathers, and their children made HS an innovation in quality improvement in pediatric health care.

Although the original demonstration program ended in 2001, HS program services are continuing at twelve of the original twenty-four demonstration sites; ten sites have “spin off” services; and new HS programs are being established.

Healthy Steps shares its origins with programs like Early Head Start and other early childhood programs that strengthen early preparation for learning. It provided services that are consistent with many assumptions of early childhood interventions and their framework for change. This set of assumptions, as characterized by Shonkoff and Phillips (National Research Council and Institute of Medicine, 2000), incorporates specific assertions about the nature of development and influences on development. These include the importance of young children’s relationships with their primary caregivers, and the impact of multiple risk factors and sources of stress on caregivers, which in turn affect their abilities to recognize and meet the needs of their children.

The assumptions also reflect an understanding that interventions to enhance children’s development and well-being can be designed to affect children *directly* (as is the case, for example, in programs that provide early preschool services) or *indirectly* through services to parents (as is the case in many home visiting programs). They also emphasized the importance of recognizing that expectations about family and child outcomes must be based on a deep understanding of children’s individual differences, the degree to which the caregiving environment within the family is changeable, and the match between the resources and goals of the intervention (National Research Council and Institute of Medicine, 2000).

In some respects, HS fits within the very large "tent" of early childhood intervention programs. In particular, HS services reflect an understanding of the importance of the caregiver-child relationship in all aspects of development, the importance of enhancing caregivers' emotional and other support as a means of promoting children's well-being, and a focus on aspects of the caregiving environment that are likely to be amenable to change. Nevertheless, Healthy Steps differs from other early childhood intervention programs in two particularly significant ways.

The first is that HS was designed to change pediatric care – to expand the services offered as part of standard pediatric primary care – as well as to enhance the capabilities of parents and promote the health and development of very young children. HS is thus both unique and a pioneering effort in early childhood intervention in its use of the pediatric primary care system to deliver parenting and developmental services to families. The pediatric practice is the first major institution with which newborns and their mothers and fathers interact.

Second, HS services were offered to families in participating practices regardless of risk status or identified developmental disability or difficulty. Universal early intervention programs are rare; programs typically are targeted at specific populations based on risk (e.g., economic hardship, age of parent, low birth weight, or other characteristics) or specific disorders or disabilities of the child. The HS program, however, was based on an understanding that all parents have concerns and questions about their children's health, behavior and development. It was designed to capitalize on parents' contacts with the pediatric practice, which provide opportunities to promote their knowledge and capabilities using "teachable moments" and other intervention methods.

The specific goals of the HS program were to promote improvements in:

- The clinical capacity and effectiveness of pediatric primary care to better meet the needs of families with young children;
- The knowledge, skills and confidence of mothers and fathers in their childrearing abilities; and
- The health and development of young children.

Fifteen of the 24 sites that implemented HS during the evaluation period participated in an independent national evaluation to assess the extent to which the HS program achieved these goals. Two of these sites also participated in a direct observation study evaluating the program's effects on the home environment, mother-child interaction and child development. Of the remaining nine sites, often referred to as affiliate sites, six additional sites were involved in a more limited evaluation. Two of the remaining sites implemented their own formal evaluations, which are not yet completed, and one site participated in a local evaluation.

There were many partners involved in the HS program of which The Commonwealth Fund was the leader and primary sponsor. The Commonwealth Fund sought to create, implement, and evaluate a demonstration project of consistently high quality, at sites stretching from coast to coast, and involving a broad demographic range of families. This required teamwork among four major institutional entities and a host of local collaborators.

- *The Commonwealth Fund* originated the program, providing a vision for the national project, support for the nationwide institutions, and partnership with the local funders;

- *Boston University School of Medicine* designed the program, trained site staff, and provided technical assistance to the sites;

- *ICF Consulting* directed and coordinated the program's implementation; and

- *Johns Hopkins Bloomberg School of Public Health*, evaluated the project.

In tandem with these were local funding partners at each of the 24 sites. A National Advisory Committee provided guidance and feedback to the project and its evaluation.

Healthy Steps: The First Three Years describes the results of the national evaluation of the HS program. The 15-site national evaluation involved a sample of 5,565 children (including both intervention and control children) enrolled at birth and followed for three years. At six sites, newborns were assigned randomly to the intervention or control group; at nine sites, a quasi-experimental design was used and a comparison location was selected.

The report also includes a summary of results for the evaluation at six affiliate sites and the embedded direct observation study. The six affiliate sites met the same requirements as the sites selected for the national evaluation but did not have a comparison population. As the national and affiliate evaluations were limited to self-reported measures and some of the effects of HS on parents and children were expected to be subtle, direct observation of mothers and children at two sites was conducted to enhance the ability of the evaluation to measure changes in parent and child functioning.

Chapters 2 and 3 provide a detailed description of the HS program, including its history, the larger research, policy, and practice context in which the program originated, and the core elements of the program.

Chapters 4 and 5 focus on the evaluation, describing the conceptual framework that guided the evaluation; the evaluation goals, objectives, design, and analysis strategy; the diversity of the sample; and the demographic characteristics of the key samples for analysis.

Chapters 6 and 7 focus on program implementation. They describe implementation from the perspective of the lead physicians, site administrators, and HS Specialists at the 15 national evaluation sites; summarize the services that the HS Specialists reported providing to families; and the services that families in the program reported receiving.

Chapter 8 examines the impact of the program on the attitudes and practices of clinicians and practice staff.

Chapter 9 summarizes the program's impact on the nature and kinds of services that families in the program received compared to families in the control group. In *Chapter 10*, the conceptual framework for examining the effects of HS on families provides the overall structure for summarizing program effects on parents and children.

Chapter 11 examines how HS affected subgroups of families: low, middle, and high income; teen, young adult, and older mothers; and first-time vs. second or greater-time mothers.

Chapter 12 examines the extent to which variation in aspects of implementation affected receipt of services and program outcomes.

Chapter 13 summarizes evaluation results at the six affiliate sites and *Chapter 14* presents results of the direct observational study at the two randomization sites.

Chapter 15 describes program costs and potential benefits.

Chapter 16 addresses program sustainability.

Chapter 17 concludes the report with a summary of key program effects, the context for understanding program effects and costs, and the implications of evaluation results for practice, research, and policy.

The report is comprehensive and somewhat technical. It is intended to serve as a resource document for a multidisciplinary audience that includes program participants and funders, practitioners, researchers and all others interested in learning about the evaluation of the HS program and its findings.

2. Healthy Steps: Origins, Goals, and Policy Context

The Healthy Steps Program: Origins, Goals, and Policy Context

- In January 1995, The Commonwealth Fund began developing the Healthy Steps for Young Children Program. The initiative was designed to enhance the medical care system for young children from birth to age 3 and their families by incorporating preventive developmental and behavioral services into routine pediatric primary care in pediatric and family practices. The goals of Healthy Steps were to develop and evaluate a new whole-child, whole-family model of child health care.

- This chapter provides an overview of the larger research, policy, and practice context in which Healthy Steps was created and implemented and outlines the history of the Healthy Steps program.

- With Healthy Steps, The Commonwealth Fund established its presence on the cusp of the advancements in child health that were beginning to converge in the mid-1990s. The initiation of Healthy Steps came at a remarkable time for early childhood health and child development. In 1994, the Carnegie Corporation of New York released a policy report entitled *Starting Points: Meeting the Needs of Our Youngest Children. Starting Points* outlined the growing scientific evidence documenting the importance of the first few years of life on later development, and called for public and private sector resources to be directed to protecting and nurturing young children and their families.

- Advances in knowledge and increased investment in early childhood issues at this time were marked by the convergence of profound changes in four areas:

  1. Scientific research on early childhood development;
  2. State and federal policy investments in supporting families with young children;
  3. Attention to the quality and coverage of health care for children;
  4. Popular media and public interest in young children.

- The Commonwealth Fund's Survey of Parents with Young Children documented the need for the Healthy Steps approach. This national survey provided a representative snapshot of the conditions of families with young children and the pressures and challenges faced by mothers and fathers and their children. It was the information gathered in this survey that validated the need for the Healthy Steps initiative, and what parents need from the health care system to help them rear their children. The survey revealed that parents were eager for more information on issues of normal growth and development, such as how to promote learning, and how to discipline, toilet train, manage sleep problems, and deal with a crying baby.

2. ORIGINS, GOALS, AND POLICY CONTEXT

2.1. Introduction

In January 1995, The Commonwealth Fund (CWF) launched the Healthy Steps for Young Children Program. The initiative was designed to enhance the medical care system for young children from birth to age three and their families by incorporating preventive developmental and behavioral services into routine pediatric primary care in pediatric and family practices. The goals of Healthy Steps (HS) were to develop and evaluate a new whole-child, whole-family model of child health care. More specifically, HS was designed to: 1) promote the clinical capacity and effectiveness of pediatric primary care to better meet the needs of families with young children; 2) promote the knowledge, skills and confidence of mothers and fathers in their childrearing abilities; and 3) promote the health and development of young children (McLearn et al., 1998; Zuckerman et al., 1997).

Healthy Steps integrated non-physician experts in child development into primary care teams that care for young children and their families in pediatric practice settings. These experts, called HS Specialists, were nurses, child development experts, social workers, or other professionals who were trained to share child development information with parents and maintain effective connections between the family and the practice. The HS Specialists worked with the child's physician or nurse practitioner to monitor child health and development, promote good health practices, and respond to parents' concerns about their developing infants or toddlers. They also played a primary role in the provision of HS services. These services include enhanced well child care, home visits, a child development information line, child development and family health checkups, written informational materials, parent groups, and linkages to community resources.

With the HS Program, CWF established its presence on the cusp of the advancements in child health that were beginning to converge in the mid-1990s. The initiation of HS came at a remarkable time for early childhood health and child development. In 1994, the Carnegie Corporation of New York released a policy report entitled *Starting Points: Meeting the Needs of Our Youngest Children* (Carnegie Task Force on Meeting the Needs of Young Children, 1994). *Starting Points* outlined the growing scientific evidence regarding the importance of the first few years of life on later development. It also called for public and private sector resources to be invested in protecting and nurturing young children and their families. *Starting Points* served as a catalyst that increased attention to early childhood development at a time in which there were significant advancements in scientific research, increased public interest in children, a bounding economy, and a restructuring of the health care system. The alignment of these forces supported the development of non-profit and community-based efforts to promote early childhood health and development and channeled both public and private investments in these early childhood programs and policies. This chapter provides an overview of the larger research, policy, and practice context in which HS was created and implemented and outlines the history of the HS program.

2.2 Research and Policy Context for Young Children and Families: 1995-2002

It is important to view HS in the context of the social changes and forces that have coincided to alter the landscape for early childhood policy and developmentally-oriented child health care progress. An upsurge of research in neurobiological, behavioral, and social sciences advanced understanding of the conditions in the first three years of life that influence later outcomes. In addition, the social and economic circumstances in which families were raising children in America changed considerably (Shonkoff and Phillips, 2001). The progress and increased investment in early childhood issues at this time was marked by the convergence of profound changes in four areas:

1. Research on early childhood development;
2. State and federal policy investments in supporting families with young children;
3. Attention to the quality and coverage of health care for children; and
4. Popular media and public interest in young children.

2.2.A. Scientific Research

The decade of the 1990s was proclaimed as the "Decade of the Brain" by President George H.W. Bush and by Joint Resolution in the United States Senate and House of Representatives. These actions emphasized the explosion of research being produced in neuroscience, biology, and behavioral and social sciences, and encouraged the focus of government and public attention on the burgeoning research in these fields (Bush, 1989). The neuroscience and behavioral development research that was conducted during this time provided evidence that later brain development is highly dependent on early childhood experiences (Halfon et al., 2002). This research also revealed the effects that early relationships have on later behavior and development, in addition to the influences of genetics and environment (National Research Council and Institute of Medicine, 2000).

In 1997, the National Research Council created a three-year multidisciplinary commission to examine and report on the science of early childhood. The Committee on Integrating the Science of Early Childhood Development released its findings in 2000 in the landmark book *Neurons to Neighborhoods: The Science of Early Childhood Development.* *Neurons to Neighborhoods* drew on the body of research that covered early childhood from birth to age five and brought together evidence from many fields on all aspects of development. It addressed influences on young children and later development, and the roles that brain development, social relationships, societal values, and parenting play in the developmental trajectories of early childhood (National Research Council and Institute of Medicine, 2000). Integrating the multidisciplinary science of young child development, *Neurons to Neighborhoods* reached the following conclusions:

- Nature and nurture are inextricably intertwined.
- Early environments matter and nurturing relationships are essential.
- Society is changing and the needs of young children are not being addressed.
- Children's emotional and social development is as important to school readiness as their cognitive and language development (National Research Council and Institute of Medicine, 2000).

Two recent reports have analyzed the economic implications of investing in young children. A 1999 RAND report, *Investing in Our Children*, produced a cost-benefit analysis of the need for targeted early intervention programs for young children and their families. This analysis became an important element in the development of policies and programs that addressed early childhood development (Halfon, McLearn et al., 2002; Karoly et al., 1998). *Investing in Our Children* concluded that early interventions targeted at disadvantaged children can provide significant benefits to the children who participate and their families. In addition, government funds invested early in the lives of some disadvantaged children and their families may save some children from placing burdens on the state in terms of welfare, criminal justice, and other costs. A report by James J. Heckman, "Policies to Foster Human Capital," emphasized that the social skills learned by young children in early childhood programs set a pattern for acquiring life skills in later years, and thus there is an economic advantage in investing in early intervention programs (Heckman, 1999). In another important addition to the growing body of knowledge on the health and development of young children, the Centers for Disease Control conducted the National Survey of Early Childhood Health in 2000. This survey provides information about families around the country, and contributes to the understanding of families' experiences with preventive pediatric care and the ways that parents promote children's health and development (Halfon, Olson et al., 1997).

Other research accomplishments during this period included the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care and Youth Development. This study began in 1991 and investigated the effects of variations in child care on early childhood development. The 1997 report, *Rethinking the Brain: New Insights into Early Development* by the Families and Work Institute, compiled evidence about child development in the context of brain science and early experiences (Shore, 1997). In addition, the Science and Ecology of Early Development 2000 (SEED 2000) project has brought together multiple federal agencies to create an integrated research agenda to study the normative development of children in low-income families. More recently, the Early Childhood Longitudinal Study of a Birth Cohort was launched by the National Center on Education Statistics in 2001 to assess children's health and development status and study the transitions between home, early care and education programs, and kindergarten.

The Commonwealth Fund contributed to the accumulation of information documenting the experiences of young children by conducting the National Survey of Parents with Children from Birth to Age Three in 1995-6. This was the first national survey to examine parents' experiences with infants and toddlers and the kinds of support they receive from health care providers. The survey revealed that American parents are struggling with the demands of rearing young children under considerable financial and time pressures. These parents also want more information, services, and attention from doctors on how they can help their young children thrive and learn (Young et al., 1998).

The research findings amassed during the "Decade of the Brain" pointed to the possibilities of targeted interventions to address early childhood development, and highlighted opportunities that were being missed to get infants and toddlers off to a good start for healthy development. Increasing evidence indicated that efforts to improve overall child development and child health must begin in, and indeed focus on, the first three years of life, when the pathways that lead to later development are created and reinforced. Studies during this time also identified the major adverse effects that parental health problems, abuse, and neglect have on brain development in young children. Research also demonstrated the importance of active nurturing, speaking and reading to children, and promoting early relationships to encourage healthy child development. The important roles of parents as nurturers and teachers in the early years, with implications for later school readiness, were also emphasized. These research efforts inform and guide evolving practices and policies in pediatrics that promote child development and help support parents with young children.

2.2.B. Child Health Care Practice and Policy

Government reports written in the late 1970s and early 1980s had highlighted the need for comprehensive child health services that include not only traditional medical care, but also counseling, anticipatory guidance, and various health promotion and preventive services oriented towards psychosocial issues (Barth and McLearn, forthcoming). However, the mid- to late-1990s saw the establishment of these recommendations into formal practice guidelines, such as those issued by *Bright Futures* in 1994 and the American Academy of Pediatrics, Health Supervision Guidelines, III in 1997. These revised pediatric guidelines reflected improved understanding of the "new morbidities" (e.g., parental health behaviors, abuse, child behavioral problems). They also emphasized the importance of incorporating prevention, early detection, and management of various behavioral, developmental, and social functioning problems into routine pediatric practice standards. The standards also recognized the important role that parents and communities play in the health and development of young children (Green, 1994; American Academy of Pediatrics, 1997).

In addition, curricular guidelines for residency training in developmental and behavioral pediatrics were issued by the Society for Developmental and Behavioral Pediatrics in 1997. More recently, the pediatric Residency Review Committee of the Accreditation Council on Graduate Medical Education adopted new guidelines for residents that require a one-month rotation focusing on behavioral and developmental pediatrics and incorporation of behavioral and developmental issues into ambulatory and inpatient residency training.

Quality of care became an important issue that framed many of the advancements in child health care practices during the development of the Healthy Steps program. The Institute of Medicine (IOM) issued a report entitled *Crossing the Quality Chasm* in 2001, in which it described a framework for improving health care quality. The IOM framework included six areas to address to improve quality: safety, effectiveness, patient centeredness, timeliness, efficiency, and equity (Committee on Quality of Health Care in America, Institute of Medicine, 2001). Other research emphasized the importance of including child health services in the movement to improve the quality of health care. However, research also indicated the need to study and address child health care quality issues separately from the evaluations and improvements being made for adult health care. The distinct provider systems and different epidemiology of illness for children, the dependence of children on caregivers for access to health care, and the developmental issues essential to the care of young children that are not relevant to adults mean that quality improvement for child health care must be addressed on its own (Ferris et al., 2001). These studies and reports indicated that progress in the provision of preventive developmental services to children needed to incorporate the advancements being made in quality improvement of health care, and in turn, that the movement to improve the quality of health care needed to consider the specific issues inherent in child health services.

Also at this time, access to medical insurance and coverage of services for children was changing dramatically. As part of the Federal Balanced Budget Act of 1997, Title XXI pumped $20.3 billion in block grant funding into states to provide health insurance to uninsured children. States could apply to use the money to expand Medicaid and/or create a new children's health program called State Children's Health Insurance Program (S-CHIP)(Kagan and McLearn, 2000). The National Governor's Association (NGA) embraced Title XXI, and designated the Health Policy Studies Division of the NGA Center for Best Practices to support Governors and their staffs and assist state efforts to expand health insurance coverage for children through S-CHIP. Although there were mandated components and benchmark standards, the funding provided by federal grant money gave states broad flexibility to determine the availability and delivery of services for their residents, and the resulting programs and policies have varied in their comprehensiveness and extensiveness. However, most states provided coverage for preventive and primary care, including services such as routine well-baby care, immunizations, primary and acute care visits, prescription drugs, dental care, diagnostic assessments, and emergency room utilization (Halfon, McLearn et al., 2002). As of October 1998, income eligibility levels for access to health insurance for children ranged from 133% to 400% of the federal poverty level (NGA Center for Best Practices, 1999). Currently almost 20 million children receive health care services through Medicaid and SCHIP (National Governor's Association, 2002). However, there are still gaps in the provision of child health services; recent results from the National Health Interview Survey estimate that 8.3 million children under age 18 lack health insurance in the United States (Centers for Disease Control, National Center for Health Statistics, 2002).

Many of these training and practice guidelines and quality of care assessments have been incorporated into pediatric practices and state health care coverage policies. These services and models of care have been implemented in a vast array of health care settings, paving the way for child development issues and family support practices to be integrated into pediatric care for all children and for children's health care to benefit from the advancements in quality of care achieved during the 1990s.

2.2.C. State and Federal Policy

The research advancements outlined above stimulated a greater involvement and investment of the public sector in early childhood and family support issues. As stated in *Child Rearing in America*, "Americans have [historically] been reluctant to involve government in the private lives of families, and especially families with young children. The architects of American democracy promoted a fundamental belief that families should bear the greatest responsibility for nurturing their children, with government playing a secondary role, if any" (Halfon, McLearn et al., 2002). Much of this had already changed by the time the early childhood boom of the mid-1990s began: states had been receiving funding for maternal and child health services through the Title V Block Grant since 1935; the Early Periodic Screening Diagnostic and Treatment (EPSDT) program had been implemented for Medicaid recipients for almost thirty years; and the mid-1980s had seen an increase in funding initiatives on the state and national level to improve child health. However, the 1990s were marked by a concentrated progression of public policies sustained in both federal and state legislatures that greatly increased the role of the government in the lives of families and in efforts to support parents and their young children.

The widespread visibility and growing importance of early childhood issues compelled politicians across the political spectrum to show support for policies and initiatives that focused on families with young children (Karoly et al., 1998). State and federal policy also responded to the changes in child health care practices described above. The first federal program to seek to incorporate some of the new information about the importance of the first three years of life on later developmental, behavioral, and health outcomes was Early Head Start, initiated in 1994 as an expansion of the Head Start Program. By 1996, the Administration for Children, Youth, and Families was funding 143 Early Head Start programs around the country that sought to address the fragmentation of community services for children from birth to three years, and that would provide services using a two-generation model of health care and family support (Mathematica Policy Research Inc., 2002) The recently published Early Head Start evaluation report, *Making a Difference in the Lives of Infants and Toddlers and Their Families: The Impacts of Early Head Start*, describes the significantly positive impacts that Early Head Start programs have had on cognitive development, language development, and social-emotional development at ages two and three. In addition, Early Head Start programs have produced favorable impacts on a wide range of parenting outcomes such as attachment, discipline strategies, and emotional support for their children (Love et al., 2002).

Other federal government initiatives incorporated the growing scientific research on early childhood. In 1995, The Child Care Bureau and the Maternal and Child Health Bureau, both housed within agencies of the U.S. Department of Health and Human Services, launched a nationwide effort, called the *Healthy Child Care America Campaign*, to promote healthy child development through child care systems and encourage linkages between health and child care providers. In 1997 the White House held two conferences on young children, one on childcare and one on early childhood development. Also in 1997, First Lady Hillary Clinton announced a nationwide effort to encourage families to read to their young children at home. In addition, federal agencies expanded data collection on the early life predictors of educational success in efforts such as the aforementioned National Survey on Early Childhood Health. More recently, First Lady Laura Bush convened the Summit on Early Childhood Cognitive Development in 2001 and the Bush Administration introduced the Early Childhood Education Initiative in 2002.

Legislation passed in 1996 and 1997 indicated the degree to which the information about and interest in early childhood issues had taken hold of the policy agenda at the federal and state levels. Policy change was seen not only in specific programs such as Early Head Start that received funding, but in more sweeping initiatives designed to support and improve early childhood development. The welfare reform debate in 1996 prompted policymakers to examine new approaches and models to provide assistance to disadvantaged children and families (Karoly et al., 1998). Temporary Assistance for Needy Families (TANF), the program that took the place of Aid to Families with Dependent Children (AFDC) in 1997, resulted in more emphasis on parental employment, but also in increasing the coverage of child care costs for many families. Many of these advances relied on the processes of devolution, whereby power and jurisdiction was being transferred from the federal government to the state governments. Much of the enactment of early childhood and child development programs and policies therefore took place at the state level.

The combination of increased federal funding and state budget surpluses resulting from the growing economy created the chance for states to initiate programs to serve families with young children. Many states seized these opportunities to improve their policies and programs designed to protect and nurture young children and their families. Between 1998 and 2000 there was a 109% increase in expenditures for infant and toddler services and programs (Knitzer, 2001). As of 2000, 31 states were funding one or more child development and family support program and as of 2002, 43 states were funding pre-kindergarten programs and other services supporting child development (Halfon et al., 2002). Many states have also begun to focus on "system development" issues in order to increase their ability to support families with young children (Knitzer, 2001)

Numerous states have stood out in their commitment to early childhood through policy initiatives. For example:

- Missouri initiated the Early Childhood Development, Education, and Care Fund that expanded services for infants and toddlers through Early Head Start and created a prekindergarten program for 3- and 4- year olds (Cauthen et al., 2000).

- The state of Vermont enacted "Success by Six," a statewide health and developmental improvement campaign. "Success by Six" provides a community-designed package of comprehensive supportive services such as home visits, lactation support, family literacy, and parent-child play groups for families with children from birth to age 6. The program has shown positive effects on several child outcomes (Cauthen et al., 2000).

- California's Proposition 10, "The Children and Families First Act," was passed in 1998 and provides $700 million annually (from taxes on tobacco products) to programs focused on children age 5 and younger. Prop 10 also contained provisions to build new quasi-governmental infrastructure to serve as community outcomes trusts for young children in each county (Halfon, McLearn et al., 2002; Cauthen et al., 2000).

- Kentucky adopted the "Governor's Early Childhood Initiative" that funds a range of maternal and child health programs and services, a home visiting and family support program, and improvements in the quality and availability of early care and education services (Cauthen et al., 2000).

- North Carolina has implemented "Smart Start," a comprehensive public/private initiative to help children enter school healthy and ready to succeed that consists of a variety of services for children from birth to age 6. "Smart Start" received $219 million in state funds in fiscal year 2000 (Cauthen et al., 2000).

In addition, North Carolina, Utah, Vermont, and Washington have been involved in the Assuring Better Child Health and Development (ABCD) Program, an initiative started by The Commonwealth Fund and managed by the National Academy for State Health Policy (NASHP). ABCD is dedicated to strengthening the capacity of the health care system to provide low-income parents with the knowledge and skills necessary to support their young children's healthy development. Specific objectives of ABCD include working with Medicaid officials to improve well-child health care, enhancing parents' knowledge and use of beneficial child-rearing practices, and identifying family risk factors. The four states participating in ABCD have formed a working consortium to exchange information, promote collaboration, and encourage other states to adopt similar strategies to promote provision of preventive child development services through Medicaid, children's health programs, and community health centers (The Commonwealth Fund, 2002).

2.2.D. Popular Media and Public Interest

The release of *Starting Points* was widely covered by the national media in 1994. An ensuing flood of books, television programs, magazine articles, and internet websites began providing information to the general public about the research findings on the importance of early childhood and the ways to promote child development in young children (Halfon, McLearn et al., 2002). A cover story in *Time* magazine and a special edition of *Newsweek* magazine on young children and child development, both published in 1997, marked the peak of the national media attention on early childhood issues. The *Time* article emphasized advancements in neuroscience and related commonly-recognized vision, emotion, language, and movement benchmarks to the growth and activity of babies' and young children's brains. It also specified ways that parents could foster the healthy development of their children. The *Newsweek* special edition was comprehensive in its scope, illustrating the evidence about brain development in early childhood from neuroscience research, but also discussing in depth the ways that early experiences (including reading and speaking to children, early relationships, and active parent nurturing) contribute to healthy brain development (Nash, 1997). Also during 1997, ABC aired a TV special sponsored by the "I Am Your Child" Early Childhood Public Engagement Campaign. This campaign, which was supported in part by the Carnegie Corporation in the wake of *Starting Points*, also distributed research reports, community planning guides, videotapes, and an informational CD-ROM for the parents of young children.

Coinciding with the media coverage, public interest in early childhood issues also increased. From a broader standpoint, societal expectations about parenting had been changing: Many more Americans believed that most parents face times when they need help and assistance rearing their children, and an overwhelming percentage of Americans believed that it is harder to be a child today than it was in the past (Farkas and Johnson, 1997). The expanding knowledge in early child development fields gave way to a new "early childhood market," with a surge in sales of Mozart CDs for babies, the creation of new educational television programs, the opening of specialized toy stores and activity centers for children, and the development of publications and products designed to assist and guide parents through the childrearing experience (Halfon, McLearn et al., 2002). Although many of these accurately adapted lessons from neuroscience, some products and publications oversimplified the developmental process and misrepresented the evidence from research on early childhood development.

Media coverage has continued in more recent years: *Newsweek* published a follow-up to its 1997 special edition in 2000, with updated information and coverage of the policy and programmatic advancements that had been made. Numerous books, such as *The Youngest Minds* (Barnet and Barnet, 1998) and *The Scientist in the Crib* (Gopnik et al., 1999). have been published for both parents and policy makers, detailing the importance of early child development suggesting ways to promote healthy child development. At the same time, critics such as John Bruer concluded that evidence from the neurological and social sciences had been misinterpreted and overstated. Bruer's book, The *Myth of the First Three Years of Life*, criticized the popularization of the first three years of life by advocates, policymakers, and the media, and questioned its relevance to social policies to optimize healthy child development (Bruer, 1999). The Carnegie Corporation released *What Kids Need: Today's Best Ideas for Nurturing, Teaching, and Protecting Young Children* (Shore, 2002) in 2002, as a follow-up to its *Starting Points.* Overall, public awareness of and interest in early childhood issues has increased dramatically since the early 1990s (Halfon, McLearn et al., 2002). Much of this popular media coverage and the growing "early childhood market" reinforced foundations' investments in early childhood research and initiatives. The media coverage and public interest also assisted the advocacy efforts that drove governmental policymakers to include early childhood issues in their legislative agendas (Halfon, McLearn et al., 2002). Ongoing research in these fields, adjustments in health care practices, and national debate about the role of policies to address early childhood issues have provided fodder for continuing media coverage and sustained public interest.

2.3. History of the Healthy Steps Program

With all the attention focused on early childhood issues by the media, foundations, the public, researchers, state governments, and the federal government, CWF was in the vanguard of this movement, reaching out front in making an investment for early childhood and child development by creating the Healthy Steps for Young Children Program in late 1994. The Commonwealth Fund decided that working through the health care system would be the most effective way to reach children and parents during the developmentally critical first few years of children's lives. Pediatric clinicians have the most consistent contact with the broadest range of young children and their families. In addition, the universal and periodic nature of infant and toddler health care affords the opportunity for ongoing contact with children and parents that is necessary for the incorporation of developmental and behavioral services. The Commonwealth Fund has supported Healthy Steps for over seven years, from the design stage onward in three major activity areas: site development and implementation; curriculum development and training; and national and affiliate evaluations.

In addition to enhancing developmental services within routine pediatric primary care, the HS program staff determined that to be effective, primary care for young children should be a two-generational endeavor that would serve both mothers and fathers and their children, with a focus on the nurturing relationship between parent and child. As an initiative that seeks to maximize the ability of the health care system to provide high quality behaviorally- and developmentally-oriented preventive care services to young children and support parents, HS was groundbreaking. Healthy Steps was also unique because it was made available to children and families of all income levels and was adaptable to implementation in various practice settings.

The Commonwealth Fund's Survey of Parents with Young Children documented the need for the HS approach. This national survey provided a representative snapshot of the conditions of families with young children, and the pressures and challenges faced by mothers and fathers and their children. The information gathered in this survey validated the need for the HS initiative. The survey revealed that parents were eager for more information on issues of normal growth and development (such as how to promote learning), and how to discipline, toilet train, manage sleep problems, and deal with a crying baby. Slightly more than half the 2,000 parents interviewed felt satisfied with their pediatrician's guidance on these matters. Not surprisingly, parents were more likely to rate as "excellent" those physicians who provided useful information or guidance"(Young et al., 1998). These findings underscored the need to improve the quality of primary care practice for young children. They also served as a springboard for the idea of expanding child development services and information to families within the context of existing well child care visits. This became one of the foundations of the HS model of care.

2.3.A. Leadership, Partners, and Funding

Shortly after the program's inception, Kathryn Taaffe McLearn, Ph.D., an expert in early childhood health and development, was brought on board to work with Margaret E. Mahoney, the immediate past president of CWF and chairman of the future Healthy Steps National Advisory Committee, to oversee the development and implementation of the Healthy Steps for Young Children Program. The National Advisory Committee (NAC)[2.1] soon included Senator Nancy Kassebaum and the renowned pediatrician T. Berry Brazelton, as well as other preeminent representatives from the fields of pediatrics, academe, business, public policy, and the media. The NAC was charged with providing strategic guidance to the program and first met in May 1996; meetings were then held semiannually for the first four years, and once a year subsequently. The American Academy of Pediatrics (AAP) became a co-sponsor of the Healthy Steps program within the first year. Concurrently, a national program office was established to provide ongoing program management, infrastructure, and support for site development and implementation. Economist Michael Barth, Ph.D. was selected to direct the efforts of the national program office.

Under the leadership of Karen Davis, Ph.D., the president of CWF, HS began developing partnerships with local funders, national foundations, and health care providers in 1995. Meetings with representatives of community and health conversion foundations were held in Chicago, San Francisco, Kansas City, Texas, North Carolina, and Pennsylvania. The partnering foundations became the primary funders of HS sites around the country: Each site involved a partnership among the local funding partners, the health care provider, and the Healthy Steps for Young Children Program. More than 85 foundations and health care providers have joined the HS program. Many of the 85 foundations have formed an informal group called the Local Funder Network (LFN).[2.2] Beginning in 1996, the LFN has met

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[2.1] The following is the complete list of members of the National Advisory Committee: Margaret E. Mahoney, Chairman; Joel Alpert, M.D.; Howard Berman; T. Berry Brazelton, M.D.; Peter Budetti, M.D., J.D.; Katie Couric; Barbara A. DeBuono, M.D., M. P. H.; Fernando Guerra, M.D., M.P.H.; Robert J. Haggerty, M.D.; Myron A. Hofer, M.D., Judith B. Igoe, R.N., M.S., F.A.A.N.; Nancy Kassebaum Baker; David M. Lawrence, M.D., M.P.H., Charlene B. Rydell, M.S.S.A.; Ruth J. Simmons, Ph.D.; Edward Zigler, Ph.D.

[2.2] The following is a complete list of national and local funders: ACCESS care; Aetna Health Plans; Amarillo Area Foundation; Amarillo Area Health Care Specialists; Anderson Foundation; The Atlantic Philanthropies; The Barr Foundation; The Baxter Allegiance Foundation; Best Health Care of Western Pennsylvania; BlueCross/BlueShield of Kansas City; BlueCross/BlueShield of Rochester; Boeing Corporation; The Boston Foundation; The Brown Foundation; California Community Foundation; The California Endowment; California Proposition Ten - Orange County; California Proposition Ten - Riverside County; Capital Cities/ABC; Inc.; Chambers Family Fund; The Chicago Community Trust; Children's Trust Fund of Texas; Cigna Foundation; City of Rancho Mirage; Clothes Helping Kids; Inc.; The Colorado Trust; The Commonwealth Fund; Community Memorial Foundation; The Denver Foundation; The Dorothy Rider Poole Health Care Trust; The Duke Endowment; The Fan Fox and Leslie R. Samuels Foundation; The Fry Foundation; Gateway Health Plan; The George Foundation; The Gerber Foundation; The Greater Kansas City Community Foundation and Affiliated Trusts; Group Health/Kaiser Permanente Community Foundation; Gulf Coast Memorial Foundation; Harris Foundation; Healthcare Professional Associates; Henry Ford Health System; Hogg Foundation for Mental Health; The twice annually, once in conjunction with the Healthy Steps National Advisory Committee, and once at the annual meeting of Grantmakers in Health, of which many LFN organizations are members. Typically, 10-15 funders are represented at these meetings. The LFN serves as a forum for discussion of HS program operations and facilitates information exchange about fitting HS into general funding priorities and activities of the LFN member organizations. The Healthy Steps National Program Office staffs these LFN operations. Together with CWF, local foundations have contributed more than $37 million to the HS program since 1994. Most of the members of the LFN are funders of the original 24 HS sites.

2.3.B. Healthy Steps Curriculum Development and Training Institutes

At the Boston University School of Medicine, an interdisciplinary pediatric team led by Barry Zuckerman, M.D., Steven Parker, M.D., and Margot Kaplan-Sanoff, Ed.D. was selected to work with field staff to define the HS approach, to develop the curriculum, to train medical teams across the country in the HS approach, and to create materials for HS participants. In the summer of 1996, the first collection—a draft of the materials that guided pediatric clinicians in the HS approach for infants—was released. The completed manual, *Strategies for Change: Child Development in Primary Care for Young Children*, was available in 1999.

The materials were designed to help physicians individualize the care of each child, with the focus on the whole child and the whole family, and to help clinicians and families build a relationship that would get young children off to a good start. The materials

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Houston Endowment; Howard Heinz Endowment; Humana Health Care Plans; Independent Physicians Association; James E. and Diane W. Burke Foundation Inc. ; Jewish Healthcare Foundation; The John A. Hartford Foundation; John D. & Catherine T. MacArthur Foundation; Kaiser Foundation Health Plan; Kaiser Foundation Health Plan of Colorado; Kaiser Foundation Research Institute; Kansas Health Foundation; Lori and Peter Gevalt; Lumberton Children's Clinic; Medicaid Administrative Claiming Fund (IA); Medicaid Administrative Matching Fund (NC); MedImmune; Memorial Hospital System; Merck Vaccines; Michael Reese Health Trust; The Nathan Cummings Foundation; The Nesholm Foundation; Parents as Teachers; Partners HealthCare System; Inc.; Pasteur Merieux Connaught USA; The Pendleton Foundation; Peninsula Community Foundation; Piton Foundation; Polly Ryon Memorial Hospital; Prime Health Foundation; Prince Charitable Trusts; Robert McCormick Tribune Fund; The Robert Wood Johnson Foundation; Robeson County Smart Start Board; Rockwell Fund; Inc.; Rose Community Foundation; Ross Labs; Ryan Memorial Foundation; San Antonio Metropolitan Health Department; Self Family Foundation; The Skillman Foundation; Swalm Foundation; Temple Hoyne Buell Foundation; Texas Children's Hospital; Texas Tobacco Settlement Revenues; Thomas C. Barry; United Way of the Texas Gulf Coast; The University of Iowa Hospitals & Clinics; University of North Carolina Hospitals; University of North Carolina Chapel Hill Department of Pediatrics; W.P. and H.B. White Foundation; The Walt Disney Company; Washington Square Health Foundation; William T. Grant Foundation; William Randolph Hearst Foundation; The Wilson Foundation.

document child-rearing needs from birth to three years, integrating medical care with behavioral and psychological information in the context of an expanded focus on normal growth and development. They also address such issues as child safety in the home, breast-feeding, smoking, and maternal depression. The HS methods described in *Strategies for Change* include using "teachable moments"—opportunities when the practice team can share information that will increase parents' understanding about their young child and about their roles as mothers and fathers. The issue of maternal depression is addressed by helping clinicians both recognize depression and encourage its treatment (Kaplan-Sanoff et al., 1999). The Boston University team also created parent materials, including Linkletters, Parent Prompt Sheets, Parent Handouts, and the Child Health and Development Record. All were made available in both English and Spanish and were categorized by target ages.

2.3.C. National Program Office Site Selection and Implementation

Healthy Steps site selection and implementation followed in correspondence with the HS material development and training sessions. The first efforts to engage local funders and health care providers to institute the HS approach at local sites garnered much interest. Interested sites submitted letters of intent and received materials to assist in their planning. By the summer of 1996, 26 letters of intent had been received from local initiative applicants, of which 18 had submitted planning documents. Becoming a HS evaluation site required strong interest by the lead pediatrician and a commitment of three years from the practice and the local funder. In the spring and summer of 1996, site visits were conducted to select 15 sites for the national evaluation. Sites were required to have a client base of 200 or more newborns within a 6-9 month period, the support of senior leadership at the site, and either the potential to support random assignment or the ability to assist in the development of a comparison site. Other sites that initiated the HS program became HS affiliate sites, which implemented the HS program components, but did not include a comparison group for evaluation.

2.3.D. The Healthy Steps Evaluation

After a competitive request for proposals, an interdisciplinary team from the Johns Hopkins Bloomberg School of Public Health, headed by Bernard Guyer, M.D., M.P.H., was selected to undertake a formal evaluation. The evaluation phase, which ended in late 2001, included multiple measures of the HS program. The evaluation was charged with tracking the process, outcomes, cost-effectiveness, and sustainability of HS.

The evaluation team participated in site visits to prepare and train personnel for carrying out the evaluation and to maintain quality assurance for the evaluation. Discussions with the sites demonstrated the importance of involving the evaluation team in all aspects of selection and implementation. Thus, during the first year of implementation, the evaluation team carried out a formative evaluation of the Allentown, Pennsylvania pilot site. The objectives included the following: establishment of a process monitoring system; interviews with HS families and focus groups with providers, staff, and parents that confirmed the HS model of care; surveys of provider staff that led to provision of additional onsite training; and key informant interviews that led to increased technical assistance through program manuals, monitoring calls and visits, and expanded training sessions.

Members of the Johns Hopkins University evaluation team also participated in reviewing planning documents and making recommendations about site participation in the affiliate network. Healthy Steps affiliate sites were also interested in evaluating the program at their sites; this interest generated an evaluation of six of the original nine affiliate sites that differed most significantly from the national evaluation in that there were no control (comparison) families included in the evaluation. Evaluation goals, objectives, methods, and results are covered in subsequent sections of this report.

HEALTHY STEPS℠

3. The Healthy Steps Program

The Healthy Steps Program

The Healthy Steps program was designed to enhance the ability of pediatric practices to serve families with young children. With the support and leadership of The Commonwealth Fund and many cooperating local foundations, the Healthy Steps demonstration program served more than 4,000 families with newborn children in 24 sites across the country. *[Fifteen of these sites were part of the national evaluation, which is described in this report.]* More than 125 clinicians, including residents and nurse practitioners, were involved in the initiative.

The key feature of the Healthy Steps program was the Healthy Steps Specialist. Healthy Steps Specialists were professionals with training in early childhood development, nursing, or social work. Each site had two Specialists, very often with complementary professional backgrounds. During the 3-year intervention, each Healthy Steps Specialist had a caseload of approximately 100 families.

The charge to the Healthy Steps Specialist and the sites was to provide a mix of services for families that had not previously been offered by the practice, or had not been offered in such intensity. The Healthy Steps program comprised seven major elements:

> **Enhanced well child care:** Well child office appointments, conducted jointly or sequentially by a pediatrician, family physician, or nurse practitioner, and a Healthy Steps Specialist, were designed to answer parents' questions about child development; to identify and respond to "teachable moments;" and to encourage early reading activities as part of the Reach Out and Read Program.
>
> **Home visits by Healthy Steps Specialists:** Home visits were timed to reach parents and their children at key developmental junctures over the first three years of the children's lives.
>
> **Child development telephone information line**: Healthy Steps Specialists at each site staffed a telephone line to answer parents' questions about day-to-day worries and developmental concerns.
>
> **Child development and family health check-ups:** Check-ups with developmental assessments were conducted to detect signs of developmental or behavioral problems and to identify family health risks.
>
> **Written materials for parents that emphasized prevention and health promotion**: Parents received materials prior to and during office visits that addressed medical, developmental, and practical topics. Parents also received a Child Health and Development Record that chronicled immunizations, physical growth, developmental milestones, and parental concerns through age 18.
>
> **Parent groups**: Meetings were facilitated by the Healthy Steps Specialists to offer social support as well as opportunities for interactive learning opportunities.
>
> **Linkages to community resources**: The Healthy Steps Specialists at each site compiled a book listing community resources. At some sites, Specialists developed a bulletin board in the practice that displayed a variety of information pertinent to child development and community resources.

Two additional features stand out as basic to the approach of Healthy Steps: an emphasis on relationships between staff and families and on teamwork among staff members.

3. THE HEALTHY STEPS PROGRAM

3.1. Introduction

The Healthy Steps (HS) program was designed to enhance the ability of pediatric practices to serve families with young children. Through the program, practices were to help parents increase their understanding of all aspects of their children's development and to improve their comfort and competence in parenting. The HS program was based on the recognition that:

- Infancy is a period of extraordinarily rapid development.
- Infancy is often a highly stressful period for parents.
- Infancy is a time when parents are likely to be particularly open to new ideas.
- Pediatric practices are the institutions that are likely to see families of young children first, and often most frequently, during the earliest years of a child's life.[3.1]

The philosophy of HS is well summarized by the statement that: "The best way of helping children is to help their parents, and the best way of reaching parents is through their children" (Parker and Zuckerman, 1998).

With the support and leadership of The Commonwealth Fund (CWF) and many cooperating local foundations, the HS demonstration program served more than 4,000 families with newborn children in 24 sites across the country. *[Fifteen of these sites were part of the National Evaluation, which is described in this report.]* More than 125 clinicians, including residents and nurse practitioners, were involved in the initiative.

Children were entered into the program by their parents either in the hospital at the time of birth or during their first visit to the practice. Unless their parents moved away, withdrew from the practice, or withdrew from the HS program, children remained in the program until age three years.

[3.1] Guidelines of the American Academy of Pediatrics recommend that there be ten well-child visits in the first three years of life (American Academy of Pediatrics, 1997).

3.2. The Healthy Steps Program

3.2.A. The Healthy Steps Specialist

The key feature of the HS program was the HS Specialist. These specialists became new partners in the delivery of pediatric care. HS Specialists were professionals with training in early childhood development, nursing, or social work. Each site had two Healthy Steps Specialists, very often with complementary professional backgrounds. Each HS Specialist had a caseload of approximately 100 families.

3.2.B. Seven Basic Elements of Healthy Steps

The charge to the HS Specialist and the sites was to provide a mix of services for families that had not previously been offered by the practice, or not offered in such intensity. There were seven major elements to the program.

3.2.B.1. Enhanced Well Child Care: Joint or Linked (sequential) Office Visits

The HS Specialist met with the family at the office either at the same time as the pediatric clinician (joint visit) or immediately before or after (linked visit). The HS Specialist discussed with families their questions and concerns about their child's behavior and development. If they met before the clinician's visit, the HS Specialist discussed what parents might wish most to ask the doctor and prepared them to ask it. The HS Specialist also provided anticipatory guidance—looking at what might be occurring next in the child's development and how that might best be handled. The HS Specialist reviewed questions of safety. Specialists looked for "teachable moments," in which reactions to the child's behavior in the office could be modeled for the parents and discussed with them. The importance of books, even for

The HS Specialists

The HS Specialists employed at the 15 national evaluation sites ranged in age from 25 to 55 years. Sixteen (44.4%) were registered nurses, of whom half (8) were pediatric nurse practitioners. Twenty-four (66.7%) had Masters degrees and 9 (25.0%) Bachelors degrees. All but one were female.

The HS Specialists brought to their new positions a variety of experience and training in social work, early childhood education, child development and psychology. Almost all had prior work experience or formal course work in child development (97%), child growth (97%), psychology (97%), and family relationships (94%). The majority had experience in crisis intervention (89%), case management (86%), maternal and child health (83%) social work (81%), and home visiting (58%). Almost 70% had prior experience and/or training in physical assessment and 50% in diagnosis and treatment. Although 92% were familiar with developmental assessments when they began their jobs, most had little experience with the specific assessments used in the program. The majority saw their new role as an opportunity to make a contribution to pediatric practice, to help families, and to learn new skills.

Source: Thirty-six HS Specialists representing all of the national evaluation sites completed a short questionnaire at the beginning of the evaluation or their employment.

BUILDING RELATIONSHIPS

"In a Healthy Steps practice, well-child visits follow the American Academy of Pediatrics (AAP) guidelines for scheduled visits and immunizations. Each visit is likely to offer several "teachable moments," when pediatric clinicians and HS Specialists can draw on their observation of the child and the parents' natural interest in their baby's health and development to communicate information effectively about behavior, temperament, and "goodness of fit." In the process, clinicians and HS Specialists can also strengthen the crucial relationship between themselves and mothers and fathers."

Source: Kaplan-Sanoff M, Zuckerman B, Parker S, Bernard, A, Magee T, Lawrence P, Ed. Levine TK, *Healthy Steps Strategies for Change, Child Development in Primary Care for Young children*, Department of Pediatrics, Boston University School of Medicine, Boston, MA, 1999, p 1-9.

babies, and the development of early literacy skills were discussed with families. [In fact, starting at the 6-month visit, each child received a book from the clinician at each office visit, as part of the *Reach Out and Read Program.*] The HS Specialist also asked about stresses the family might be experiencing, including parental conflict, maternal depression, smoking, and substance abuse. Specialists gave parents printed handouts on particularly relevant subjects.

3.2.B.2. Home Visits

Within the three years of the program HS Specialists were expected to offer a minimum of six home visits to the 100 families in their caseloads. One home visit was to occur within the first few weeks after birth, with the expectation that the HS Specialist might encourage continued breastfeeding and give support as patterns of care were being first established. Another home visit was to be at about nine months, as the child was becoming mobile. Safety hazards in and around the house were the focus of this visit. As part of home visits, HS Specialists usually left a relevant handout for parents to read at their convenience. Home visits were scheduled at the mutual convenience of HS Specialist and family and continued throughout the toddler period. As with all other aspects of the program, families were free to decline home visits—either one by one or altogether.

3.2.B.3. The Child Development Telephone Information Line

Healthy Steps Specialists at each site had a dedicated telephone line for communication with families. The HS Specialist might call to see how things were going or to remind a mother of an upcoming office visit. HS Specialists often received parental requests for advice or assistance, typically handling questions on subjects such as crying, sleep problems, discipline, and family disagreements about discipline. With some families, HS Specialists fielded calls on subjects such as financial difficulties and marital problems. Families could call as often or as infrequently as they chose. All families were promised a response to their phone calls within 24 hours. In taking phone calls, an important part of the task of the HS Specialist was to triage phone calls and to refer calls appropriately to the health professionals in the practice.

Seven Elements of Healthy Steps

Healthy Steps Specialist and a package of services, including:

Enhanced well child care: Well child office appointments were conducted jointly or sequentially by a pediatrician, family physician, or nurse practitioner, and a Healthy Steps (HS) Specialist. These visits were designed to answer parents' questions about child development; to identify and respond to "teachable moments;" and to encourage early reading activities as part of the *Reach Out and Read Program.*

Home visits by HS Specialists: Home visits were timed to reach parents and their children at key developmental junctures over the first three years of the children's lives.

Child development telephone information line: Telephone lines at each site were staffed by HS Specialists to answer parents' questions about day-to-day worries and developmental concerns.

Child development and family health check-ups: Check-ups with developmental assessments were conducted to detect signs of developmental or behavioral problems, and to identify family health risks.

Written materials for parents that emphasized prevention and health promotion: Parents received materials prior to and during office visits that addressed medical, developmental, and practical topics. They also received a Child Health and Development Record that chronicled immunizations, physical growth, developmental milestones, and parental concerns through age 18.

Parent groups: Meetings were facilitated by the HS Specialists to offer social support as well as interactive learning opportunities.

Linkages to community resources: The HS Specialists compiled a book listing community resources, and developed a bulletin board in the practice that displayed an assortment of resource information.

Source: The Commonwealth Fund: *The Healthy Steps for Young Children Program* Brochure, 1999.

3.2.B.4. Child Development and Family Health Check-Ups

Each HS Specialist periodically administered standardized developmental assessment tools, to check on each child's development and discuss it with the child's parent. Sometimes these more formal check-ups on development were administered at an office visit; sometimes they were administered at home. At the earliest visit, the HS Specialist used parts of the Brazelton Neonatal Assessment instrument to assess the child and begin to provide the family with information about their child's responses and capabilities. The Denver Developmental Screening Test (DDST) was used on a periodic basis. The MacArthur Communicative Development Inventory was typically used as language began to emerge.

3.2.B.5. Written Materials for Parents that Emphasize Prevention

Written materials were developed specifically for HS with the goals of informing mothers and fathers about their child's development and also involving them more in their child's care. Age-appropriate newsletters, called *Linkletter*s, were mailed to the family before each scheduled well child appointment. These contained information likely to come up at the visit. Age-appropriate *Parent Prompt Sheets*, given to parents at check-in for well child visits, suggested questions to ask the pediatric team. A *Child Health and Development Record* provided to parents at the beginning of the program, could be used to record the child's growth and development, immunizations, and illnesses. The booklet also contained information on developmental milestones and safety. Other handouts also were developed and distributed that provided information on developmental and behavioral topics as well as medical and more practical issues. These handouts facilitated parent involvement during well-child visits (Kaplan-Sanoff M, 2001).

3.2.B.6. Parent Groups

Group discussions for participants in the program were offered by the HS Specialists. Specialists facilitated discussions with interested parents about issues that many of them seemed to be facing or were about to face. Parents had the opportunity to share ideas and reactions with each other and to feel the support of others who were going through similar experiences.

3.2.B.7. Links to community resources

Healthy Steps Specialists compiled information about services available in the community for their participants. These might be more intensive services than the HS Specialist could provide, such as a smoking cessation program or mental health services. Information on quality childcare centers or early intervention services might also be included. This information was available in written form but also through discussion between parent and HS Specialists.

3.3. Features Basic to Healthy Steps

Two additional features stand out as basic to the approach of HS: an emphasis on relationships between staff and families and an emphasis on teamwork among staff members. These aspects were emphasized in almost all materials about the program. They were also emphasized in the hiring and training of personnel for the program, in technical assistance to the sites during the program, and in what staff and families said about the program.

3.3.A. Relationships Between Staff and Families

It was envisioned that physicians would themselves be open to a broader range of discussion with families than had previously been the case. Nevertheless, the majority of relationship-building became the responsibility of the HS Specialists. HS Specialists knew from the outset that they were to allow families the luxury of time in talking with them. They understood that they were to be approachable and available to participants. They were to be respectful in all aspects of their manner in dealing with participants. They also were to be highly flexible in meeting the needs of participants. These, taken together, were to be used to develop a sense of rapport—or at least greater understanding—with the families they served. They understood they would be likely to have many more contacts with some families than with others, depending on the wishes and needs of each family. Healthy Steps Specialists also were trained to explore some of the more sensitive issues of parenting, such as how a mother herself was parented.

3.3.B. Teamwork Among Staff Members

Healthy Steps put staff members in an organizational framework with each other that was less hierarchical and more cooperative than most current models of pediatric practice. Like all new projects, it was expected to require careful planning among members of the practice staff. It was also designed to create operational approaches that allowed for candor, flexibility, and mutual respect among team members.

3.4. Healthy Steps Program Protocols

A set of written protocols and guidelines, observed by the 15 sites enrolled in the national evaluation and monitored by the Healthy Steps National Program Office (NPO), described the HS Specialists' role and key elements of the program. Consistency in the way the program was delivered across the 15 sites was promoted by the specificity of these protocols, program materials provided to each practice, and the uniform training of the practices in the program components and philosophy.

3.5. Training

Ongoing training was an essential part of the HS program. Key personnel from each site participated in three annual Healthy Steps Training Institutes in Boston, Massachusetts. As outlined in the Healthy Steps Program Progress Review,[3.2] the four goals of training were:

1. To translate new knowledge in child development, parenting and women's health and practical clinical strategies for clinicians.

2. To emphasize the importance of relationships between parent and child, and parent and professional.

3. To create multi-disciplinary teams of pediatric clinicians and HS Specialists.

4. To help participants transform their pediatric practices into HS practices.

Training institutes were conducted by a multidisciplinary team and were based on principles of adult learning that include case-based problem solving and other interactive strategies. Participants brought cases from their daily practices to supplement cases and video vignettes presented by the trainers. Further, each participant received a training manual that

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[3.2] Healthy Steps Training Overview in Healthy Steps Program Progress Review, April 18, 1997, page 2.

Healthy Steps Program Protocols

OBJECTIVE	EXPECTED OUTCOMES (EXAMPLES)
Healthy Steps Specialist	
▪ Deliver Healthy Steps services to families in a timely and coordinated manner. ▪ Provide child behavior and developmental information, guidance, and assessment to families, helping parents to develop confidence in their parenting abilities. ▪ Create a solid relationship between the family and the Healthy Steps team. ▪ Collect or ensure the collection of evaluation data. ▪ Coordinate the Healthy Steps activities of the entire Healthy Steps team.	▪ In-office meetings with families. ▪ Seamless hand-off between Healthy Steps Specialist and doctor/pediatric nurse practitioner of clinical/medical and behavioral/developmental matters. ▪ Home visits conducted as desired by parents. ▪ *Healthy Steps Child Health and Development Record* reviewed with parents and kept current. ▪ Handouts distributed to follow up on topics discussed during home and well-child visits. ▪ Responses provided to inquiries on the Healthy Steps Telephone Information Line. ▪ Attendance and participation of parents in parents' groups. ▪ Identification and discussion of issues arising from child and family assessment. ▪ Referrals made to community resources.
Enhanced Well Child Care Strategies	
▪ Create "teachable moments," when parents are most receptive to information concerning their child's development and behavior. ▪ Encourage positive maternal health behavior (e.g., linkages with obstetrical care, breastfeeding, referrals for maternal depression and smoking cessation). ▪ Strengthen the relationship between the family and the Healthy Steps practice. ▪ Promote early language development. ▪ Engage in problem solving jointly with parents. ▪ Promote and support the involvement of fathers in the care and nurturing of the child.	▪ Maintenance of age-appropriate immunization coverage. ▪ Identification and use of "teachable moments." ▪ Strengthened relationship between the family and the Healthy Steps practice. ▪ Better linkages between obstetrical care of mothers and pediatric care of infants. ▪ Longer durations of breastfeeding (relative to pre-Healthy Steps average of practice). ▪ Referrals for maternal depression and smoking cessation.
Home Visits	
▪ Build a supportive relationship between the Healthy Steps practice and the family. ▪ Enable the Healthy Steps Specialist to better understand how the child's home environment can help foster growth and development and use this information in working with parents. ▪ Provide information on child behavior and development, infant care, safety, and injury prevention within the context of the home environment. ▪ Conduct developmental assessments.	▪ Visits will be scheduled by the Healthy Steps Specialist and carried out. ▪ A positive, supportive relationship will evolve between the Healthy Steps Specialist/ practice and the family. ▪ Parents will feel comfortable requesting additional home visits, as needed. ▪ The Healthy Steps team will have more information about a child's home environment (e.g., safety, comfort, toys, etc.) so they can better advise parents on how to promote the child's health and development.
Telephone Line	
▪ Provide information to parents on issues of child development and behavior, thereby promoting parental confidence, strengthening the parent-child relationship, and decreasing parental stress, insecurity, and feelings of isolation. ▪ Strengthen the relationship between parents, the Healthy Steps Specialist, and the pediatric practice. ▪ Support doctors/pediatric nurse practitioners by providing information to parents and addressing their concerns about developmental and behavioral issues during "off-hours" when doctors/pediatric nurse practitioners are unavailable. ▪ Reinforce information that doctors/pediatric nurse practitioners share with parents on issues of normal child development and temperament.	▪ Parents will make use of the Healthy Steps Telephone Information Line when they have concerns about development, behavior, and parenting. ▪ Timely and useful information will be provided by the Healthy Step Specialist in response to calls, resulting in greater parental confidence and reduced stress. ▪ A stronger relationship will be forged between parents and the Healthy Steps Specialist and by extension, between parents and the practice. ▪ Medical calls will be successfully triaged to the medical information/emergency advice line.

Healthy Steps Program Protocols

OBJECTIVE	EXPECTED OUTCOMES (EXAMPLES)
Developmental Assessments	
▪ Identify the strengths and concerns of the child and family. ▪ Enhance parents' understanding of their child's development through feedback requested by parents and in other "teachable moments." ▪ Monitor child's healthy growth and development. ▪ Promote "goodness of fit" between child's behavior and parental expectations. ▪ Engage in collaborative problem solving with parents to determine how best to address developmental issues. ▪ Make necessary referrals to community resources. ▪ Build a supportive alliance with the family.	▪ Parents will be well informed of expected behaviors and developmental milestones. ▪ Healthy Steps team can better advise parents on how to promote their child's health and development. ▪ Referrals will be made to appropriate community resources on a timely basis.
Child Health and Development Record	
▪ Record the child's health and developmental information. ▪ Increase parents' knowledge of their child's health, growth, and development. ▪ Serve as an interactive vehicle for communication between the parents and the Healthy Steps team. ▪ Strengthen the relationship between the family and the Healthy Steps team.	▪ Parents will come to well-child visits with prepared questions. ▪ Parents will show greater understanding and awareness of their child's health, growth, and development.
Handouts	
▪ Provide information in a concise and comprehensive manner on a variety of medical, developmental, and practical topics. ▪ Increase parents' knowledge of the topics covered in the handouts. ▪ Provide informational resource that Healthy Steps Specialists can refer to when they take calls on the Healthy Steps Telephone Information Line.	▪ Parents will request handout on specific topic. ▪ Parents will ask the Healthy Steps team questions related to information in the handouts. ▪ Parents will request new handouts addressing other topics.
Parent Groups	
▪ More efficiently provide general information to parents and enhance parent learning through group discussions and question/answer sessions. ▪ Create opportunities for parents in the Healthy Steps practice to develop an informal peer support system. ▪ Expose parents to different styles of parenting and interpretations or applications of child development information as they establish their own approach to child rearing.	▪ A minimum of one group session or seminar will be held each month. ▪ Parents will suggest topics and participate in the groups. ▪ Parents will meet peers and informal parent support networks will emerge. ▪ Practices will find this is an efficient way to provide information. ▪ Practices will find that this increases parent satisfaction with the services they offer.
Linking with Community Resources	
▪ Promote the exchange of information among Healthy Steps families in the practice. ▪ Provide families with easy access to available information on the practice and community resources related to family health and child development. ▪ Encourage families to seek assistance, if needed, by providing information on referral and treatment programs.	▪ Information on the practice, childcare issues, and community resources will be readily available to parents. ▪ Parents will avail themselves of resources described above. ▪ Parents will have greater knowledge of community resources. ▪ The Healthy Steps Specialist will make appropriate referrals to community resources.

described the program in detail and reviewed, reinforced and supplemented information presented in the training sessions.

Each training institute typically included a cohort of three to five sites, with two physicians, two HS Specialists, and a practice administrator from each site. The training institutes covered many topics not usually included in the education of pediatric health care providers. These included early brain development, breast-feeding, newborn and child development assessment, maternal depression, promoting early learning and reading, family health behaviors, and systems change within pediatric settings. During the second and third years, three-day training institutes centered on team processes, as well as on content pertaining to toddler and preschool development and clinical problems.

In principle, upon completing the initial training institute and returning to their sites, lead physicians were expected to provide an orientation to HS for all practice staff. In reality, this "train-the-trainer" approach did not work as expected. Additional opportunities were created to increase the number of site staff attending the second and third year training institutes.

Following the initial training, HS Specialists participated in biweekly technical assistance teleconference sessions with key Boston University School of Medicine (BU) training staff (Zuckerman et al., 1997). These teleconferences provided a forum for answering questions, reinforcing training, and "troubleshooting" implementation issues. These continued throughout the program but their frequency decreased over time and their focus changed somewhat to topics of interest to the HS Specialists. During the second year, calls focused less on implementation and more on clinical concerns.

3.6. National Program Office Support

Support from the NPO complemented the training institutes and technical assistance calls. Initial visits made by key national program staff and evaluators to prospective HS sites offered the opportunity to introduce implementation issues at a very early stage in the site's planning, to anticipate potential barriers to implementation at the sites, and to take steps to resolve them. Topics that became part of routine discussions at these visits included implementation issues such as the need for integration of new staff into the practice and the extent of organizational change required.

In addition to the training manuals and HS program materials, the NPO created a set of HS program manuals and other written materials to guide sites in the practical operational and financial aspects of implementing HS. The manuals made recommendations for orienting the HS Specialist to the practice and infrastructure needs to help sites plan more effectively. They included the contact information for individuals designated from the national program and evaluation staff to address specific implementation and evaluation issues. To help sites make more information available to families enrolling in HS, the manuals included prototypes for a press release and fact sheet for the HS local initiative.

3.7. Program Monitoring

From the outset, program operations of the HS sites were monitored by the NPO, which took advantage of interactions between the sites and BU training and technical assistance team and, when appropriate given data confidentiality issues, the Johns Hopkins University (JHU) evaluation team. Monitoring by the NPO was both formal and informal. The collection of information by the BU and JHU teams was both formal and incidental to their contacts with sites as part of their training and evaluation responsibilities. These various sources of monitoring information are described below.

3.7.A. Site Visits

The primary source of monitoring information came from site visits developed, scheduled, led, and summarized by the NPO with participation by a representative from the BU team, CWF, and sometimes by members of the National Advisory Committee. There were two site visits held with each HS operating site. The first, referred to as the Monitoring Site Visit, was typically conducted at each HS site between six and nine months after start-up of operations. The second site visit, referred to as the Sustainability Site Visit, typically took place at each site at approximately 18 months after start-up.

3.7.A.1. First Site Visit (Monitoring Site Visit)

The purpose of the Monitoring Site Visit was to determine the extent to which HS was being implemented; to receive information on the usefulness of the HS training and materials; to assess the impact of HS on pediatric practice; to obtain information on the use of the HS Information and Communication System; to confirm and update data on enrollment; to discuss budget issues, including adequacy of the current budget and funding base for the post-evaluation period; and to discuss formation of a local advisory committee.

After each site visit, the National Program Director prepared an overview report. After review by the other site visitors, a final report was prepared. Each site visitor completed an "Assessment of Quality of Implementation at Sites" form. The Program Director prepared a formal letter to site personnel summarizing the views of the site visitors with regard to the general performance of the site and the actions to be taken by the site, BU, JHU, and/or the NPO.

3.7.A.2. Second Site Visit (Sustainability Site Visit)

The general format for the second site visit was quite similar to that of the Monitoring Site Visit except for one major change: the site was actively involved in the development of the agenda. A letter was sent to the site several months prior to the scheduled site visit, initiating a discussion of the site visit planning process and requesting that the site complete a Self-Reporting Form. The Self-Reporting Form was submitted to the NPO and circulated to the site visitors prior to the visit. Based on knowledge of the site and information in the Self-Reporting Form, a final agenda was developed for the site visit.

The general format for the visit included: a relatively brief review of program implementation; discussion of clinical issues; the extension program if the site had one;[3.3] and sustainability. The discussion of sustainability was intended to take up much of the site visit. The format of the site rating, site visit report, and feedback to site and funder personnel were essentially identical to the formats used for the monitoring site visit.

3.7.B. Healthy Steps Monitoring Checklist

The NPO combined information from the site visits, BU technical assistance telephone call summaries (see below), and all other contacts with sites to develop a "Healthy Steps Monitoring Checklist." This checklist was modified from time to time and used to inform The Commonwealth Fund about HS site operations.

[3.3] Healthy Steps permitted sites that wished to do so to extend program services to newborns and their families during the period of the evaluation. These families, referred to as "extension families," did not take part in the evaluation.

3.7.C. Formal Telephone Calls with Sites

During the period when the monitoring checklist was being completed, formal and informal telephone calls were held with sites to collect relevant information. In addition, from time to time the Program Director or another NPO staff member would call sites to talk about a particular subject and obtain information. Finally, during the summer of 2001, the NPO began making regular calls to all HS sites (both original and new) using a standardized form.

3.7.D. Visits to Sites

In addition to the scheduled site visits described above, from time to time the Program Director would make a visit to a site to deal with a particular issue that may have arisen such as the sale of a medical practice or personnel problems within a site, or to make a presentation at a site Local Advisory Committee meeting.

3.7.E. Summaries of Technical Assistance Calls

BU facilitated regular technical assistance telephone calls with groups of sites. A member of the NPO staff typically listened in on these calls, prepared a summary of the content of the calls, and circulated them to the National Program and Evaluation Team.

3.8. Summary

Integral to the HS program were the training, materials, support and monitoring that sites received from BU and/or the NPO throughout the project. Monitoring information provided the NPO with an ability to combine information from multiple viewpoints and multiple parties over time. The provision of monitoring, training, materials and support facilitated implementation, problem solving, and adherence to the HS protocols.

HEALTHY STEPS℠

4. The National Evaluation

The National Evaluation

The national evaluation assessed whether adding specialists in child development and a package of enhanced services to standard pediatric care produced positive changes in mothers' knowledge, beliefs, and psychological health; their engagement in activities with their child that promote health, learning, and development; and their satisfaction with their child's pediatric care. It also assessed program costs per child and the program's potential for sustainability.

The evaluation studied a cohort of children from birth to age three at 15 evaluation sites located throughout the US. The sites represent multiple types of pediatric practice settings (health maintenance organizations, hospital-based clinics, and group practices). At six sites, children were randomized to the intervention or control group. At nine sites, a comparison location was selected.

5,565 children were enrolled in the evaluation, 2,963 (53.2%) children in the intervention group and 2,602 (46.8%) in the control group. The study population was demographically and economically diverse.

To make early home visiting possible and mirror the way families enter pediatric care, enrollment was limited to newborns. The evaluation protocol specified that the newborn be less than 4 weeks of age at the time of enrollment (from birth to 28 days of life, inclusive) and a patient at the Healthy Steps site.

Almost all newborns were eligible. Children were excluded only if: 1) their parents expected to move from the area or change their site of care within six months after birth; 2) their mothers (or fathers if they were the custodial parents) did not speak English or Spanish fluently; 3) they were to be adopted or placed in foster care; or 4) they were too ill to make an office visit within the first 28 days of life. Enrollment began in September 1996 and ended in November 1998. The last child in the evaluation cohort reached three years of age in November 2001.

At specified points in the evaluation, sites and families provided data for the evaluation. Data from evaluation sites included key informant interviews and self-administered questionnaires completed by clinicians and practice staff at baseline and 30 months after start-up, contact logs maintained by the Healthy Steps Specialists, and data on program costs. Data from families included two hour-long telephone interviews completed by the mother (or primary caregiver), the first when her child was 2-4 months of age and the second, 30-33 months of age. In addition, data on visits and vaccinations were abstracted from the children's medical records.

Analyses were conducted to describe program implementation, to estimate the impact of Healthy Steps on the attitudes and practices of clinicians and practice staff at the sites, and to obtain an overall estimate of program effects on parent and child outcomes. Effects for Healthy Steps families were assessed both for families as a whole and for subgroups of families. In both cases, the evaluation relied on an intention to treat approach, in which intervention and control groups were compared without regard to the intensity of services delivered at an individual level. The results reflect the overall effect of the Healthy Steps program if it were adopted in the community.

4. THE NATIONAL EVALUATION

4.1. Introduction

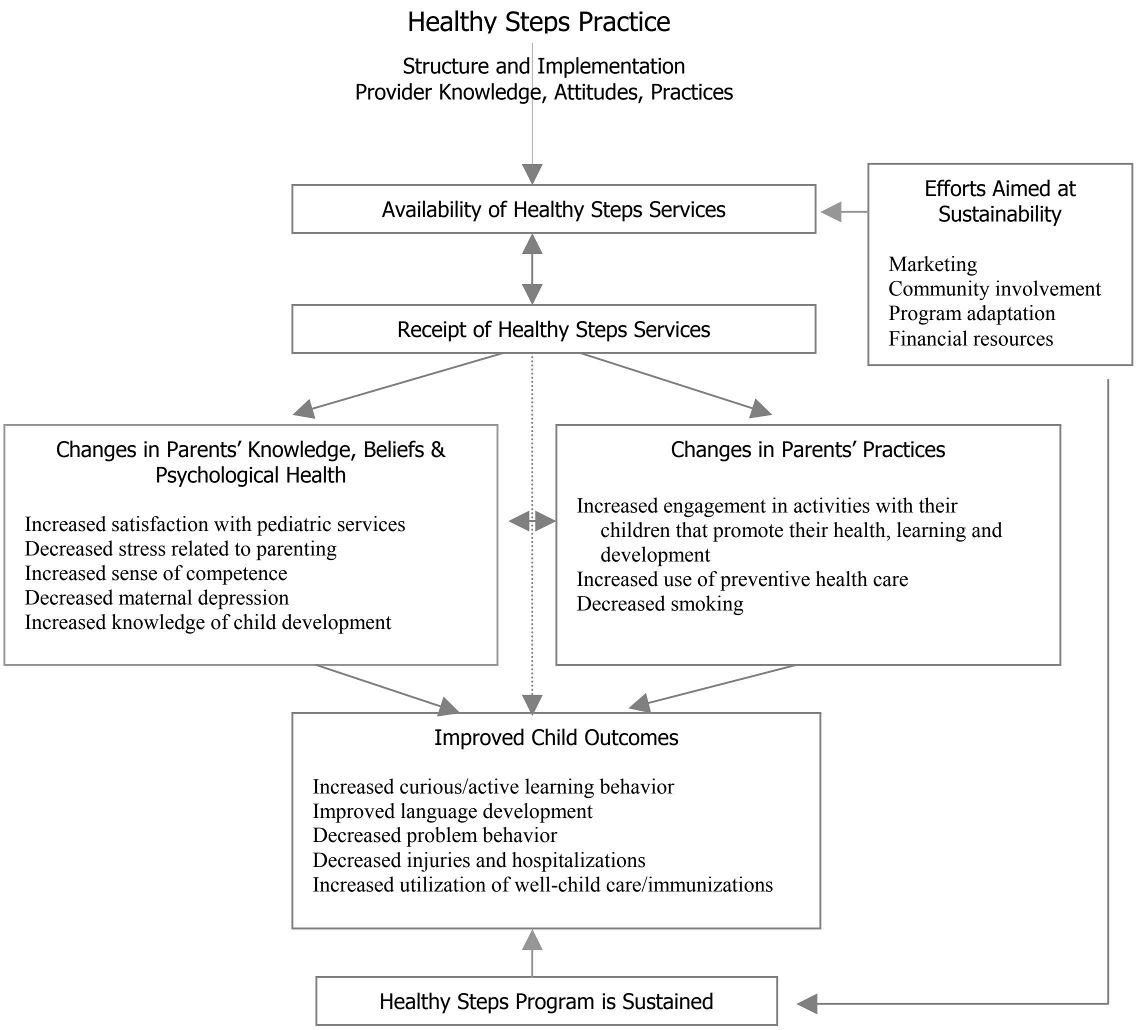
The evaluation of the Healthy Steps (HS) program was complex because the program had multiple objectives, components, and expectations. Program leaders wanted to know not only if the program worked but how and why it succeeded. They were interested in the degree to which HS was implemented by participating practices as well as the extent to which the findings from this demonstration project and its evaluation could influence future directions of pediatric practice. The evaluation design attempted to address all of these considerations. This section provides a detailed description of the conceptual framework that guided analyses of outcomes; the evaluation objectives, goals, and assumptions; and the evaluation design, including samples, data sources, variable development, and analysis methods.

4.2. Conceptual Framework

The fundamental premise of the HS program was that improving the behavioral and developmental services that the pediatric practice offers to infants, toddlers, and their parents would promote the children's health and development. Parents' interactions with their child's pediatric practice, particularly with the HS Specialist, would increase their sense of competence as parents, improve their understanding of their child's development, and produce other positive changes that would help them meet the changing developmental needs of their children. In addition to improving child outcomes *indirectly*, the HS program could affect the child *directly* if, for example, through a home visit, the HS Specialist identified a child's need and made a referral for particular community based services. The conceptual framework **(Figure 4.1)** demonstrates the hypothesized relationships between the HS program, parental beliefs and practices, and child outcomes.

Figure 4.1. Conceptual Model for Evaluation of the Healthy Steps Program

HEALTHY STEPS



4.3. Evaluation Goals and Objectives

The evaluation had one principal purpose: to assess whether the HS program met its stated goals. Accordingly, the evaluation sought to determine the degree to which the HS program succeeded in enhancing pediatric practice, thereby increasing parents' knowledge about early nurturing of infants, involving parents more in their children's development, and promoting practices that in turn, improved the health, safety and health care utilization of their children. To achieve this broad goal, the evaluation posed the eight specific questions described below.

Evaluation Questions	
1	How did providers and local foundations implement the Healthy Steps program in their sites? What were the factors that facilitated or impeded implementation?
2	To what degree did the Healthy Steps program affect providers' knowledge, attitudes and practices related to the content of pediatric care and the Healthy Steps components?
3	To what degree did children and families at Healthy Steps sites receive Healthy Steps services?
4	To what extent did the Healthy Steps program affect parents' knowledge, beliefs and practices regarding their understanding of early child development and parenting?
5	To what degree did the Healthy Steps program affect parents' utilization of health care services, adoption of health and safety promotion practices, and satisfaction with pediatric care for their young children?
6	To what degree did the Healthy Steps program affect children's health and development?
7	How much did the Healthy Steps program cost and to what degree was it cost-effective?
8	What is the potential for replication and institutionalization of Healthy Steps in general pediatric care?

Question 1: How did providers and local foundations implement the Healthy Steps program at their sites and what were the factors that facilitated or impeded implementation?

The evaluation documented the process of implementing HS, including the characteristics of the population served at each site, the services provided, the institutions and providers involved, and the broader political and financial environments of the participating sites. The evaluation identified modifications of the HS program as a whole that were made in the early stages of implementation. Also assessed were the extent to which the program was implemented as designed at each site and if modifications were made at individual sites, the reasons for doing so.

Question 2: To what degree did the Healthy Steps program affect providers' knowledge, attitudes and practices related to the content of pediatric care and the Healthy Steps components?

The evaluation assessed whether the knowledge, beliefs and practices of clinicians and practice staff with regard to the HS model of pediatric care were changed as a result of their participation in the program.

Question 3: To what degree did children and families at Healthy Steps program sites receive Healthy Steps services?

The evaluation documented the extent and intensity with which the HS components were delivered to children and families, as reported by both the HS Specialists and mothers.

Question 4: To what extent did the Healthy Steps program affect parents' knowledge, beliefs and practices regarding their understanding of early child development and parenting?

The evaluation included an analysis of the effects of the program on parents' knowledge, beliefs and practices that are likely to promote the health, growth, and development of their children.

Question 5: To what degree did the Healthy Steps program affect parents' utilization of health care services, adoption of health and safety promotion practices, and satisfaction with pediatric care for their young children?

The evaluation documented the extent to which families utilized the full range of health services available through their pediatrician, including the timeliness of well child care. The evaluation also assessed the extent to which parents sought services for their child, such as emergency department visits, that might have been avoided through adequate attention to prevention. In addition, a range of safety and health promotion practices, as well as the satisfaction of parents with the enhanced pediatric services provided, were examined.

Question 6: To what degree did the Healthy Steps program affect children's health and development?

The evaluation assessed the effectiveness of HS in enhancing children's health and development, the ultimate desired outcomes of the program. Among outcomes measured were immunization status, injuries, and language development.

Question 7: How much did the Healthy Steps program cost and to what degree was it cost-effective?

The evaluation assessed the costs of delivering the package of HS components and the benefits derived from it. Costs and benefits were measured from society's point of view. The cost and benefit information will be valuable to medical practices, payers, and purchasers who are interested in potential program costs and its benefits, the latter in both the near and longer term.

Question 8: What was the potential for replication and institutionalization of Healthy Steps in general pediatric care?

The evaluation design recognized specific questions related to continuation and growth of the program. These questions focused on: (1) the potential for replication of the HS model by other pediatric providers; (2) the potential for institutionalizing HS into pediatric services within the participating providers; and (3) the potential for integrating HS into pediatric services on a national basis. The evaluation addressed the potential for institutionalizing HS into pediatric services within the participating providers (question number two, above) and catalogued national level implementation supports.

4.4. Evaluation Design

The evaluation design relied on two kinds of comparison strategies in which six evaluation sites employed a randomized controlled trial, and nine sites, a quasi-experimental nonequivalent control group design. At the six randomization (RND) sites, newborns receiving services within the same practice were randomized at study enrollment into intervention and control groups. This strategy was restricted to sites that could provide adequate numbers of children for both groups, and for which procedures could be adopted to reduce the potential for spillover of program services to the control group. At the remaining nine quasi-experimental (QE) sites, a comparison location was selected in a comparable community. Families in the comparison group at randomization sites received all aspects of standard pediatric care within the practice, but not the services of the HS Specialists or the specific HS components.

4.4.A. Evaluation Assumptions

The evaluation design was based on the understanding that a complex intervention like the HS program would be delivered with somewhat different intensities and clinical styles to families with differing characteristics at the various participating sites. It was designed to test the intervention as delivered in "real world settings." Because of these constraints, a series of assumptions guided the evaluation design. The nine major assumptions were:

Evaluation Assumptions	
1	The HS Program comprised a defined core of components outlined in a set of protocols and guidelines.
2	Program monitoring was to be conducted independently of the evaluation.
3	Evaluation outcomes were to be conceptually linked to the Healthy Steps program goals, objectives, and content.
4	Healthy Steps components were to be offered to all families regardless of risk or need.
5	The Healthy Steps program could duplicate some services already offered by pediatric practices or community agencies.
6	Some program components could be adopted by comparison practices during the evaluation.
7	Evaluation sites were to represent the different patterns of organization (hospital-based pediatric clinics, health maintenance organizations, and group practices).
8	Standard evaluation and enrollment procedures were to be employed across sites.
9	The intention to treat principle was to be applied to the intervention population.

Assumption 1: The HS program comprised a defined core of components outlined in a set of protocols and guidelines

HS entailed a defined core of interventions based on written protocols and guidelines that were the same across the 15 sites. Variability in intervention content was minimized by the specificity of the protocols and by the uniform training of participating practices in the intervention components. Training manuals developed for the HS program were considered the "gold standard" for the definition of the intervention. This assumption about the standardization of the intervention was not intended to make the intervention package uniform for every family. Rather, the program design provided for adapting the elements of the package to the needs of the individual families.

Assumption 2: Program monitoring was to be conducted independently of the evaluation.

Implementation of the HS program at the sites was periodically monitored by the National Program Office (NPO) with support from The Commonwealth Fund (CWF) and Boston University School of Medicine (BU). Monitoring included two site visits over the course of the project as well as ongoing technical assistance and advice to the programs. To maintain objectivity, evaluators did not provide feedback or support to the sites concerning program implementation.

Assumption 3: Evaluation outcomes were to be conceptually linked to HS program goals, objectives, and content.

The evaluation focused on parameters that the HS program was most likely to affect. Through its emphasis on parent education and child development, it was anticipated that HS would affect parents' knowledge, beliefs and practices and, in turn, the development and behavior of children. Secondary effects, such as more age-appropriate utilization of health services and more timely receipt of services such as immunizations, also were seen as possible results of the improved tracking of families receiving HS services. Other possible secondary effects resulting from improved parent education regarding preventive health strategies included reductions in injuries, emergency department trauma visits, and preventable hospitalizations.

Assumption 4: Healthy Steps program components were to be offered to all families regardless of risk or need.

The program was intended to be universally applicable to all populations. The package of intervention components was not designed to address the needs of some low income families who may require intensive social support, case management and financial resources, but families were not excluded based on their source of health insurance. It was expected that overall, HS sites would serve families that reflected the nation as a whole demographically.

Assumption 5: The Healthy Steps program could duplicate some services already offered by pediatric practices or community agencies.

Healthy Steps incorporated into its package of services a number of strategies that were already in use in pediatric practices or in other agencies in a community. Therefore, it was possible that HS would duplicate services already being provided. For example, the HS program offered home visits from the HS Specialists. However, families might also receive one or more home visits from a public health nurse, their managed care organization, or any number of other community-based social service agencies. The evaluation documented the extent to which such duplication of services occurred.

Assumption 6: Some program components could be adopted by comparison practices during the evaluation.

Because patterns of health care delivery are changing rapidly across the country, we anticipated that some HS components would be adopted by comparison sites during the course of the evaluation. In addition, many of the sites already provided one or more of the HS components to families in their pediatric practice. It was unrealistic to think that such changes could be prevented in order to preserve a more pure distinction between the control and intervention groups. The ability of the evaluation to demonstrate differences in the effects of the intervention was limited by the extent to which the patterns of care in the comparison sites became more like those at the HS sites. The evaluation gathered information on changing practice patterns to help us understand their potential influence on findings regarding effects of the program.

Assumption 7: Evaluation sites were to represent the different patterns of organization of pediatric practice (hospital-based pediatric clinics, health maintenance organizations, and group practices).

Because one goal of HS was to influence the future of pediatric care delivery, HS sites needed to represent different patterns of organization of pediatric practice, both as currently practiced and as likely to emerge through the changing economics of health care. Thus, HS sites were categorized by organizational type into hospital-based ambulatory clinics, health maintenance organizations (HMOs), and group practices. The characteristics of these organizational types are discussed later.

Assumption 8: Standard evaluation and enrollment procedures were to be employed across sites.

To ensure comparability across sites, some evaluation procedures were standardized to a protocol so they could be carried out consistently at all sites. For example, in order to enroll families in HS at the earliest possible moment, some sites could have initiated contact with families prenatally. However, this was not an option for other sites, whose first opportunity to contact families occurred in the hospital or perhaps not until the first office visit. Accordingly, enrollment in HS was standardized across the sites to occur in the hospital or at the first pediatric office visit, but not prenatally.

Assumption 9: The "intention to treat" principle was to be applied.

Regardless of whether the randomization or quasi-experimental evaluation design was used, we applied the principle of "intention to treat" to the intervention population. The concept of intention to treat derives from the literature on randomized clinical trials. Application of the intention to treat principle means that all the subjects enrolled in the intervention group are treated in the analysis as if they had received the full intervention, even if some are known to have received less or to have dropped out. *(For further description of "intention to treat" analysis, see section 4.6.B.3.a.).*

4.4.B. Site Selection

Between September 1996 and July 1997, CWF selected 15 sites. A decision was made early in the program that sites would be selected by allowing local foundations, which formed partnerships with CWF, to identify excellent pediatric practices in the community. The primary reason for this selection method was CWF's perception that the long-term sustainability of HS depends on commitment at the local level from

Healthy Steps Local Initiatives in the National Evaluation

Major Organizational Types of Evaluation Practices	
Hospital-based pediatric clinics (3 sites)	These ambulatory clinics are located in teaching hospitals. Patients are cared for by trainees who are supervised by faculty. Practices and policies are determined by the hospital administration and academic pediatric departments. Pediatric populations are more likely to be inner city residents with limited access to the private health care sector.
HMO pediatric clinics (4 sites)	These are multi-specialty facilities in which the pediatric clinic is staffed by physicians who are employees of the HMO. Practices and policies are determined by the HMO administration and pediatric department. Pediatric populations include both families who receive their HMO coverage through employer benefits and Medicaid families who have been assigned to care.
Group practices (8 sites)	These community-based pediatric practices are free standing as private group practices, owned by larger health systems, or located within a community health center. Pediatricians work in small groups and are independent in setting their own practices and policies. These facilities may receive governmental subsidy funds to be organized as primary care or community health centers. The private group practices are more likely to serve middle class populations with a variety of health insurance coverage while the community health centers serve more low-income families.

community leaders, pediatricians and local foundations. Accordingly, the sample of sites was one of convenience. Within this context, however, the goal of site selection was to represent the major organizational types of pediatric practices.

We excluded sites with multiple locations that would have combined different types of practices (for example, combining a hospital clinic with a group practice to create a site) to achieve adequate numbers of families for the evaluation. We did not attempt to restrict the characteristics of the practices, other than by limiting the number of specific types.

Evaluation constraints placed further conditions on site selection. Practices in the quasi-experimental evaluation design were assigned to be in the intervention or control groups. Assigning practices in this way opened the possibility of introducing selection bias on the part of the parent agency or the local funder(s). This type of bias can occur when the treatment group (in this case, the pediatric practice assigned to provide HS services) is in some way more "ready" to be affected by the project than the control group. In this case, the local health providers and local foundations selected to participate in the program were likely to be the most enthusiastic and committed. The potential disadvantages of this bias were offset by the advantages to program implementation.

As sites were recruited into the program, the potential to implement either the randomization or quasi-experimental design strategy was assessed to reduce the potential interaction between selection and the intervention. Before sites were selected, each site provided objective information about the characteristics of their site and of their populations and participated in a site visit with members of the National Program team, local funders, and evaluators. Information gathered through this process was used by evaluators and the NPO to determine the design strategy that each site would employ, and if it was the quasi-experimental design, to match comparison to intervention sites. The most appropriate design for each site was considered one that would yield the most rigorous scientific results given logistic constraints.

Table 4.1. Locations and Characteristics of the Healthy Steps National Evaluation Sites [a]

City/State	Organizational Type
Randomization Sites	
Allentown, PA	Group Practice
Amarillo, TX	Group Practice
Florence, SC	Group Practice
Iowa City, IA	Hospital Based Pediatric Clinic
Pittsburgh, PA	Hospital Based Pediatric Clinic
San Diego, CA	HMO Pediatric Clinic
Quasi-Experimental Sites	
Boston, MA	HMO Pediatric Clinic
Chapel Hill, NC Birmingham, AL	Hospital Based Pediatric Clinic
Chicago (Downer's Grove), IL	Group Practice
Detroit, MI	HMO Pediatric Clinic
Grand Junction, CO Montrose, CO	Group Practice
Kansas City, KS	Group Practice
Kansas City, MO[b]	HMO Pediatric Clinic
New York, NY	Group Practice
Richmond, TX	Group Practice

[a] A second location is indicated only for those quasi-experimental sites where the intervention and comparison practice were located in separate metropolitan areas.

[b] In December 1999 the Healthy Steps program at this evaluation site was discontinued due to market pressures, changes in health insurance carriers, and other challenges.

4.4.B.1. Randomized Trial (6 sites)

In the six sites that employed a randomization design, families were enrolled in the evaluation and then randomly assigned either to the intervention or control group. The advantages of such randomized designs in evaluating social experiments have been identified by Hollister and Hill (Hollister and Hill, 1995). Random assignment of participants to intervention and control groups increases the likelihood that the intervention received is uncorrelated with the personal characteristics of the families -- with randomization, patients are not able to "sort" or "self-select" themselves into homogeneous intervention groups. Researchers thus can be fairly confident that any observed variation (or lack of variation) in outcomes is not because of contamination from self-selection.

The use of a randomized trial for the outcome evaluation posed the most stringent conditions for implementation of HS. The potential for "spillover" of the intervention to the control group meant that staff in RND sites had to resist the desire to provide the HS intervention to control group families. Multiple safeguards were required to reduce the chance of spillover.

4.4.B.2. Quasi-Experimental Design (9 sites)

The inability to randomize families into intervention and control groups differentiated the two study designs. Nine comparison sites were selected for the HS intervention sites by matching as closely as possible the characteristics of their target populations and the communities in which they were located. Comparison sites were matched by type of practice, demographic mix of clients and, if selected from a different community, on urban/rural location.

Comparison Strategies at Quasi-Experimental Design Sites

Comparison Sites in the Same Metropolitan Area (New York, Richmond, Boston)	A comparison group drawn from the same metropolitan area was considered optimal because it incorporated adjustment for "community effect." An additional advantage of comparison sites located in the same metropolitan area but not the same suburb or neighborhood is that families were unlikely to learn of the Healthy Steps practice and to select it over the comparison practice because of the services offered.
Comparison Sites from Different, but Matched Metropolitan Areas (Chapel Hill, Grand Junction)	A comparison group of children receiving care from a similar type of practice as the intervention practice but in a different metropolitan area offered the advantage of reducing the potential for selection bias as might occur for sites in the same area, but had several disadvantages, as well. Community effects could not be directly controlled in the design. The logistics of data collection also were more complicated here than for comparison sites from the same metropolitan area.
Comparison Sites from the Same Parent Organization, Regardless of the Community (Chicago, Kansas City BC/BS, Kansas City Humana, Detroit)	A variant on the previous two approaches was selection of a comparison site from one of multiple sites of a parent organization, such as in the case of a large HMO with multiple sites or a pediatric group practice with two or more sites. These sites were located in the same metropolitan area but in different communities. A major advantage of this approach was that the practice policies and guidelines were similar for intervention and comparison sites. This approach also facilitated data collection and other evaluation procedures. However, the intervention and comparison sites were no more similar demographically than at other matched sites.

4.4.C. Eligibility

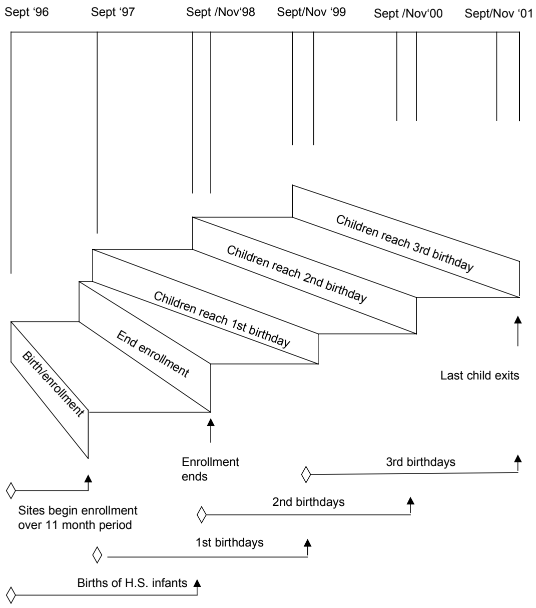
To make early home visiting possible and mirror the way families enter pediatric care, enrollment was limited to newborns. The evaluation protocol specified that the newborn be less than four weeks of age at the time of enrollment (from birth to 28 days of life, inclusive) and a patient at the HS site. Children were excluded only if: 1) their parents expected to move from the area or change their site of care within six months after birth; 2) their mothers (or fathers if they were the custodial parents) did not speak English or Spanish fluently; 3) they were to be adopted or placed in foster care; or 4) they were too ill to make an office visit within the first 28 days of life.

4.4.D. Enrollment and Evaluation Procedures

4.4.D.1. Enrollment

Enrollment took place either in the hospital following the child's birth or at the first pediatric office visit. Consecutive enrollment of newborns began in September 1996 at one pilot site. The initiation of subsequent sites was staggered over a one-year period to allow time to set up enrollment and other evaluation procedures. The length of time required to obtain an adequate sample was more than a year at some sites. Therefore, it took two years to complete the enrollment of families, which ended in November 1998. Children in the evaluation were followed until the last child in the cohort reached three years of age---in November 2001.

Progression of Children through the Evaluation



At each site an interactive planning process culminated in the development of a detailed evaluation protocol and site orientation. Planning and orientation required two site visits approximately two to three months apart.

During the first site visit, a member of the evaluation team met with key physicians, administrators, and staff in a three to four hour planning session to tailor evaluation procedures to the constraints at the site, agree on a timeline for planning, and establish a tentative start date. The start date was coordinated with the dates of the Healthy Steps Training Institutes in Boston. A site-specific evaluation manual was the key tool used to plan and document the evaluation procedures. The manual described the study design and evaluation protocols. It detailed the steps to enroll evaluation families, described documentation and data collection procedures, and included copies of evaluation forms.

During the second site visit, all site staff were invited to participate in an orientation to the HS program and evaluation procedures. In addition, enrollment staff received detailed training on enrollment procedures and HS Specialists received training on completing evaluation forms. Each site identified an individual to be accountable for implementing and maintaining the evaluation protocol. Enrollment packets (containing consent forms, a welcome letter, documentation forms, and for intervention families, short biosketches of the HS Specialists) provided materials to use with families approached to enroll in HS. At RND sites, evaluation materials also included sealed envelopes containing the random assignments.

One or more enrollment staff, employed by the site, screened prospective parents, enrolled them, and carried out the randomization procedures. Because of the potential for spillover, HS Specialists were permitted to enroll families only at QE intervention sites. The enrollment staff identified families of newborns who indicated the HS practice was their child's primary provider. Enrollment staff met with the mother (or mother and father) before discharge from the hospital or at the first office visit. Prior to the encounter, the staff obtained the next sequential enrollment packet (lowest number not yet assigned). She or he then contacted the mother, determined eligibility, introduced the mother to the HS evaluation, reviewed consent procedures, obtained informed consent, completed the randomization process (at RND sites), informed the mother of the family's evaluation status (intervention or control), provided the mother with the appropriate documentation and a small teddy bear for the child, and notified the site that the family had been enrolled in the evaluation. Among the study documents reviewed with the mother was a letter, which welcomed the family to the evaluation, reiterated the requirements of participation, and reviewed the services offered to the family. The letter to control families described the usual services available to parents.

4.4.D.2. Assignment of Families to Intervention or Control Group

At enrollment, each child received a unique 8-digit HS identifier to protect participant confidentiality and make it possible to link information across sets of data. A series of consecutive 7-digit identification (ID) numbers was pre-determined for assignment to children upon enrollment in the evaluation at each site.

At QE sites, the 8th digit, designating intervention or control group status, was pre-assigned – either 1 for intervention families or 2 for control families.

At RND sites, intervention or control status was assigned randomly following enrollment. Each RND site was provided a file of sealed random assignment envelopes, each numbered consecutively (from 1-200+). During enrollment, immediately after the mother and/or father consented to participate, enrollment staff selected and opened the next envelope in the sequence. The envelope contained the random assignment. The 8th digit (either 1 for intervention or 2 for control) had been pre-assigned by computer in random sequence. This was done in blocks of four. That is, the computer generated 8th digit for each group of four consecutive ID numbers was randomly assigned so that it fell in one of the following sequences: 1122; 1212; 2121; 2211; 2112; and 1221. This procedure prevented a long string of one group or the other, as might occur in fully random assignment.

4.4.D.3. Ongoing Evaluation Procedures

Over the course of the evaluation, national evaluation staff maintained ongoing collaboration with the HS sites to ensure the quality of evaluation data. An evaluation team member assigned to each site responded to operational questions related to enrollment, administration of questionnaires, and collection of process data. To ensure uniformity of evaluation procedures across sites, responses to site questions regarding the evaluation were documented in *Frequently Asked Questions* memoranda, which were posted on the HS Information Communication System and distributed to site evaluation coordinators, HS Specialists, lead physicians and enrollment staff. Sites used a pre-paid express delivery system to return evaluation forms and questionnaires to the evaluation team at regular intervals. In turn, each HS site received monthly feedback on the number of families enrolled and questionnaires completed to assist them in monitoring the progress of data collection.

4.5. Data Sources, Measures, and Analysis Samples

At specified points during the evaluation period, sites and families provided data for the evaluation. The questionnaires and forms used in the evaluation, the measures comprising them, and the samples for each are described below.

4.5.A. Sites

4.5.A.1. Site Questionnaire

The site administrator, the lead physician, and/or other designee completed a questionnaire at baseline (1997) and again 30 months into implementation (1999-2000), to capture the practice context in 1996 before HS and to address changes in the practice subsequent to the initiation of HS.

The respondents provided objective information about the practice context at start-up and some of the changes that had taken place in the practice during the time period of HS. Respondents also provided information about the practice environment in which pediatric services were being delivered prior to and towards the end of the HS intervention.

4.5.B. Providers and Informants

4.5.B.1. Key Informant Interviews

Key informant interviews provided data on program implementation. These interviews were structured questionnaires administered at baseline and 30 months into implementation to lead physicians, HS Specialists and site administrators at the 15 HS intervention sites.[4.1]

The interviews at baseline included a series of questions related to the introduction of HS to the site and the process of deciding to

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[4.1] In addition to the key informant interviews mentioned above, interviews were conducted with lead funders and the Chief of Pediatrics, as appropriate, at baseline. These data were reported earlier and contributed to the assessment of the potential for HS sustainability.

participate. Questions about the site's previous experience with similar projects, understanding of the HS model, anticipated problems with implementation, the role of the HS Specialist, and anticipated outcomes of the program were included. The 30-month interviews added objective questions related to the components of the HS program, teamwork, and communication patterns. Subjective, open-ended questions addressed the practice context/environment and changes over time, implementation factors, the impact of HS in the practice, the role of the HS Specialist, and the future of the HS program.

Most baseline interviews were conducted face-to-face by members of the evaluation staff, primarily in 1997. The 30 month interviews were conducted by telephone during the years 1999-2000. The objective parts of the interviews were completed by the informants before the telephone interviews were conducted. Interviews lasted between 30 and 60 minutes.

Informants were assured that all responses would be kept confidential and that results would be reported in aggregate form only. Interviewers emphasized that individual answers would not be linked to specific informants.

4.5.B.2. Self-Administered Provider Questionnaire

A structured questionnaire was self-administered to all clinicians and practice staff in regular contact with pediatric patients approximately one month and 30-months after start-up. The content of the provider questionnaires varied depending on the role of the individual at the site. Variations of the questionnaire were administered to four groups: physicians and nurse practitioners; nurses and other clinical staff; clerical and administrative staff; and HS Specialists.

Physicians and nurse practitioners (MDs/NPs) completed the most comprehensive questionnaire. The baseline questionnaire contained questions related to their background, including education, number of years in pediatric care and working at the site, and any special training they had received in child development or child behavior. Many of these questions were updated at 30 months. Questions were asked about the amount of time they spent at well child visits in the first two months of life (at baseline) and for two-year olds (at 30 months) performing specific activities at the visits (physical exam, anticipatory guidance, answering parents' questions, and other activities).

The baseline and 30 month questionnaires for MDs/NPs also included questions about barriers they perceived to providing well child care, the topics they discussed with families, their satisfaction with the time they spend discussing behavior and development with parents, and their ability to meet the needs of parents. Similar questions were asked about their satisfaction with the ability of clinical support staff to meet the needs of parents. They were also asked about their perceptions of the services that the HS Specialist provided to families.

The questionnaires for nurses and other clinical staff included questions about their educational background along with questions about topics they discussed with parents, their perceptions of the care provided at the practice, and their perceptions of the services provided by the HS Specialists. The questionnaires for clerical and administrative staff included the same items except those relating to topics discussed with parents. The HS Specialists responded to the questionnaire for nurses and clinical staff.

Providers at RND sites were asked to respond to questions concerning services provided and perceptions of care for both intervention and control families because approximately half of families at these sites received HS services and half did not.

4.5.B.3. HS Specialists Time Surveys

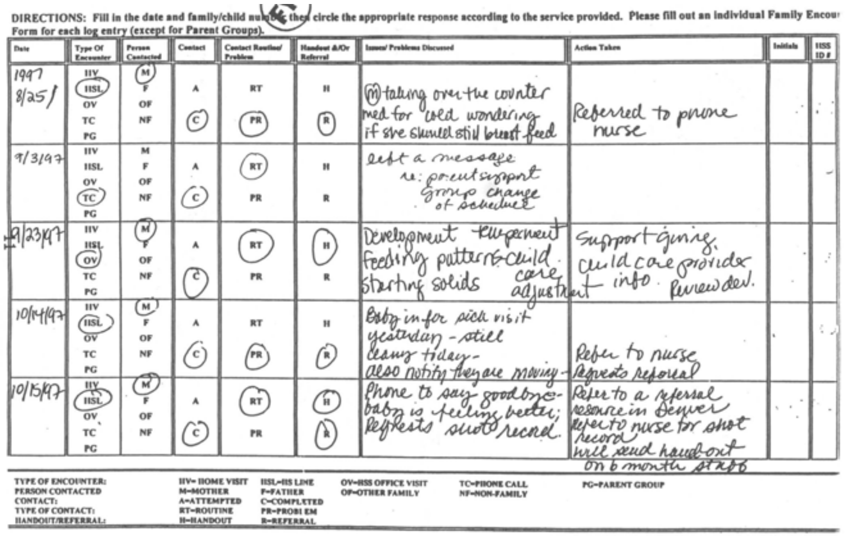
HS Specialists completed a structured self-administered questionnaire at 6-month intervals to document the amount of time they spent on program, non-program, and evaluation activities. The HS Specialists’ answers reflect their best estimates of how they distributed their time.

4.5.C. Families[4.2]

4.5.C.1. HS Specialists Contact Logs

At the beginning of the HS evaluation, each HS Specialist was provided with contact logs and instructions for documenting contacts with the families receiving HS services. Each form was labeled with the child's name and HS identification number, and sent to the HS Specialist for completion. Healthy Steps Specialists were asked to document every contact they had with the family including home visits, office visits, telephone calls from or to families, parent groups, mailings or *other* contacts. Information requested about each contact included: the date of contact; whether the contact was completed or not; the person(s) contacted; and actual subjects discussed with the family during the contact. Up to 15 individual topics could be recorded by the HS Specialist for any one encounter with a family. *(See Chapter 6 for topics coded).*

A comprehensive list of topics discussed during HS Specialists' contacts with families was developed. These topics were grouped into six larger categories by members of the Boston University School of Medicine team that designed the intervention. For purposes of the analysis, we truncated the sample of logs at 32 months of age.



DIRECTIONS: Fill in the date and family/child number then circle the appropriate response according to the service provided. Please fill out an individual Family Encou
Form for each log entry (except for Parent Groups).

Date	Type Of Encounter	Person Contacted	Contact	Contact Routine/ Problem	Handout &/Or Referral	Issues/ Problems Discussed	Action Taken	Initials	HSS ID #
1997 8/25/	HV [✓ HSL] OV TC PG	[✓ M] F OF NF	A [✓ C]	RT [✓ PR]	H [✓ R]	(M) taking over the counter med for cold wondering if she should still breast feed	Referred to phone nurse		
9/3/97	HV HSL OV [✓ TC] PG	M F OF NF	A [✓ C]	[✓ RT] PR	H R	left a message re: parent support group change of schedule			
9/23/97	HV HSL [✓ OV] TC PG	[✓ M] F OF NF	A [✓ C]	[✓ RT] PR	[✓ H] R	Development temperament Feeding patterns child care adjustment starting solids	Support giving child care provider info. Reviewed dev.		
10/14/97	HV [✓ HSL] OV TC PG	[✓ M] F OF NF	A [✓ C]	RT [✓ PR]	H [✓ R]	Baby in for sick visit yesterday - still cranky today - also notify they are moving -	Refer to nurse Requests referral		
10/15/97	HV [✓ HSL] OV TC PG	[✓ M] F OF NF	A [✓ C]	[✓ RT] PR	[✓ H] [✓ R]	Phone to say goodbye - baby is feeling better; Requests shot record.	Refer to a referral resource in Denver refer to nurse for shot record will send handout on 6 month stage		

TYPE OF ENCOUNTER:	HV= HOME VISIT	HSL=HS LINE	OV=HSS OFFICE VISIT	TC=PHONE CALL	PG=PARENT GROUP
PERSON CONTACTED	M=MOTHER	F=FATHER	OF=OTHER FAMILY	NF=NON-FAMILY	
CONTACT:	A=ATTEMPTED	C=COMPLETED			
TYPE OF CONTACT:	RT=ROUTINE	PR=PROBLEM			
HANDOUT/REFERRAL:	H=HANDOUT	R=REFERRAL			

[4.2] In addition to data provided by families, data provided by sites about the services that each child received at the practice are described in this section.

The reliability of the coding of the contact logs was estimated by computing percent agreement for the types of contacts and topics discussed for a sample of HS contacts. Contacts within each type and each year of interest were selected at random for recoding. Within each of the four major categories of contacts (home, office, telephone line, and general telephone), two hundred contacts were recoded in year 1, 200 in year 2, and 100 in the first 6 months of year 3. In all, 1290 contacts were recoded. The percent agreement among coders for type of contact and the major topic areas was high overall, indicating substantial to almost perfect agreement for the majority of comparisons.

4.5.C.2. Newborn Form

A brief standardized form, in English or Spanish, was self-administered by the parent(s) or administered by an interviewer at the time of enrollment. This *newborn form* provided data on the baby's characteristics; demographic characteristics of the mother, father, and family; prenatal utilization of services; health behaviors of the mother and father; and parents' decisions about a pediatric provider for their newborn. The questionnaire was administered to the parent or a 'proxy' for the parent in the hospital at time of birth or at the time of the first office visit.

4.5.C.3. 6-month, 12-month, 18-month and 24-month Forms

Forms similar to the newborn form were self-administered by the parent(s) or administered by practice staff when the child was approximately 6 months, 12 months, 18 months, and 24 months of age. These forms were used to gather data on selected family demographic characteristics, parenting practices, and health behaviors of the mother and father. The form usually was administered to the parent or a 'proxy' for the parent during an office visit to the evaluation site. At some sites, forms were mailed to families or telephone interviews were conducted with parents whose children did not make a visit during the window of opportunity, or who did not complete the form at the visit. At a few sites, parents could complete the form at home before the office visit or during a home visit.

In these forms, parents were asked about the support they received from the pediatric practice regarding child rearing activities and their receipt of practice-based and other services. Questions also included whom they would ask if they had a question about the child's speech, as well as use of safety devices, smoking practices, and whether the mother had a postpartum medical visit. A series of questions focused on the engagement of parents in activities that promote their children's health, learning, and development, including talking, playing, and reading. There were also questions about the frequency of injuries, emergency department visits, and hospitalizations in the last six months. The 24-month form incorporated the MacArthur Communicative Development Inventories/Words and Sentences measure of language development.

4.5.C.4. The MacArthur CDI/WS[4.3]

A measure of language development, the MacArthur Communicative Development Inventories /Words and Sentences (CDI-WS) (Fenson, 1994), was used to evaluate the effects of HS on language development. The CDI -WS offered several advantages: 1) it could be self-administered by parents; 2) the reading level for the instrument was appropriate for parents with limited education; 3) it contains measures for both receptive and expressive language skills; and 4) it was one of the developmental assessment tools routinely administered to intervention families by the HS Specialists.

The CDI-WS, designed for children 16 through 30 months of age, assesses vocabulary production and contains several items measuring grammatical development. A shorter version of the CDI-WS also is available. Because of time constraints, Short Form A, which relies on a subset of 100 words used in the full form, was used to measure vocabulary production. The Short Form, like the full CDI-WS, includes a question on whether the child is combining words. Other CDI-WS measures included sentence complexity and the longest sentences spoken by the child. A validated Spanish version of the Short From was not available in time for use in the evaluation. Accordingly, only information on whether the child combined words, longest sentences spoken, and sentence complexity were obtained from parents completing the Spanish language version.

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The CDI-WS typically was administered to the parent or a 'proxy' for the parent during an office visit. At some sites, forms were mailed to families or telephone interviews were conducted with parents whose children did not make a visit during the window of opportunity or who did not complete the form at the visit. At a few sites, parents completed the form at home before the office visit or during a home visit. Practice staff or the HS Specialist may have assisted parents who had difficulty reading.

Completed forms were returned to the evaluation team, where they were date-stamped, reviewed, and the length of sentences coded. The majority of forms were undated. Undated forms were assigned the date of the well child visit within the window of opportunity for the questionnaire (23 – 26 months) as documented in the medical record or HS contact logs.[4.4]

4.5.C.5. Parent Interviews

Structured parent telephone interviews were conducted when the children reached 2-4 months of age and 30-33 months of age. The mother was the primary respondent for the interview. In cases in which the mother was not available, the child's guardian or primary caretaker was interviewed. The computer-assisted interviews, conducted by Battelle Centers for Public Health Research, updated the sociodemographic characteristics of the family, including the mother's and father's education, marital status, employment, income, and household composition. Interviews at both time periods included questions developed specifically for the evaluation as well as standard survey instruments. Some of these measures were modified to reduce the time burden for the surveys. **Table 4.4** describes each standard measure included in the two surveys and any modifications.

The 2-4 month interview also included questions about the mothers' knowledge of child development; their sense of competence about childrearing; their perception of support for

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[4.4] Of 1856 forms received, 1412 were not dated. All completed forms were stamped with the date the evaluation team received them. The number of days between the date of completion and the date of receipt varied from site to site, from shipment to shipment, and from individual to individual. Missing dates were assigned the date of the office visit or HS Specialist contact within the window of opportunity for the questionnaire as documented in the medical record or HS contact logs. If no visit was found, mean number of days from the date of completion to the date forms in the same batch and from the same site were received was applied to the receipt date.

childrearing activities from both formal and informal sources; their engagement in activities with their children that promote health, learning, and development; and their satisfaction with their relationship with their child. The individual interviews were conducted in English or Spanish as appropriate and averaged 53 minutes and 49 minutes for intervention and control families, respectively. The longer interview with intervention families was due to additional questions asked of mothers about their satisfaction with the HS Specialist. The Spanish interviews took longer on average than the English interviews.

The 30-33 month interview was the primary source of data on parent and child outcomes and assessed the extent to which families received the HS intervention. Of particular interest were parents' receipt of developmentally-related services from the pediatric practice and their satisfaction with care they received. The interview required 59 minutes, on average, in the intervention group and 56 minutes in the control group. Parents were asked about utilization of health related services and about the child's health and progress in reaching age-appropriate developmental milestones, concerns the parent had about the child's development or behavior, and whether the child was referred to services for a behavior or developmentally-related problem. Questions were asked about parenting activities that promote development, and about routines in the family and engagement in safety activities. Items from the Child Behavior Checklist for 2-3 year olds (Achenbach, 1992) was included Also included were items from the Parenting Sense of Competence (Gribaud-Watson and Wandersman, 1978, Johsnton and Mash, 1989), Parent Behavior Checklist (Fox, 1994), Parental Response to Child Misbehavior (Holden and Zambarano, 1992), Hassles Scale (Curry et al., 1994), and modified CES-D (Radloff, 1977). Finally, the questionnaire included items about the mother's general health status, use of substances, use of mental health services, use of the child's doctor or her obstetrician/gynecologist as a source for discussing problems with depression, and use of preventive health care.

4.5.C.6. Medical Record Reviews

The medical record abstraction (MRA) was obtained when the child reached 32 months of age. The abstraction process was exactly the same for both experimental and control children, regardless of site.

Using a standard pre-coded form, trained abstractors at each evaluation site audited the medical records of participating children after the children reached 32 months of age. The abstractors participated in two to three days of competency-based training in the protocol. All training was conducted at the evaluation site by the project director. All primary care records were abstracted, including electronic and archived records.

Abstracted visit data included the type and date of the visit, whether a well child exam was performed, and the child's weight and height. Also collected were the date and type of each vaccine received and whether the vaccine was given at the evaluation site or at another practice ("off site")[4.5] Additional data abstracted were dates of Denver Developmental Screening Tool assessments and/or developmental checks; dates and types of referrals or consultations; reasons for referrals and consultations; dates of hospitalizations, emergency department visits, or urgent care visits; reasons and/or diagnoses for hospitalizations and emergency visits; and any broken appointments.

A random sample of approximately 5% of the records was re-abstracted at each site. Percentage agreement was 87% or higher for visit type, 96% or higher for visit date, 99% or higher for vaccine type, and 98% or higher for vaccine date.

4.5.C.7. Cost Data

Healthy Steps sites reported expenditure data for each of their three fiscal years to the NPO. These data were reviewed to ensure completeness and comparability. Expenditure data included amounts paid for salary and fringe benefits for HS Specialists, as well as expenditures for clerical staff, enrollment staff, transportation, office equipment, handout materials, and the telephone warm line. In order to determine which expenditures should be considered as "costs of Healthy Steps" additional data were obtained from the practices on the amount of time each staff person devoted to the HS program, and the amount of

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[4.5] Few children received vaccines off site. The majority of the vaccinations received off site were noted in the record. When documentation of off site vaccine doses was missing, site staff attempted to obtain this information from the off site provider.

administration and capital overhead that was attributable to the HS program.

Sites also were asked to provide cost offset data for the economic analysis. The data requested from each site included: a record of each visit made by the child to the practice; the payer type (self-pay, private, medical assistance); provider type (physician or nurse practitioner); CPT visit code; code of any procedure performed; immunization performed (yes/no) and type of vaccine; relative value units assigned to the visit; and the amount reimbursed by the payer for the visit (amount actually received).

Table 4.2. Number of Sites, Clinicians and Practice Staff Providing Evaluation Data at Randomization and Quasi-Experimental Sites

		Sites									
		Randomization		Quasi-Experimental						All	
				Intervention		Control		All			
Type of Data	Time Interval	%	N	%	N	%	N	%	N	%	N
Sites											
Baseline Site Questionnaires	1 month after start-up	100	6	100	9	100	9	100	9	100	15
30-month Site Questionnaire	30 months after start-up	100	6	100	9	100	9	100	9	100	15
Site Providers and Informants											
Key Informant Interviews	30 months after start-up										
HS Specialists		100	13	100	19			100	19	100	32
Lead Physicians		100	8	100	10			100	10	100	18
Administrators		100	7	100	8			100	8	100	15
Provider Surveys											
Baseline	1 month after start-up										
MDs/NPs		64	32	80	48	76	38	78	86	74	118
Nurses/Other Clinical		71	52	82	46	80	41	86	87	77	139
Clerical/Administrative		88	38	78	42	88	49	83	91	84	129
HS Specialists		100	14	100	18			100	18	100	32
30-Month	30 months after start-up										
MDs/NPs		77	40	74	29	65	30	69	59	72	99
Nurses/Other Clinical		71	62	70	31	73	33	72	64	72	126
Clerical/Administrative		79	31	69	40	81	29	73	69	75	100
HS Specialists		100	12	94	15			94	15	96	27
HS Specialist Time Surveys											
1st 6 Months	6 months after start-up	100	13	100	16					100	29
2nd 6 Months	12 months after start-up	100	13	100	18					100	31
3rd 6 Months	18 months after start-up	100	13	100	16					100	29
4th 6 Months	24 months after start-up	100	11	100	16					100	27
5th 6 Months	30 months after start-up	100	12	100	17					100	29
6th 6 Months	36 months after start-up	100	11	100	16					100	27

Table 4.3. Number of Families Providing Evaluation Data (or for whom data were provided) at Randomization and Quasi-Experimental Sites

		Randomization Sites						Quasi-Experimental Sites							
		Intervention		Control		All		Intervention		Control		All		All	
		N = 1133		N = 1102		N = 2235		N = 1830		N = 1500		N = 3330		N = 5565	
Type of Data	Time Interval	%	N	%	N	%	N	%	N	%	N	%	N	%	N
Parent Forms															
Newborn Form	Enrollment	100	*1133*	100	*1102*	100	*2235*	99.9	*1829*	99.9	*1499*	99.9	*3328*	99.9	*5563*
6-month Form	5-9 months of age	76.2	*863*	58.6	*646*	67.5	*1509*	69.9	*1279*	58.9	*882*	64.9	*2161*	65.9	*3670*
12-month Form	10-14 months of age	66.1	*749*	58.1	*640*	62.1	*1389*	58.4	*1068*	47.2	*708*	53.3	*1776*	56.9	*3165*
18-month Form	15-19 months of age	54.5	*617*	46.5	*512*	50.5	*1129*	46.3	*848*	27.1	*407*	37.7	*1255*	42.8	*2384*
24-month Form	20-26 months of age	48.5	*550*	38.5	*424*	43.6	*974*	39.0	*714*	17.8	*267*	29.5	*981*	35.1	*1955*
MacArthur CDI-WS	23-26 months of age	47.0	*532*	36.0	*397*	41.6	*929*	37.8	*691*	15.7	*236*	27.8	*927*	33.4	*1856*
Parent Interviews															
2-4 Month Parent Interview	2-4 months of age	90.1	*1021*	90.4	*996*	88.9	*1987*	88.0	*1610*	86.6	*1299*	87.3	*2909*	88.0	*4896*
30-33 Month Parent Interview	30-33 months of age	73.4	*832*	69.1	*761*	71.3	*1593*[a]	65.0	*1189*	63.7	*955*	64.4	*2144*	67.2	*3737*
Medical Record Review															
	32 months of age, withdrawal from site or evaluation	100.0	*1113*	97.9	*1079*	98.1	*2192*	95.8	*1753*	97.2	*1458*	96.4	*3211*	97.1	*5403*
Cost Offset Data															
	32 months of age, withdrawal form site or evaluation	95.3	*1080*	92.9	*1024*	94.1	*2104*	94.9	*1735*	95.1	*1426*	94.9	*3161*	94.6	*5265*
HS Specialist Contacts															
HS Contact Log Entries	32 months of age, withdrawal form site or evaluation	80.8	*916*					99.2	*1813*					92.1	*2729*

Table 4.4. Selected National Healthy Steps Evaluation Instruments

DOMAIN	INSTRUMENT	DESCRIPTION
Maternal Depression	Center for Epidemiologic Studies of Depression Scale [a]	"The CES-D was developed for use in studies of the epidemiology of depressive symptomatology in the general population. Its purpose differs from previous depression scales, which have been used chiefly for diagnosis at clinical intake and/or evaluation of severity of illness over the course of treatment. The CES-D was designed for use in general population surveys to measure current level of depressive symptomatology, with emphasis on depressed mood. The symptoms are among those on which a diagnosis of clinical depression is based but which may also accompany other diagnoses. The possible range of scores is 0 to 60, with higher scores indicating more symptoms, weighed by frequency of occurrence." The measure used in the Healthy Steps evaluation was reduced from the standard 20 items to 14 items because of the need to reduce the length of the interview and because we found the 14-item scale to be highly correlated (>.95) with the 20-item scale in earlier studies conducted by some of the Healthy Steps investigators
Mother's Stress	Hassles scale [b]	The Stress Scale is an 11-item scale adapted by Curry et al. (1994) from the Hassles Scale, developed by Kanner (1981). It conceptualizes stress as daily difficulties and circumstances that place chronic demands on an individual's energy and abilities to meet their needs and responsibilities.
Parenting Sense of Competence	Parenting Sense of Competence (PSOC) Scale and its subscales [c,d]	The PSOC scale includes 17 items scored on a 6-point scale from *strongly agree* (1) to *strongly disagree* (6). The instrument was designed to assess parenting self-esteem. "Parenting self-esteem encompasses both perceived self-efficacy as a parent and the satisfaction derived from parenting. Self-efficacy refers to the degree to which the parent feels competent and confident in handling child problems, and it functions as a moderator of parent-child relationships. Therefore, caregivers with low levels of perceived control over child behavior are sensitized to and cope ineffectively with difficult child behavior. Satisfaction indicates an affective dimension of parenting, reflecting the degree to which the parent feels poorly motivated in the parenting role. These two dimensions of parenting self-esteem, perceived efficacy and satisfaction, appear important to understanding parenting within the clinical context." Higher scores indicate a greater sense of parenting competence or self-esteem.
Parenting Behavior	Parent Behavior Checklist (PBC) [e]	The Parent Behavior Checklist (PBC) also known as Parent Inventory (PI) is an empirically derived, descriptive classification system of specific behaviors and developmental expectations of parents who have a child between 1 and 4 years of age. The scale consists of 100 items and includes three subscales: 1) Expectations (50 items) that measure a parent's developmental expectations of their child (e.g.,"My child should use the toilet without help"). It measures developmental expectations, not to be confused with knowledge of development. "Although other questionnaires measure parents' *knowledge* of child development, they do not directly address the development expectations parents have for their own children." "Parents who score significantly above the mean on this subscale may need instruction to lower their expectations to a more reasonable level. In contrast, parents who score significantly below the mean may need encouragement to increase their expectations." 2) Discipline (30 items) that assesses parental responses to problem child behaviors (e.g. "I yell at my child for whining"); and, 3) Nurturing (20 items) that measure specific parent behaviors that promote a child's psychological growth (e.g., "I read to my child at bedtime"). 25 of the 50 items in the expectations subscale and 18 of 20 items in the nurturing subscale were included in the Healthy Steps evaluation.
Parent Response to Child Misbehavior	Parent Response to Child Misbehavior [f]	The Parent Response to Child Misbehavior (PRCM) was designed to determine techniques used by parents in response to their children's misbehaviors and to assess the frequency with which parents use each of ten different responses to misbehavior over the course of an average week. The ten response types include: reasoning; diverting to another behavior, negotiating; threatening; use of time-out; spanking (with hand or object); ignoring; withdrawing privileges; yelling in anger and slapping (face or hand). Items take the form of phrases and are coded on a 7-point Likert scale ranging from *Never* to *9 or more times per week*. There is no total score available from the PRCM. In the HS evaluation, the scale was condensed to 4 response categories to facilitate administration by telephone.
Child's Health Status	National Health Interview Survey Questions on Childs' Health Status	Health status is measured in both parent interviews using questions from the National Health Interview Survey asking respondents to rate their child's health as excellent, very good, good, fair, or poor. Four additional questions, adapted from RAND, were asked in the 30-33 month parent interview about susceptibility of the child to illness and experience with serious illness, to form a scale of the child's health status.

Table 4.4. (continued) Selected National Healthy Steps Evaluation Instruments

DOMAIN	INSTRUMENT	DESCRIPTION
Child Behavior	Child Behavior Checklist (CBCL)[g]	The Child Behavior Checklist (CBCL) is a well-researched and widely-used instrument designed to obtain parents' reports of behavioral/emotional problems of children aged 2-3. It was used to measure children's emotional and behavioral problems. The CBCL/2-3 consists of 99 items describing behavioral/ emotional problems, plus an open-ended item for additional problems. Parents rate their child for how true each item is now or within the past 6 months using the scale "often true", "sometimes true" or "never true". The CBCL/2-3 provides raw scores, T scores and percentiles for 6 syndromes representing Internalizing, Externalizing and Total Problems. These syndromes are social withdrawal, depressed, sleep problems, somatic problems, aggressive, and destructive. In the HS evaluation, the aggressive behavior, depressed, and sleep problems subscales were used.
Language Development	MacArthur CDI-WS [h]	The MacArthur Communicative Development Inventories /Words and Sentences (CDI-WS). The CDI-WS is designed to measure language development in children 16 through 30 months of age. It assesses vocabulary production and contains several items measuring grammatical development. A shorter version of the CDI-WS also is available. Because of time constraints, Short Form A, which relies on a subset of 100 words, was used to measure vocabulary production. The Short Form, like the full CDI-WS, includes a question on whether the child is combining words. Other CDI-WS measures included sentence complexity and longest sentences spoken by the child. A validated Spanish version of the Short From was not available in time for use in the evaluation. Accordingly, only information on whether the child combined words, longest sentences spoken recently, and sentence complexity were obtained from parents completing the Spanish language version. Mean Vocabulary Score (English-Language version only): One hundred words comprise the CDI-WS Short Form A vocabulary checklist, which is intended to measure vocabulary production Combining Words: Parents were asked whether their child had begun to combine words "not yet," "sometimes," or "often." The two latter categories were combined to indicate that the child had begun to combine words. Sentence Complexity: In the sentence complexity section of the CDI-WS, parents were asked to choose from each of 37 pairs of more or less complex phrases. They could select either phrase or neither one. For each of the 37 items, we assigned a score of zero if the parent checked the less complex phrase or left that item blank, and a score of one if the parent checked the more complex alternative. Mean Length of the Longest Sentence: In this section parents were asked to list three of the longest sentences they have heard their child speak. The number of morphemes in each sentence was counted following instructions in the training manual. A morpheme is a linguistic unit that contains no smaller meaningful parts, e.g., birthday or doggie. For forms completed in Spanish, words were counted rather than morphemes. We then calculated the mean of the three longest sentences or if fewer than three sentences were listed, the mean length of utterance was based on the sentence(s) recorded.

[a] Radloff, L.S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*; 1: 385-401.

[b] Curry, M.A., Campbell, R.A., & Christian, M. (1994). Validity and reliability testing of the prenatal psychosocial profile. *Research in Nursing and Health*; 17: 127-135.

[c] Gribaud-Watson J, Wandersman L. (1978) Development and Utility of the Parenting Sense of Competence Scale. Paper presented at the meeting of the APA, Toronto.

[d] Johnston & Mash. (1989). A measure of parenting satisfaction and efficacy. *Journal of Clinical Child Psychology;* 18: 167-175.

[e] Fox RA. (1994). Parent Behavior Checklist Manual. Austin, TX: Pro Ed

[f] Holden GW, Zambarano RJ. (1992) Passing the rod: Similarities between parents and their young children in orientations toward physical punishment. In IE Sigel, AV McGillicuddy-DeLisi, and JJ Goodnow (eds). Parental belief systems: The psychological consequences for children (2nd-ed). Pp 143-172). Hillsdale, NJ: Lawrence Erlbaum Associates.

[g] Achenbach TM. (1992) Manual for the Child Behavior Checlist/2-3 & 1992 profile. Burlington, VT: University of Vermont Department of Psychiatry.

[h] Fenson L et al (1994). The MacArthur Communicative Development Inventories: User's guide and technical manual. San Diego, CA: Singular Publishing Group.

4.6. Variable Development, Analysis, and Outcome Variables

4.6.A. Variable Development

The provider surveys and parent interviews included a number of instruments for which scales were developed and their psychometric properties evaluated. For many of the parent interview instruments, such as the Parenting Sense of Competence (PSOC) Scale and its subscales, there are standard formats for combining items and their psychometric properties are well established. For these instruments, we computed the standard scale score and assessed the degree of inter-relatedness of the items using Cronbach alpha and the item-to-total correlation for each item in the scale. Cronbach alpha is a measure of the degree of interrelatedness of the items of the scale; that is, how well the items, when taken together, form an internally consistent overall score. Values equal to or above 0.8 are generally considered to indicate a highly reliable (internally consistent) scale with values from 0.7 to 0.8 being acceptable. Values below 0.6 are considered to be unacceptable. We also created subscales for newly developed instruments, computing a Cronbach alpha value for each. The specific scales utilized in the provider surveys and parent interviews are described in more detail below.

4.6.A.1. Provider Survey Scales

Much of the information contained in the provider surveys could be built into scales measuring a broader concept. Examples of these concepts are the satisfaction of clinicians with their ability to meet the developmental needs of families with young children or an index of barriers to providing quality well child care related to managed care restrictions and policies. For many of these scales, the items that were combined together were straightforward. For those that were not, a factor analysis was performed on baseline data to evaluate whether there was some underlying linear structure in the data, for example, for the long instrument assessing perceptions of the care provided at the site. The factor analyses were only moderately helpful in these instances, so the items were grouped primarily based on conceptually similar content. **Table 4.5** provides descriptions of the measures and subscales designed for the evaluation. **Tables 4.6 to 4.8** show the alpha values for each scale, the number of items in the scale, their range of scores for the baseline and 30-month survey samples and their means and standard deviations. The same items comprised scales for each of the groups studied: physicians and nurse practitioners; nurses and other clinical staff; administrative and clerical staff; and HS Specialists. The scales for each group, however, are shown separately.

Table 4.5. Provider Measures Designed for the National Healthy Steps Evaluation

DOMAIN	MEASURE (S)	DESCRIPTION
Perception of barriers to providing quality care	Limited staff; problems with managed care or Medicaid reimbursement; not enough time to answer parents' questions, teach parents, or follow-up children	Physicians/nurse practitioners were asked about several factors that affected their ability to provide quality well child care to their patients. These concerns included: limited staff; problems with managed care or Medicaid reimbursement; not enough time to answer parents' questions, teach parents, or follow-up children. These items were combined to develop a composite measure indicating 2 or more barriers (limited staff, not enough time) or 1 or more barriers (problems with managed care or Medicaid reimbursement).
Satisfaction with care	Satisfaction with ability of clinical support staff (including HS Specialists) to meet the needs of new parents concerning behavior and development	Physicians/nurse practitioners, nurses/other clinical staff, and HS Specialists were asked questions about their satisfaction with the ability of clinical support staff to meet the needs of new parents in relation to their child's behavior and development. The measure included two questions (child's behavior, child's development) that were combined to represent the child's development and behavior. Satisfaction was assessed on a four point Likert scale with 1 being *very dissatisfied* and 4 being *very satisfied.* The higher the score, the greater the satisfaction of the clinician. The total score for the combined variable was divided by the number of items combined to form the variable. By doing this, it was easier to interpret the values because they could be directly compared with the response categories for the specific items. For example, a mean score of 3.5 signified very satisfied.
Perceptions of care	Listening to parents and supporting parents.	All respondents were provided with a series of statements describing the care provided by physicians and nurse practitioners as well as nurses/other clinical support staff at their site. The response to each item was rated on a 5-point Likert scale with a value of 1 being *strongly disagree* with the statement and a 5, *strongly agree.* This instrument was divided into two subscales based on the content of the item and the results of a factor analysis. The subscales were: listening to parents (8 items) and supporting parents (4 items). "Listening to parents" included: always have time to answer parents' questions; do not seem to have other things on their minds when they talk to parents; do not act like parents can't understand growth and development information; are not always in a rush when they see children; encourage parents to ask questions about their child's growth and development; seem to think carefully about parents and about their child's development; make parents feel they are doing a good job caring for their child; understand that parents know their child better than anyone else does. "Supporting parents" included: suggest things that parents can do for their child that fit into their family's daily life; give parents advice on how to solve problems at home with their child; help parents get services for their child from other agencies and programs; help parents get information they need about their child's growth and development; point out what parents do well. The negative items were recoded for their subscales so that the responses to all items were in a positive direction. The values of the items for each subscale were summed for each respondent and divided by the total number of items in the subscale so that the mean scores could be interpreted in relation to the response categories for the items. A mean score on each subscale of 4.5 or higher indicated that the respondent *strongly agreed* that physicians/nurse practitioners or nurses/clinical staff "listen to parents" or "provide support" and a score of 3.5 or higher indicated *agree/strongly agreed.* Because the level of agreement on these two scales was high, a dichotomous variable indicating a score of 4.5 or higher was used to examine variability among groups.
Perceptions of care	Discussed 3 or more risk factors	Physicians/nurse practitioners, nurses/other clinical staff, and HS Specialists answered questions about the topics they discussed with parents. These included whether they raised issues of substance abuse, maternal depression, domestic violence, or child abuse. These individual items were combined to form one variable indicating whether the provider covered 3 or more of these family risk factors with parents.

Table 4.5. (Continued) Provider Measures Designed for the National Healthy Steps Evaluation

DOMAIN	MEASURE (S)	DESCRIPTION
Perceptions of HS Specialist's role	Talked to parents about child's behavior and development; showed parents activities and gave information about what to do with child; and provided parents with support, helped with stress and referred them for emotional problems.	Respondents were provided with a series of statements describing the services HS Specialists provided to intervention families at their sites. The response to each item was rated on a 5-point Likert scale with a value of 1 being *strongly disagree* with the statement and a 5, *strongly agree.* This instrument was divided into three subscales based on the content of the item and the results of a factor analysis. The subscales were: talked to parents about child's behavior and development; showed parents activities and gave information about what to do with child; and provided parents with support, helped with stress and referred them for emotional problems. The values of the items for each subscale were summed for each respondent and divided by the total number of items in the subscale so that the mean scores could be interpreted in relation to the response categories for the items. A mean score for each subscale of 4.5 or higher indicated that the respondent *strongly agreed* that HS Specialists provided the care to families and a score of 3.5 or higher indicated *agree/strongly agreed.*
Perceptions of HS Specialist's role	HS Specialist discussed temperament, sleep problems or both with parents	Physicians/nurse practitioners, nurses/other clinical staff, administrative/clerical staff and HS Specialists answered questions about the topics they discussed with parents. These included whether the HS Specialists discussed temperament and sleep problems with parents. These individual items were combined to form one variable indicating whether the HS Specialist discussed one or more of these topics.

Table 4.6. Characteristics of Developed Scales in Surveys of Physicians and Nurse Practitioners

	Interview Sample	Number of Items	Range	Cronbach Alpha	Mean	S.D.
Perceptions of Barriers to Providing Quality Care						
Staff Problems [a]	Baseline	2	0-2	0.30	1.25	0.74
	30 Months	2	0-2	0.66	1.16	0.85
Reimbursement Problems [b]	Baseline	2	0-2	0.63	0.55	0.77
	30 months	2	0-2	0.79	0.88	0.90
Time Problems [c]	Baseline	3	0-3	0.74	1.35	1.20
	30 months	3	0-3	0.83	1.99	1.22
Satisfaction with Ability of Clinical Support Staff to Meet Behavioral/Developmental Needs						
Very satisfied with ability of clinical support staff to meet children's developmental and behavioral needs [d]	Baseline	2	2-8	0.96	6.24	1.26
	30 months	2	2-8	0.96	6.39	1.46
Perceptions of Care Provided by Physicians and Nurse Practitioners						
Strongly agree that physicians and nurse practitioners listen to parents [e]	Baseline	8	22-40	0.64	32.07	3.04
	30 months	8	23-38	0.31	31.13	2.89
Strongly agree that physicians and nurse practitioners give support to parents [f]	Baseline	5	14-25	0.58	19.07	2.13
	30 months	5	14-24	0.58	19.48	1.86
Discussed Developmental Topics						
Strongly agree that physicians and nurse practitioners discussed 3 or more family risk factors with parents [g]	Baseline	3	0-4	0.85	2.41	1.59
	30 months	3	0-4	0.80	1.98	1.59
Perceptions of HS Specialist's Role						
Strongly agree that HS Specialists talked to parents about child's behavior and development [h]	Baseline	5	15-25	0.96	21.71	3.50
	30 months	5	15-25	0.92	23.66	2.19
Strongly agree that HS Specialists showed parents activities and gave information about what to do with child [i]	Baseline	4	12-20	0.95	16.69	2.83
	30 months	4	12-20	0.85	18.03	2.14
Strongly agree that HS Specialists provided parents with support, help with stress, and referred parents for emotional problems [j]	Baseline	2	6-10	0.83	8.29	1.49
	30 months	2	6-10	0.68	8.94	1.12
Strongly agree that HS Specialists discussed temperament, sleep problems, or both with parents [k]	Baseline	2	0-2	0.93	0.86	0.96
	30 months	2	0-2	0.89	1.75	0.63

[a] Staff problems: shortage of support staff, limited staff to address parent's/child's needs.

[b] Reimbursement problems: low Medicaid reimbursement rates; problems with reimbursement by managed care organizations.

[c] Time problems: not enough time to answer parents' questions, to teach parents, to follow-up families (at least two of three items).

[d] Very satisfied with ability of staff [nurses, social workers, nutritionists, HS Specialists, medical assistants] within practice to meet the needs of parents concerning child behavior and child development.

[e] Strongly agree that physicians and nurse practitioners listened to parents: always have time to answer parents' questions; do not seem to have other things on their minds when they talk to parents; do not act like parents' can't understand growth and development information; are not always in a rush when they see children; encourage parents to ask questions about their child's growth and development; seem to think carefully about parents and about their child's development; make parents feel they are doing a good job caring for their child; understand that parents know their child better than anyone else does.

[f] Strongly agree that physicians and nurse practitioners give support to parents: suggest things that parents can do for their child that fit into their family's daily life; give parents advice on how to solve problems at home with their child; help parents get services for their child from other agencies and programs; help parents get information they need about their child's growth and development; point out what parents do well.

[g] Strongly agree that physicians and nurse practitioners discussed 3 or more family risk factors with parents: mother's or father's substance abuse; maternal depression; domestic violence or child abuse.

[h] Strongly agree that HS Specialists talked to parents about child's behavior and development: encouraged parents to talk about problems they or their young child were experiencing; listened carefully to what parents said about their child; gave parents advice about solving problems that they were having at home with their child; gave parents help understanding their child's growth and development; checked the progress of their child.

[i] Strongly agree that HS Specialists showed parents activities and gave them information about what to do with child: showed parents activities that they could do with their child to help her/him grow and learn; told parents about the kinds of behaviors they could expect to see in their child in the next six months; helped parents organize the daily routines for their child; let parents consider options for themselves and their child that were best for both of them.

[j] Strongly agree that HS Specialists provided emotional support; referred parents for help with their emotional problems: provided emotional support; referred parents for help with their emotional problems.

[k] Strongly agree that HS Specialists discussed temperament, sleep problems, or both with parents: discussed temperament, sleep problems (1 or more items).

Table 4.7. Characteristics of Developed Scales in Surveys of Nurses and Other Clinical Staff

	Interview Sample	Number of Items	Range	Cronbach Alpha	Mean	S.D.
Satisfaction with Ability of Clinical Support Staff to Meet Behavioral/Developmental Needs						
Very satisfied with ability of clinical support staff to meet children's developmental and behavioral needs [a]	Baseline	2	0-8	0.92	4.25	2.81
	30 months	2	0-8	0.95	3.23	2.96
Perceptions of Care Provided by Physicians and Nurse Practitioners						
Strongly agree that physicians and nurse practitioners listen to parents [b]	Baseline	8	24-40	0.79	32.95	3.74
	30 months	8	24-40	0.78	32.38	3.99
Strongly agree that physicians and nurse practitioners give support to parents [c]	Baseline	5	15-25	0.71	20.43	2.32
	30 months	5	14-25	0.84	20.58	2.88
Discussed Developmental Topics						
Strongly agree that HS Specialists (nurses and other clinical staff) discussed 3 or more family risk factors with parents [d]	Baseline	3	0-4	0.83	0.76	1.36
	30 months	3	0-4	0.86	0.59	1.19
Perceptions of HS Specialist's Role						
Strongly agree that HS Specialists talked to parents about child's behavior and development [e]	Baseline	5	15-25	0.98	20.84	4.01
	30 months	5	15-25	0.97	22.05	3.23
Strongly agree that HS Specialists showed parents activities and gave information about what to do with child [f]	Baseline	4	12-20	0.94	15.96	3.08
	30 months	4	12-20	0.90	16.64	2.69
Strongly agree that HS Specialists provided parents with support, help with stress, and referred parents for emotional problems [g]	Baseline	2	6-10	0.84	7.83	1.61
	30 months	2	4-10	0.75	8.10	1.48
Strongly agree that HS Specialists discussed temperament, sleep problems, or both with parents [h]	Baseline	2	0-2	0.91	0.69	0.91
	30 months	2	0-2	0.92	1.38	0.89

[a] Very satisfied with ability of staff [nurses, social workers, nutritionists, HS Specialists, medical assistants] within practice to meet the needs of parents concerning child behavior and child development.

[b] Strongly agree that physicians and nurse practitioners listened to parents: always have time to answer parents' questions; do not seem to have other things on their minds when they talk to parents; do not act like parents' can't understand growth and development information; are not always in a rush when they see children; encourage parents to ask questions about their child's growth and development; seem to think carefully about parents and about their child's development; make parents feel they are doing a good job caring for their child; understand that parents know their child better than anyone else does.

[c] Strongly agree that physicians and nurse practitioners give support to parents: suggest things that parents can do for their child that fit into their family's daily life; give parents advice on how to solve problems at home with their child; help parents get services for their child from other agencies and programs; help parents get information they need about their child's growth and development; point out what parents do well.

[d] Strongly agree that nurses and other clinical staff discussed 3 or more family risk factors with parents: mother's or father's substance abuse; maternal depression; domestic violence or child abuse.

[e] Strongly agree that HS Specialists talked to parents about child's behavior and development: encouraged parents to talk about problems they or their young child were experiencing; listened carefully to what parents said about their child; gave parents advice about solving problems that they were having at home with their child; gave parents help understanding their child's growth and development; checked the progress of their child.

[f] Strongly agree that HS Specialists showed parents activities and gave them information about what to do with child: showed parents activities that they could do with their child to help her/him grow and learn; told parents about the kinds of behaviors they could expect to see in their child in the next six months; helped parents organize the daily routines for their child; let parents consider options for themselves and their child that were best for both of them.

[g] Strongly agree that HS Specialists provided emotional support; referred parents for help with their emotional problems: provided emotional support; referred parents for help with their emotional problems.

[h] Strongly agree that HS Specialists discussed temperament, sleep problems, or both with parents: discussed temperament, sleep problems (1 or more items).

Table 4.8. Characteristics of Developed Scales in Surveys of Administrative and Clerical Staff

	Interview Sample	Number of Items	Range	Cronbach Alpha	Mean	S.D.
Perceptions of Care Provided by Physicians and Nurse Practitioners						
Strongly agree that physicians and nurse practitioners listen to parents [a]	Baseline	8	24-40	0.83	32.12	4.29
	30 months	8	24-40	0.80	32.05	4.32
Strongly agree that physicians and nurse practitioners give support to parents [b]	Baseline	5	14-25	0.76	19.49	2.66
	30 months	5	15-25	0.81	20.24	2.83
Perceptions of HS Specialist's Role						
Strongly agree that HS Specialists talked to parents about child's behavior and development [c]	Baseline	5	15-25	0.95	20.72	3.51
	30 months	5	15-25	0.94	22.08	3.35
Strongly agree that HS Specialists showed parents activities and gave information about what to do with child [d]	Baseline	4	12-20	0.91	15.44	2.79
	30 months	4	12-20	0.85	15.89	2.68
Strongly agree that HS Specialists provided parents with support, help with stress, and referred parents for emotional problems [e]	Baseline	2	6-10	0.80	7.58	1.47
	30 months	2	6-10	0.75	8.11	1.47
Strongly agree that HS Specialists discussed temperament, sleep problems, or both with parents [f]	Baseline	2	0-2	0.91	0.59	0.87
	30 months	2	0-2	0.92	1.03	0.97

[a] Strongly agree that physicians and nurse practitioners listened to parents: always have time to answer parents' questions; do not seem to have other things on their minds when they talk to parents; do not act like parents' can't understand growth and development information; are not always in a rush when they see children; encourage parents to ask questions about their child's growth and development; seem to think carefully about parents and about their child's development; make parents feel they are doing a good job caring for their child; understand that parents know their child better than anyone else does.

[b] Strongly agree that physicians and nurse practitioners give support to parents: suggest things that parents can do for their child that fit into their family's daily life; give parents advice on how to solve problems at home with their child; help parents get services for their child from other agencies and programs; help parents get information they need about their child's growth and development; point out what parents do well.

[c] Strongly agree that HS Specialists talked to parents about child's behavior and development: encouraged parents to talk about problems they or their young child were experiencing; listened carefully to what parents said about their child; gave parents advice about solving problems that they were having at home with their child; gave parents help understanding their child's growth and development; checked the progress of their child.

[d] Strongly agree that HS Specialists showed parents activities and gave them information about what to do with child: showed parents activities that they could do with their child to help her/him grow and learn; told parents about the kinds of behaviors they could expect to see in their child in the next six months; helped parents organize the daily routines for their child; let parents consider options for themselves and their child that were best for both of them.

[e] Strongly agree that HS Specialists provided emotional support; referred parents for help with their emotional problems: provided emotional support; referred parents for help with their emotional problems.

[f] Strongly agree that HS Specialists discussed temperament, sleep problems, or both with parents: discussed temperament, sleep problems (1 or more items).

Table 4.9. Characteristics of Developed Scales in Surveys of HS Specialists

	Interview Sample	Number of Items	Range	Cronbach Alpha	Mean	S.D.
Satisfaction with Ability of Clinical Support Staff to Meet Behavioral/Developmental Needs						
Very satisfied with ability of clinical support staff to meet children's developmental and behavioral needs [a]	Baseline	2	4-8	0.93	6.97	1.09
	30 months	2	0-8	0.98	5.31	3.26
Perceptions of Care Provided by Physicians and Nurse Practitioners						
Strongly agree that physicians and nurse practitioners listen to parents [b]	Baseline	8	21-37	0.83	30.10	4.25
	30 months	8	23-36	0.68	29.85	3.76
Strongly agree that physicians and nurse practitioners give support to parents [c]	Baseline	5	9-23	0.86	17.10	3.68
	30 months	5	11-23	0.84	18.04	3.24
Discussed Developmental Topics						
Strongly agree that HS Specialists (nurses and other clinical staff) discussed 3 or more family risk factors with parents [d]	Baseline	3	0-4	0.80	3.22	1.18
	30 months	3	0-4	0.92	2.00	1.79
Perceptions of HS Specialist's Role						
Strongly agree that HS Specialists talked to parents about child's behavior and development [e]	Baseline	5	20-25	0.93	23.68	1.96
	30 months	5	20-25	0.89	24.19	1.55
Strongly agree that HS Specialists showed parents activities and gave information about what to do with child [f]	Baseline	4	15-20	0.83	18.29	1.81
	30 months	4	15-20	0.66	18.33	1.54
Strongly agree that HS Specialists provided parents with support, help with stress, and referred parents for emotional problems [g]	Baseline	2	8-10	0.75	9.23	0.86
	30 months	2	6-10	0.60	9.12	0.99
Strongly agree that HS Specialists discussed temperament, sleep problems, or both with parents [h]	Baseline	2	2	NA	2.0	0
	30 months	2	1-2	0.00	1.96	0.19

[a] Very satisfied with ability of staff [nurses, social workers, nutritionists, HS Specialists, medical assistants] within practice to meet the needs of parents concerning child behavior and child development.

[b] Strongly agree that physicians and nurse practitioners listened to parents: always have time to answer parents' questions; do not seem to have other things on their minds when they talk to parents; do not act like parents' can't understand growth and development information; are not always in a rush when they see children; encourage parents to ask questions about their child's growth and development; seem to think carefully about parents and about their child's development; make parents feel they are doing a good job caring for their child; understand that parents know their child better than anyone else does.

[c] Strongly agree that physicians and nurse practitioners give support to parents: suggest things that parents can do for their child that fit into their family's daily life; give parents advice on how to solve problems at home with their child; help parents get services for their child from other agencies and programs; help parents get information they need about their child's growth and development; point out what parents do well.

[d] Strongly agree that HS Specialists discussed 3 or more family risk factors with parents: mother's or father's substance abuse; maternal depression; domestic violence or child abuse.

[e] Strongly agree that HS Specialists talked to parents about child's behavior and development: encouraged parents to talk about problems they or their young child were experiencing; listened carefully to what parents said about their child; gave parents advice about solving problems that they were having at home with their child; gave parents help understanding their child's growth and development; checked the progress of their child.

[f] Strongly agree that HS Specialists showed parents activities and gave them information about what to do with child: showed parents activities that they could do with their child to help her/him grow and learn; told parents about the kinds of behaviors they could expect to see in their child in the next six months; helped parents organize the daily routines for their child; let parents consider options for themselves and their child that were best for both of them.

[g] Strongly agree that HS Specialists provided emotional support; referred parents for help with their emotional problems: provided emotional support; referred parents for help with their emotional problems.

[h] Strongly agree that HS Specialists discussed temperament, sleep problems, or both with parents: discussed temperament, sleep problems (1 or more items).

4.6.A.2. Parent Interview Variables

In the 2-4 month and 30-33 month parent interviews, we created subscales for the newly developed instruments to measure the parent's perception of the care they and their child received from the child's health care providers. A set of questions was developed that asked about the parent’s level of agreement with descriptions of the care their baby received from physicians (MDs) and nurse practitioners (NPs) at the baby's doctor's office. These descriptions were repeated for other clinical staff there. A similar but more extensive list of questions was developed for the 30-33 month interview. These questions described various aspects of the care received from doctors and nurse practitioners only. Similar scales were developed for questions about the HS Specialists. Parents were asked somewhat different questions in the 2-4 months interview than in the 30-33 month interview. Counts of the number of HS services received and of the number of topics discussed with the parents were assessed in terms of their psychometric properties. **Table 4.10** describes the parent interview variables designed specifically for the evaluation.

Tables 4.11 and **4.12** show the alpha values for each of the scales and subscales used in the evaluation for both standard measures as well as those specifically developed for the evaluation. These tables include the number of items in the scale, their range of scores in the 2-4 month and 30-33 month interview samples and their mean and standard deviations. The total scale scores and average scores, as measured by the total score divided by the number of items, also are shown.

Table 4.10. Receipt of Services and Parent Satisfaction Measures Designed for the National Healthy Steps Evaluation

DOMAIN	MEASURE (S)	DESCRIPTION
Receipt of HS services (2-4 months of age, 30-33 months of age)	Number of HS services received	Respondents to the 2-4 Month interview and the 30-33 Month interview were asked whether or not they had received several services offered under the HS program. These included: parent support groups; office visits about baby's development; office visits about taking care of the baby; telephone number to discuss baby's development; letter to prepare for office visits; brochures about baby's development; special health booklet.. These items were combined to develop a composite measure.
Receipt of HS services (2-4 months of age, 30-33 months of age)	Number of topics discussed	Topics discussed at 2-4 Months included: calming baby, sleep position, routines, solid foods, and car seat. Topics discussed at 30-33 Months included: importance of regular routines for young children; sleep problems; discipline; language development; toilet training; sibling rivalry; home safety; child's development; child's temperament; ways of helping child learn. These items were combined to develop a composite measure.
Satisfaction with pediatric care (when child 2-4 months of age)	Disagree that doctor or nurse practitioner "helps" parents Disagree that nurses and other staff "help" parents Disagree that doctor or nurse practitioner "listens" to parents Disagree that nurses and other staff "listen" to parents	Respondents to the 2-4 month interview were provided with a series of statements describing the ways doctors and nurse practitioners interacted with them at the evaluation site. The response to each item was rated on a 4-point Likert scale with a value of 1 being *strongly disagree* with the statement and a 4, *strongly agree.* In developing the satisfaction scales, we began our assessment by reviewing the content of the items in the instrument and combining those with similar content into four possible subscales related to: giving time to the family; listening to questions and encouraging questions from parents; supporting parents in the care of their child; and giving parents advice about resources or activities they might engage in with their baby. We then evaluated the internal consistency of the four potential subscales for doctors/nurse practitioners and for other staff. We also combined the first two and second two subscales together to form a subscale reflecting listening to parents and one measuring support and resources to parents, respectively. We decided to use these latter two subscales because the alpha values were higher than the values for the shorter subscales, and the items all contributed to the overall scale. The alpha values exceeded 0.80 for both subscales and for both types of clinicians. A score of 21 or lower indicated *disagreed* with "helping" and a score 19 or lower indicated *disagreed* with "listening."
Satisfaction with pediatric care (when child 30-33 months of age)	Disagree that doctors and nurse practitioners provided "support" to parent Disagree that doctors and nurse practitioners "listened" to parent Disagree that that doctors and nurse practitioners respected parent's knowledge, knew what was going on with the child, and made them feel like they were doing a good job	Respondents to the 30-33 month interview were provided with a series of statements describing the ways doctors and nurse practitioners interacted with them at the evaluation site. The response to each item was rated on a 4-point Likert scale with a value of 1 being *strongly disagree* with the statement and a 4, *strongly agree.* This instrument was divided into three subscales based on the content of the item and the results of a factor analysis. The first subscale was level of agreement that doctors and nurse practitioners provided "support" to parents. This subscale includes: doctors and nurse practitioners suggested things that I could do for child that fit into my family's daily life; helped me get all the information I need about child's growth and development; helped me get services for child from other agencies about programs; gave me advice on how to solve problems at home with child; gave me new ideas about things to do with child; pointed out what I did well as a parent. A score of 14 or below indicated disagreement. The second subscale, level of agreement that doctors and nurse practitioners "listened" to parents, includes: doctors and nurse practitioners always had time to answer my questions about child; seemed to have other things on their minds when I talked with them; acted like I couldn't understand information about child's growth and development; seemed to think carefully about my questions about child's development; were always in a rush when they saw child; encouraged me to ask questions about child's growth and development; did not really give me a chance to ask questions about child. A score of 19 or below indicated disagreement. The third subscale, level of agreement that doctors and nurse practitioners respected parent's knowledge, knew what was going on with the child, and made them feel like they were doing a good job, includes: doctors and nurse practitioners understood that I know child better than anyone else does; made me feel like I was doing a good job caring for child; seemed to know what was going on with child. A score of 9 or below indicated disagreement.

Table 4.10. (Continued) Receipt of Services and Parent Satisfaction Measures Designed for the National Healthy Steps Evaluation

DOMAIN	MEASURE(S)	DESCRIPTION
Satisfaction with care from HS Specialist (when child 2-4 months of age)	Agreement that the HS Specialist "listens and shows respect to parents", helps parents promote the growth and development of their child, and provides emotional support	The 2-4 month interview included questions on care provided by the HS Specialists provided to families. Respondents answered a series of statements describing the services they may have received from the HS Specialist. The response to each item was rated on a 5-point Likert scale with a value of 1 being *strongly disagree* with the statement and a 5, *strongly agree.* Here, the items were combined for three content areas on the based on the content of the items and a factor analysis. There were: listens and shows respect to parents; helps parents promote the growth and development of their child; and provides emotional support to parents. The cronbach alpha values for all three subscales exceeded 0.80. Because there were considerable missing data for one item related to referring parents for help, each scale was computed by taking the total score for all items with responses divided by the total number of items with responses. Only parents who had a missing value for one item or less are included in the analysis for these scales (for the emotional support subscale, it was 2 or less items with missing values). A mean score of 3.6 or higher indicated the mother *strongly agreed* that the HS Specialist showed respect, 3.57 or higher that HS Specialist helped, and 3.67 or higher that the HS Specialist provided emotional support. A mean score of 3 or higher indicated the mother *agreed* that the HS Specialist showed respect, 2.5 or higher that HS Specialist helped, and 2.5 or higher that the HS Specialist provided emotional support.
Agreement about services received from HS Specialist (when child was 30-33 months of age)	Agreement that HS Specialists provided services	We queried mothers about their receipt of 12 specific services HS Specialists were expected to provide. The response to each item was rated on a 4-point Likert scale with a value of 1 being *strongly disagree* with the statement and a 4, *strongly agree.* These responses were combined into one scale representing overall agreement or disagreement regarding receipt of HS Specialist services. A score of 23 or higher indicated the mother *agreed* that she received the services. A score of 32 or higher indicated the mother *strongly agreed* that she received the services.
Satisfaction with care from HS Specialist (when child 30-33 months of age)	Satisfaction with care from HS Specialists	The 30-33 month interview included questions about mother's satisfaction with nine areas of care provided by the HS Specialists. The response to each item was rated on a 4-point Likert scale with a value of 1 being *very dissatisfied* with the statement and a 4, *very satisfied.* These responses were combined into one scale representing overall satisfaction with the HS Specialist services. A mean score of 2.5 or higher indicated the mother was *satisfied* overall with care from the HS Specialist. A mean score of 3.5 or higher indicated the mother was *very satisfied* overall with care from the HS Specialist.

Table 4.11. Characteristics of Parenting Sense of Competence, Hassles, CES-D Modification and Other Standard Scales in Parent Interviews

	Interview Sample	Number of Items	Range	Cronbach Alpha	Mean	S.D.
CES-D Modification	2-4 Months	14	1-4 (0-42)	0.85	0.42* (5.81) †	0.45* (6.3) †
	30-33 Months	14	0-42	0.86	5.26	6.14
Hassles Scale	2-4 Months	10	1-4 (10-40)	0.73	3.40* (34.0) †	0.48* (4.8) †
	30-33 Months	10	12-40	0.71	33.41	4.59
Parenting Sense of Competence						
Total Score	2-4 Months	17	1-4 (31-68)	0.78	2.91* (49.5) †	0.30* (5.0) †
	30-33 Months	17	32-66	0.65	50.12	4.16
Satisfaction Subscale	2-4 Months	9	1-4 (13-36)	0.71	2.77* (24.9) †	0.37* (3.3) †
	30-33 Months	9	15-34	0.32	25.55	2.41
Efficacy Subscale	2-4 Months	8	1-4 (17-32)	0.71	3.07* (24.5) †	0.33* (2.6) †
	30-33 Months	8	12-32	0.73	24.56	2.67
Parent Behavior Checklist Modification						
Expectations Subscale	30-33 Months	25 of 50 items	45-100	0.85	69.50†	7.24
Nurturing Subscale	30-33 Months	18 of 20 items	20-72	0.80	56.49†	7.82
Parent Response to Misbehavior Modification (4 response categories)						
Physical Discipline	30-33 Months	4	0-12	0.62	2.85	2.02
Reasoning	30-33 Months	6	0-18	0.37	10.33	2.46
Irritability [a]	2-4 Months	3	1-5 (3-15)	0.62	2.09* (6.27) †	0.67* (2.0) †
Child Behavior Checklist						
Aggressive Behavior	30-33 Months	15	0-29	0.85	8.46†	5.01
Anxiety/Depression	30-33 Months	11	0-18	0.68	4.67†	2.88
Sleeping Problems	30-33 Months	7	0-14	0.68	2.85†	2.42

* Total score/number of items

† Total Score

[a] Items include: trouble calming baby; how often baby is fussy; and how often baby is fussy compared to other babies

Table 4.12. Characteristics of Developed Scales in 2-4 Month and 30-33 Month Parent Interviews

	Interview Sample	Number of Items	Range	Cronbach Alpha	Mean	S.D.
Number of Healthy Steps Services Received [a]	2-4 Months	7	0-7	0.66	3.51†	1.67†
	30 Months	6	1-6	0.67	3.47	1.52
Number of Topics Discussed [b]	2-4 Months	5	0-5	0.73	3.47†	1.54†
	30 Months	10	1-10	0.92	6.85	3.09
Satisfaction Subscales						
Helps: MD [c]	2-4 Months	8	1-4 (8-32)	0.89	3.16* (25.3)†	0.41* (3.28)†
Helps: Other Staff [c]	2-4 Months	8	1-4 (8-32)	0.89	3.14* (25.1)†	0.40* (3.20)†
Listens: MD [d]	2-4 Months	7	1-4 (7-28)	0.87	3.28* (23.0)†	0.43* (3.01)†
Listens: Other Staff [d]	2-4 Months	7	1-4 (7-28)	0.87	3.24* (22.7)†	0.41* (2.87)†
Level of Agreement that MDs and NPs Provided "Support" to Parent [e]	30-33 Months	6	1-4 6-24	0.87	17.57	2.97
Level of Agreement that MDs and NPs "Listened" to Parent [f]	30-33 Months	7	1-4 7-28	0.87	22.32	3.13
Level of Agreement that MDs and NPs Respected Parent's Knowledge, Knew What Was Going On with the Child, and Made Them Feel Like They Were Doing a Good Job [g]	30-33 Months	3	1-4 3-12	0.72	9.59	1.32
Healthy Steps Specialist Subscales						
Treats Parents with Respect [h]	2-4 Months	5	1-4 (5-20)	0.88	3.52* (17.6)†	0.44* (2.20)†
Helps Parents Promote Baby's Growth and Development [i]	2-4 Months	7	1-4 (7-28)	0.91	3.31* (23.2)†	0.49* (3.47)†
Gives Parents Emotional Support [j]	2-4 Months	4	1-4 (7-28)	0.83	3.49* (14.0) †	0.45* (1.80)†
HS Specialist Subscales Satisfaction with Care Received from HS Specialist [k]	30-33 Months	9	1-4 17-36	0.93	33.99	3.19
Agreement about Services Received from HS Specialist [l]	30-33 Month	12	1-4 12-48	0.91	38.98	5.46

* Total score/number of items

† Total Score

[a] Services include: parent support groups; office visits about baby's development; office visits about taking care of the baby; telephone number to discuss baby's development; letter to prepare for office visits; brochures about baby's development; and special health booklet.

[b] Topics discussed at 2-4 months included: calming baby; sleep position, routines; solid foods; car seat. Topics discussed at 30-33 Months included: importance of regular routines for young children; sleep problems; discipline; language development; toilet training, sibling rivalry; home safety; child's development; child's temperament; and ways of helping child learn.

[c] Helps parents: points out what parents do well; acts like parents understand information; makes parents feel like they are doing a good job; suggests things to do with baby in daily life; understands that parents know their

baby best; helps parents get needed information; gives parents advice to use at home; gives parents new ideas to do with baby.

[d] Listens: time to answer questions; understands main reason for visit; doesn't have other things on his/her mind; gives parents a chance to ask questions; thinks carefully about questions; not in a rush; encourages questions.

[e] MDs and NPs provided "support" to parent: suggested things that I could do for child that fit into my family's daily life; helped me get all the information I need about child's growth and development; helped me get services for child from other agencies about programs; gave me advice on how to solve problems at home with child; gave me new ideas about things to do with child; pointed out what I did well as a parent.

[f] MDs and NPs "listened" to parent: always had time to answer my questions about child; seemed to have other things on their minds when I talked with them; acted like I couldn't understand information about child's growth and development; seemed to think carefully about my questions about child's development; were always in a rush when they saw child; encouraged me to ask questions about child's growth and development; did not really give me a chance to ask questions about child.

[g] MDs and NPs respected parent's knowledge, knew what was going on with the child, and made them feel like they were doing a good job: understood that I know child better than anyone else does; made me feel like I was doing a good job caring for child; seemed to know what was going on with child.

[h] Respects Parents: encourages questions; listens carefully; treats parents with respect; makes parents feel comfortable; always follows through with help.

[i] Helps Parents: gives parents new ideas; shows parents activities with baby; tells parents about activities with baby; discusses recommendations specific to baby's need; helps parents understand baby's growth and development; tells parents what to expect; checks baby's progress.

[j] Supports Parents: helps parents understand their frustration; provides emotional support; refers parents for help; helps parents know what to do when upset with baby.

[k] Satisfied with Care from HS Specialists: written information the HS Specialist gave you about the child's health and development; friendliness and caring of the HS Specialist; attention the HS Specialist paid to what you had to say; opportunity you had to ask questions of the HS Specialist; explanations the HS Specialist gave you about child's health and development; how capable the HS Specialist was in working with you to promote child's health and development; support you received from the HS Specialist regarding your role as a parent; amount of time the HS Specialist spent with you; information from developmental assessments that the HS Specialist did.

[l] Agreement About Services Received from HS Specialist: showed you activities that you could do with child to help him/her grow and learn; checked child's progress; told you about the kinds of behaviors you can expect to see in child in the next few months; told you about ways to make your house safe for child; always followed through with what s/he said he would do; never made you feel as if your feelings or concerns about child were wrong; let you consider options for you and child that were best for both of you; helped you know what to do when child upsets you or does something wrong; helped you to understand child's temperament; helped you organize the daily routines for child; referred you for help with emotional problems; helped you find good child care arrangements.

4.6.A.3. Vaccine and Visit Variables

4.6.A.3.A. Age-Appropriate Well Child Visits

As specified in the HS protocols, "HS follows standard, well-tested, and respected guidelines for pediatric care, including the American Academy of Pediatrics (AAP) guidelines for scheduled visits and immunizations." The AAP guidelines for well child visits specify a first visit within 1 month of birth followed by visits at 2, 4, 6, 9, 12, 15, 18, 24, and 36 months.

A well child visit was defined as a visit for regular well-child care (visits for a weight check only or research study participation only were not included). A well child visit that occurred within the recommended period was considered age-appropriate (See **Table 4.13** for variable definitions).

4.6.A.3.B. Age-Appropriate and Up-to-Date Immunization

We defined two categories of immunization measures based on the 1997 edition of the American Academy of Pediatrics' Report of the Committee on Infectious diseases (Red Book) (American Academy of Pediatrics, 1997), the edition in use when the majority of children were eligible for vaccination. These two measures were age-appropriate vaccination and up-to-date vaccination (Detailed definitions of these variables can be found in **Table 4.13**).

Up-to-date vaccination status was measured at 24 months (UTD-24). Children were considered up-to-date if they had received four doses of diphteria-tetanus-petussis (DTP) vaccine, three doses of polio vaccine, and one dose of measles-mumps-rubella (MMR) vaccine by age 2 years. These particular vaccines were the focus of study because they comprise the historical measures of vaccination status and were less influenced by site variation in the use of combined vaccines. Doses received before the minimum age for the vaccine dose or outside the minimum interval between doses were not counted.

A series of age-appropriate vaccination indicators specified on-time vaccination. An age-appropriate vaccine was one given

Table 4.13. Well Child Visits and Vaccinations: Variables and Denominators Reported in the Healthy Steps Evaluation

AA Well Child Visit	Variable Definition (Numerator)	Sample Definition (Denominator): Children who made a visit during or after previous AA well child visit window
1 month	Visit within 41 days of birth	all
2 months	Visit between 42 days (1.5 months) and 92 days (3 months), inclusive	all
4 months	Visit between 93 days (3 months) and 151 days (5 months), inclusive	>=42 days
6 months	Visit between 152 days (5 months) and 213 days (7 months), inclusive	>=93 days
9 months	Visit between 244 days (8 months) and 305 days (10 months), inclusive	>=152 days
12 months	Visit between 336 days (11 months) and 426 days (14 months), inclusive	>= 244 days
15 months	Visit between 427 days (14 months) and 518 days (17 months, inclusive)	>= 336 days
18 months	Visit between 519 days (17 months) and 608 days (20 months), inclusive	>= 427 days
24 months	Visit between 701 days (23 months) and 851 days (28 months)	>= 519 days
Age-Appropriate Vaccination	Variable Definition (Numerator)	Sample Definition (Denominator): Children who made a visit during or after previous AA well child visit window
DTP1 (2 months)	DTP1 given between 42 days (6 weeks) and 92 days (3 months), inclusive.	all
DTP3 (6 months)	DTP1 given on or after 42 days (6 weeks) -and- DTP2 given at least 28 days after DTP1 -and- DTP3 given at least 28 days after DTP2 and before 213 days (7 months) of age, inclusive.	>=93 days
MMR (12-15 months)	MMR given between 365 days (12 months) and 488 days (16 months), inclusive.	>=336 days
Up-to-Date at 24 Months	Variable Definition (Numerator)	Sample Definition (Denominator): Children who made a visit after 20 months)
UTD-12 4.3.1 (Up-to-Date by 24 months for 4 DTPs, 3 IPV/OPVs, 1 MMR)	DTP1 given on or after 42 days (6 weeks) -and- DTP2 given at least 28 days after DTP1 -and- DTP3 given at least 28 days after DTP2 -and- DTP4 given at least 184 days (6 months) after DTP3 and between 365 days (12 months) and 24 months of age, inclusive -and- OPV/IPV1 given on or after 42 days (6 weeks) -and- OPV/IPV2 given at least 28 days after -and- OPV/IPV3 given at least 28 days after OPV/IPV2 and between 184 days (6 months) and 24 months of age, inclusive -and- MMR given between 365 (12 months) and 24 months of age, inclusive.	

during the recommended age interval for that vaccine dose. The variables assessed included the first, second, third, and fourth doses of DTP vaccine, recommend at 2 months, 4 months and 6 months, and between 15 and 18 months, respectively; the first, second, and third doses of polio vaccine (IPV or OPV); recommended at 2 months, 4 months, and between 6 and 18 months, respectively; and MMR, recommended between 12 and 15 months of age.

4.6.A.4. Variables in Assessment of Sustainability

To examine factors related to the sustainability of HS at the site level, a matrix that identified key areas and sub-factors conceptually and empirically related to sustainability was developed. In each of the key areas variables were selected or constructed to represent the sub-factors. These variables were drawn from objective measures found in the site questionnaires and provider surveys, questions included in the key informant interviews, and data abstracted from National Program Office documents. Descriptive data were further reduced by coding the qualitative answers to develop variables for the assessment. **Table 4.14** provides the detailed definitions of these variables. Chapter 16 provides a full description of the assessment of sustainability.

4.6.B. Analysis Methods

Analyses were conducted to describe HS program implementation, to estimate the impact of HS on the attitudes and practices of clinicians and non-clinicians at the sites, and to obtain an overall estimate of program effects on parent and child outcomes.

4.6.B.1. Program Implementation

Documentation of sites' perspectives on program implementation relied on both quantitative and qualitative data. The site questionnaire included objective questions for which frequencies could be obtained. The key informant interviews, on the other hand, contained both qualitative and quantitative elements and the qualitative sections required several analytic steps.

Table 4.14. Variables Reported in the Assessment of Sustainability

Items	Data Sources	Definition/Coding
Identified Need & Buy-in		
Links to community services prior to implementation of HS	Baseline Site Questionnaire	On the baseline site questionnaire, the respondent (in most cases, the site administrator) was asked to indicate which services the practice provided on site, referred to agencies/departments within the institution or referred to agencies outside the practice/institution. Eighteen of 31 possible services were selected. This item reflects the ratio of the total number of services referred "outside" the practice/institution to the number referred "inside" the institution.
Fit of HS with Institution/Practice		
Provision of selected services and referral patterns at 30 months	30-Month Site Questionnaire	Similar to the baseline site questionnaire, the site questionnaire conducted 30 months into the program asked the respondent (again, in most cases, the site administrator) to indicate which services the site provided and which the site referred. We selected 33 services from 60 that strongly reflected the philosophy or goals of Healthy Steps. This item reflects the ratio of the total number of these selected services referred to the total number of these services not provided at 30-months.
HS Specialists' assessment of barriers to implementation at 30 months	Baseline and 30-Month Key Informant Interviews	At start-up, HS Specialists were asked, "*Have there been (are there) any barriers in implementing the HS program in this practice/clinic?*" At 30-months, they were asked, "*What would you say have been your greatest challenges working as a HSS at your site*? Two members of the evaluation team categorized their responses to each of these questions as *structural/ logistical*, *organizational/ relationship*, *both structural and organizational* or *other* barriers.
Average rating of practice environment at start-up and 30 months	30-Month Key Informant Interviews	At 30 months, HS Specialists, site administrators and lead pediatricians were asked to rate the overall practice environment at the beginning of HS and 30 months into the program on a scale of 1 (*very good*) to 5 (*very poor*). Based on the ratings of all key informants, the average score for each site was calculated.
Level of agreement among medical staff regarding the direction of change in practice brought about by HS	30-Month Provider Surveys	At 30 months, all MDs/NPs and Nurses/Other Clinical Staff who worked with Healthy Steps families were surveyed. As part of the survey, they were asked a series of questions about their satisfaction with the HS program. These questions were scored 1 (*strongly disagree*) to 5 (*strongly agree*). This item captures the level of agreement among staff that HS brought negative changes to the practice. It reflects the average score of all respondents at each site to 3 specific questions. These include: if they felt the HS program 1) has increased waiting times at visits for families; 2) has caused problems in scheduling visits for families; and, 3) has been just one more thing that staff have to do.

Table 4.14. (Continued) Variables Reported in the Assessment of Sustainability

Items	Data Sources	Definition/Coding
Program Implementation		
Mean site stability score	30-Month Key Informant Interviews	A measure of site stability was created based on the HS Specialists, site administrators and lead pediatricians' reports of major administrative, financing and staffing changes that occurred at the site during the program and how disruptive they were to the program. Five members of the evaluation team, working independently, used their responses to rank each site in terms of its stability over time. Using a scale of 1 to 5 (1 more stable to 5 less stable), each member of the team made a subjective assessment of the stability of the site over time. This ranking was done to capture the circumstances in which the Healthy Steps program took place and was not meant to serve as a measure of the quality of the site or the quality of the implementation of the Healthy Steps program at the site. It is possible, for example, that an individual site had an enormous amount of change and still administered Healthy Steps with few problems.
HS Specialists' reported receipt of quality clinical and administrative support	30-Month Key Informant Interviews	Approximately 30 months into the program, HS Specialists were asked two separate questions regarding the overall quality of support they received with respect to the professional/clinical and administrative/ program aspects of their job. For example, *"Overall, how would you characteristic the support you have gotten over the past year with respect to the professional, clinical aspects of your job (for example, was it adequate; has it been critical to the success of your work; in what ways could it have been improved)?"* Two members of the evaluation team assessed their responses to each question and scored them as *positive*, *negative* or *both positive* and *negative*. HS Specialists' responses were combined at each site.
HS Specialists' report that various staff members communicated effectively	30-Month Key Informant Interviews	HS Specialists were asked if staff members --lead pediatricians, other physicians in the practice and the nursing staff—communicate effectively with them. A mean score was calculated for each site based on the combined responses from the HS Specialists.
Program Champions/Leaders		
Champions identified and categorized	30-Month Key Informant Interviews	HS Specialists were asked, *"Outside of yourself or another HS Specialist, is there a real 'champion' for HS at your site?"* This item represents the total number of unique individuals identified by all of the HS Specialists at each site.
Satisfaction of clinicians with HS	30-Month Provider Surveys	At 30 months, all MDs/NPs and Nurses/Other Clinical Staff who worked with Healthy Steps families were surveyed. As part of the survey, they were asked a series of questions about their satisfaction with the HS program. These questions were scored 1 (*strongly disagreed*) to 5 (*strongly agree*). This item is the average score of all respondents at each site to 3 specific questions. These include if they felt the HS program 1) has helped me learn more about the families in our practice; 2) has made me more aware of mental illness, substance abuse violence and other problems in my patient's families, and 3) has given me greater satisfaction that I am helping to improve the lives of my patients and their families.
Lead pediatrician's awareness of a local advisory board	30-Month Key Informant Interviews	At 30 months, the lead pediatrician at each site was asked if there is a local advisory committee involved with the HS program. This item reflects whether the lead pediatricians answered yes or no.
Sustainability Goals and Actions		
Actions aimed at continuing HS program including community involvement; marketing; program alterations, foundation issues and funding	Site Visit I, Site Visit II, NPO Program & Operations Logs	We abstracted information from the NPO's SV I, SV II and reports/logs regarding efforts sites made related to promoting HS program continuation. For 9 created categories, we calculated a count for each and identified early (SV I) or later (SV II and subsequent logs).

The first step in organizing the qualitative data in both time periods was to summarize the information received from each informant under topic areas. Topic areas were based on one or more of the individual questions asked.

The second step was to organize the topic areas into summaries of informants across sites by informant category (HS Specialist, lead pediatrician, site administrator) and within sites across informant category. This resulted in two summarized data sets for each time period. The organization of responses by site and by informant type provided a framework for describing the content of the interviews. It was possible to determine the consistency in responses within each site as well as consistency and differences across sites.

The data were analyzed by four evaluation team members, divided into two teams to review the summaries by informant type across sites, and within sites across informants. To further reduce the data to manageable segments, topics were identified by each reviewer individually. A final set of topics integrating the work of all analysis team members was developed by consensus. These topics provide the basis for the organization of the findings. The topics developed were: 1) the background and practice context into which HS was placed; 2) the spectrum of the implementation of HS; 3) the HS program and its components; 4) the strengths, benefits and challenges of HS; and 5) the HS Specialist's role and the future of HS.

4.6.B.2. Impact of Healthy Steps on Providers

Analyses were conducted to evaluate whether: (1) the attitudes and perceptions of clinicians and practice staff about developmental services for young children changed between baseline and 30 months; and (2) the change for clinicians was different between intervention and control. Analyses were conducted separately for RND and QE sites because of the different evaluation designs. Clinicians at the RND sites cared for both the intervention and control families. This phenomenon did not occur at QE sites where the intervention and control practices were geographically separate.

With the exception of the continuous response for time spent at well child visits, all responses were dichotomous. First, data were pooled across control groups and across intervention groups separately for the QE sites and at the RND sites. Changes in attitudes and practices from baseline to 30 months were compared using chi square tests for dichotomous variables and a t-test for the continuous variable. Second, marginal regression models (logistic models for the dichotomous outcomes and a linear model for the continuous outcome), fit using generalized estimating equations (GEE) were used to estimate the effects of interest (Liang and Zeger, 1986; Diggle et al., 1994). These models account for correlation of responses within individual respondents. This correlation exists for two reasons. First, at RND sites, the same clinicians served intervention and control families and, accordingly, answered some questions for both groups. Second, the same individual, whether located at a RND or QE site, may have responded at both baseline and 30 months. The marginal models also accounted for the fact that clinicians and staff at the same site tended to respond more similarly than their counterparts at other sites through the inclusion of site-specific indicator variables.

For the continuous outcome (time spent at well child visits), effects are reported as a difference of means between 30 months and baseline. The effect of HS on these changes is reported as a difference in the differences between intervention and control groups. For the dichotomous outcomes, the effects are reported as odds ratios between 30 months and baseline. The effect of HS on these ratios is reported as the ratio of the odds ratio for HS to the odds ratio for control groups. P-values based on Wald-type tests of the null hypotheses of no temporal changes (baseline to 30 months) and no effect of HS are computed, and 95% confidence intervals are presented, as appropriate. These tests and confidence intervals were computed using robust standard errors. In one instance in which all respondents in ore or more of the time-by-treatment strata provided a positive response, the models did not converge.

4.6.B.3. Analysis of Parent and Child outcomes

4.6.B.3.A. Intention to Treat

We assessed effects for HS families as a whole. The evaluation utilized an intention to treat approach, in which intervention and control groups were compared without regard to the intensity of services delivered at the individual level. Our resulting estimate of "treatment effect" is a measure of "program effectiveness" (Sommer and Zeger, 1991). This estimate tells us what the overall effect of the HS program would be if it were adopted in the community. There are two main advantages of such an analysis: it is estimating a quantity that is interesting from a policy perspective and it can be conducted with relatively few assumptions.

In addition to estimating the overall treatment effect of HS, we also examined subgroup variation in outcomes. These analyses examined differences in outcomes based on maternal age at birth, birth order, and income. These subgroup analyses are still considered intention to treat, in the sense that intervention and control groups within the same subgroup are compared without regard to the intensity of services delivered. Analyses were conducted under the following guidelines: the subgroups were those that were thought most likely to benefit from treatment; subgroups were defined using baseline factors (subgroup analyses based on post-randomization factors are subject to potential bias because the comparability of intervention and control groups cannot be guaranteed); and the number of subgroups was restricted and was based on solid *a priori* (documented) hypotheses.

In both the overall and subgroup intention to treat analyses, there are families in the intervention group who receive few or no HS services. If one assumes that that the numbers of these families are relatively large and there is an effect of HS, including them in the analysis may yield statistically or clinically non-significant intention to treat results. Although this seems intuitively unappealing, these families cannot simply be removed from the analysis. Removing them could detrimentally affect the likely comparability of groups promised by randomization and thus introduces bias.

In place of intention to treat analysis, "dose-response" analysis strategies can be used to estimate a casual link between the intensity of services and outcomes. In contrast to intention to treat analyses, dose-response analyses are focused on "program efficacy." The main advantage of a dose-response analysis is that it permits estimation of quantities that are interesting from a policy and scientific perspective. The main disadvantage is that the analysis strategies rely on strong assumptions that cannot be fully validated from the data. The evaluation did not utilize these strategies.

4.6.B.3.B. Analysis Steps

There were four major steps in the analysis. In the first three steps, the QE and RND sites were treated separately. At the RND sites, because of randomization, intervention and control families were expected to be similar on both measured and unmeasured baseline characteristics. Although the comparison practices at QE sites were selected based on their apparent similarity to the intervention practices, we expected at least some differences in practice characteristics and baseline family characteristics. Thus, results at the RND sites are less sensitive to criticisms of bias. Where results for QE sites and RND sites are in the same direction, they strengthen our ability to draw conclusions.

Step 1. Pooled Data (Bar Graphs). In the first step of the analysis, the data were pooled across control groups and across intervention groups at the QE sites and at the RND sites. Although this first step is straightforward, it is not optimal for several reasons. The results may be driven by just a few sites, which may not be reflective of the overall effect of HS. There may be some characteristics that influence both the adoption of HS and the outcomes. Pooling data can lead to biased estimates; that is, it is theoretically possible that if we did not pool data we would see that HS was superior at each site, but after pooling we see the opposite effect. Characteristics of families across sites tend to differ more than within sites, and pooling can lead to biased estimates of the estimates of program effects. This can lead to incorrect conclusions when hypothesis testing is used.

Step 2. Magnitude and Variability (Scatterplots). In the second step of the analysis, site level comparisons of the effects of HS were performed to see if they were consistent with the results of the first step. These results tell us about the magnitude and variability of the effects across sites. These analyses also account for the fact that the implementation of HS may be different across sites. However, they do not provide a combined estimate of the overall effectiveness of HS, nor do they make it possible to adjust for potential confounding factors or assess the effect of covariates on outcomes. Sample size at each site is a constraint as well.

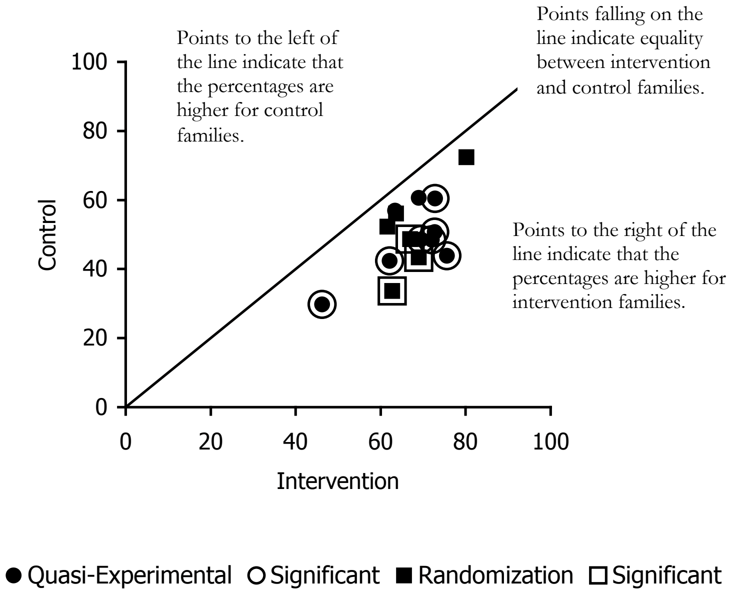
Step 3. Regression Models (Odds Ratios). To correct for the disadvantages of the first two steps, regression models were employed. The advantages of these models are fourfold. They provide a method for obtaining an overall unbiased estimate of the effect of HS. They also allow us to adjust for potential confounding due to differences between intervention and control groups on baseline characteristics that might have resulted from non-random assignment at QE sites, chance imbalance at RND sites, or selection bias due to non-response. They also allow us to account for the fact that individuals at the same site respond more similarly than individuals at other sites. Logistic regression was used for dichotomous outcomes and linear regression for continuous outcomes. Intervention effects for dichotomous outcomes were reported as odds ratios and for continuous outcomes as mean differences.

Adjusting for baseline characteristics is necessary because it is possible that these characteristics might lead to differences in some of the variables of interest in the evaluation. Therefore their effects must be considered to be able to get a clear picture of what the effects of HS are regardless of differences in participants that are not attributable to their participation in the program. "Adjusting" for differences in these baseline characteristics is a way of statistically "leveling the playing field" (much like using handicaps in horse racing or golf) that makes it possible to estimate the effects of HS taking into consideration that participants may be different at the outset of the program.

Step 4. Pooling QE and RND Analyses. In this step, results were pooled across QE and RND analyses. They were interpreted with careful attention to the separate RND and QE analyses. The pooled results represent a "weighted average" of the separate analyses. We feel most comfortable with the results of the pooled analyses when the effects of the separate analyses are in the same direction.

Figure 4.2 is a representative scatterplot that serves to introduce this method. The variable of interest is the percent of respondents who reported that someone at their practice went out of the way for them. On the horizontal axis, the percentages for the intervention families are displayed, while the percentages for the control families are depicted on the vertical axis. Across all practices, the range (i.e., variability) of this variable is from a low of 29.7% to a high of 72.8 %. Each point in the scatterplot represents the pairing of percentages for a particular site. The solid line serves as a reference to indicate equality between the intervention and control families at each site. The points to the right of this line indicate that the percentages are higher for the intervention families while the points to the left of the line indicate that the percentages are higher for the control families. The outlined point indicates that there is a significant difference (at the 0.05 level) between control and intervention at this site (in this example, all significant points are in favor of the intervention). The square points indicate RND sites and the round points, QE sites. It is clear from the scatterplot that the percentage of parents reporting someone going out of the way for them is greater for intervention families at all sites and is

Figure 4.2. Percentage of mothers reporting that someone in the practice went out of the way for them (30-33 months)



statistically significant at all but 5 sites.

The results of Step 2 analyses are shown as scatterplots. Scatterplots are a useful way of consolidating information about intervention and control families within and among sites on a variable of interest. They allow us to view the magnitude of the effects of a variable at particular sites and to assess the differences between intervention and control families at the same site. However, in comparisons at the site level, because of sample size limitations, we may not have the statistical power to detect differences that may exist across sites.

Each point on the scatterplot (**Figure 4.2**) can be translated into an odds ratio, which is one way of quantifying the effectiveness of the intervention at each site. Odds ratios are positive numbers. An odds ratio of 2 indicates that "subjects at an intervention site have twice the odds of reporting that someone went out of the way for them than subjects at the comparison site;" an odds ratio of 0.5 indicates that "subjects at an intervention site have half the odds of reporting that someone went out of the way for them than subjects at the comparison site;" and an odds ratio of 1 indicates that there is no difference between intervention and control. For continuous outcomes, instead of the odds ratio, we use the difference in means as the measure of effectiveness.

For the Step 3 analyses, we combine these site-specific odds ratios into an overall number. This is done separately for the QE and RND sites. There are many ways to construct such a number. Regression models are one such construction tool. Within this framework, we estimated the odds adjusted for potential confounding factors. These analyses account for the fact that subjects within sites tend to respond more similarly than do those at other sites through the inclusion of site-specific indicator variables. They further control for site of enrollment (hospital or office), age of the child at interview (for 2-4 month subsample only), and potential differences in the baseline characteristics of the mother (age, education, race/ethnicity, employment), father (employment), family (marital status/father in household, number of siblings, owned own home, income group) and baby (low birth weight, source of payment for care). It is important to note that the results of these analyses may differ somewhat from the step 1

4.6.B.3. Analysis of Visits and Vaccinations

The age-appropriate analyses of well child visits and vaccinations are based on medical records data. The sample for each age-appropriate visit or vaccine indicator differs. This is because not all children continued their care at the site through 32 months. Children who made a visit during or after the previous age-appropriate well child visit window were considered eligible for age-appropriate visit or vaccination. Children who made a visit on or after 20 months were included in the analysis of up-to-date vaccination. Twenty months represents the upper limit of the recommended age range for the last recommended well child visit at which an immunization would be due.

A strict intention to treat approach to comparing effects between intervention and control groups would include all children who entered the study in the analysis even though they may no longer be in care at the practice. In the HS evaluation, analyses found no differences over time between the intervention and control groups in whether families viewed their practice as their child's site of care. However, the control group did make significantly fewer visits than the intervention group. In a pure intention to treat approach, the actual levels of on-time vaccination and visits fall more sharply over time as families leave the practice and the differences between intervention and control groups become more apparent. The modified approach used in the HS evaluation includes only children who were in the practice and available for vaccination and visits (as defined above). Both approaches in the HS evaluation found similar treatment effects. Results for the modified approach were reported because measuring vaccination and attendance levels for only those children in care is more familiar in clinical practice.

4.6.C. Co-Variates and Outcome Variables

Table 4.15 lists the Step1, Step 2, and Step 3 variables covered in this report. Outcome variables are organized according to the conceptual framework for the evaluation. For each of the variables, the data source also is indicated.

Table 4.15. Co-Variates and Outcome Variables, Age at Assessment, and Data Sources [a]

	Step 1	Step 2	Step 3	Child's Age (in months) at Assessment	Data Source
BASELINE CO-VARIATES					
Enrollment site (hospital or office)	Enrolled in hospital	Enrolled in hospital	Enrolled in hospital	<1	Enrollment
Source of Payment for Baby's Medical Care (private, self-pay, Medicaid/other public)	% Public aid	% Public aid	% Public aid	2-4	Parent Interview
Household Income (income tertiles)	% Low income, < $20,000	% Low income, < $20,000	% Low income, < $20,000	2-4	Parent Interview
	% Middle income, $20,000 - $49,999	% Middle income, $20,000 - $49,999	% Middle income, $20,000 - $49,999 (reference)	2-4	Parent Interview
	% High income, $50,000 or more	% High income, $50,000 or more	% High income, $50,000 or more	2-4	Parent Interview
Family Owned Own Home	% Owned own home	% Owned own home	% Owned own home	2-4	Parent Interview
Birth Order	Distribution	% First child	% First child	2-4	Parent Interview
Mother's Age at Child's Birth	% Less than 20 Years	% Less than 20 Years	% Less than 20 Years	< 1	Parent Form
	% 20-29 Years	% 20-29 Years	% 20-29 Years (reference)	< 1	Parent Form
	% More than 30 years	% More than 30 years	% More than 30 years	< 1	Parent Form
Mother's Race (White, Black/African-American, Asian/Native American, Other)	% Black/African-American	% Black/African-American	% Black/African-American	< 1	Parent Form
Mother's Ethnicity (Hispanic vs non-Hispanic)	% Hispanic	% Hispanic	% Hispanic	< 1	Parent Form
Mother's Education (college, some college, high school graduate/no college, not high school graduate)	% College Graduates	% College Graduates	% College Graduates	< 1	Parent Form
	% Some college	% Some college	% Some college (reference)	< 1	Parent Form
	% High School Graduate/no college	% High School Graduate/no college	% High School Graduate/no college	< 1	Parent Form
	% Less than High School Graduate	% Less than High School Graduate	% Less than High School Graduate	< 1	Parent Form
Mother's Marital Status	% Married and Living with Father	% Married and Living with Father	% Married and Living with Father	< 1	Parent Form
Mother's Employment Status	% Employed	% Employed	% Employed	2-4	Parent Interview
Father's Employment Status	% Employed	% Employed	% Employed	< 1	Parent Form
Baby's Birth Weight	% low (<2500 grams)	% low (<2500 grams)	% low (<2500 grams)	< 1	Enrollment

Table 4.15. (Continued) Co-Variates and Outcome Variables, Age at Assessment, and Data Sources [a]

	Step 1	Step 2	Step 3	Child's Age (in months) at Assessment	Data Sources
RECEIPT OF SERVICES					
Number of HS Services Received from Practice [b] *(Excluding Home Visiting)*	Distribution	% 4 or more * services	% 4 or more * services	2-4, 30-33	Parent Interview
Received Handouts: Development)	% Yes			2-4, 30-33	Parent Interview
Received Special Health Booklet (to keep track of child's information)	% Yes			2-4, 30-33	Parent Interview
Received Office Visit about Child's Development	% Yes			2-4, 30-33	Parent Interview
Received Letter to Prepare for Office Visit	% Yes			2-4, 30-33	Parent Interview
Telephone number to Call about Child's Development	% Yes			2-4, 30-33	Parent Interview
Parent groups Offered by Practice	% Yes			2-4, 30-33	Parent Interview
Someone Visited Parent or Child in Their Home Since Birth (2-4 months) and Since 6 Months (30-33 Months)	% Yes	% Yes	% Yes	2-4, 30-33	Parent Interview
Number of Topics Someone in the Practice Talked with Parent or Gave them Information [c]	Distribution	% 5 Topics (2-4 months), more than 6 topics (30-33 months	% 5 Topics (2-4 months), more than 6 topics (30-33 months)	2-4, 30-33	Parent Interview
Given Developmental Assessment by Someone in Practice	% Yes	% Yes	% Yes	30-33	Parent Interview
Received Books to Read to Their Child from Practice	% Yes	% Yes	% Yes	30-33	Parent Interview
Received Information About Community Resources From Someone in Practice	% Yes	% Yes	% Yes	30-33	Parent Interview
Child Diagnosed or Referred for Problem with Walking, Talking, Hearing, or Using His/Her Hands	% Yes	% Yes	% Yes	30-33	Parent Interview
PARENT KNOWLEDGE, BELIEFS, PSYCHOLOGICAL HEALTH					
Someone Went Out of Way to Help	% Yes	% Yes	% Yes	2-4, 30-33	Parent Interview
Satisfaction with Help from MD/NP [d]	% not satisfied	% not satisfied	% not satisfied	2-4	Parent Interview
Satisfaction with Help from Staff [d]	% not satisfied	% not satisfied	% not satisfied	2-4	Parent Interview
Satisfaction with Listening of MD/NP	% not satisfied	% not satisfied	% not satisfied	2-4	Parent Interview
Satisfaction with Listening of Staff [e]	% not satisfied	% not satisfied	% not satisfied	2-4	Parent Interview

Table 4.15. (Continued) Co-Variates and Outcome Variables, Age at Assessment, and Data Sources [a]

	Step 1	Step 2	Step 3	Child's Age (in months) at Assessment	Data Sources
PARENT KNOWLEDGE, BELIEFS, PSYCHOLOGICAL HEALTH					
Level of Agreement that MDs and NPs Provided "Support" to Parent [f]	% disagree	% disagree	% disagree	30-33	Parent Interview
Level of Agreement that MDs and NPs Provided "Listen" to Parent [g]	% disagree	% disagree	% disagree	30-33	Parent Interview
Level of Agreement that MDs and NPs Respected Parent's Knowledge, Knew What Was Going On with the Child, and Made Them Feel Like Thy Were Doing a Good Job [h]	% disagree	% disagree	% disagree	30-33	Parent Interview
Overall Perception of Care at Practice (good/excellent)	% Yes	% Yes	% Yes	2-4,30-33	Parent Interview
Overall perception that Doctors and Nurses at the Practice Are Easy to Reach by Telephone	% Yes	% Yes	% Yes	30-33	Parent Interview
Willing to Pay for Healthy Steps services [i]	Distribution	% $100 or more	% $100 or more	2-4,30-33	Parent Interview
Parent Would Rely on Someone in Practice for Advice about Child's Speech (vs. other sources)	% Yes	% Yes	% Yes	6, 12	Parent Form
Parenting Sense of Competence (PSOC) (Total)	mean	mean	mean	2-4, 30-33	Parent Interview
Parenting Sense of Competence (Efficacy)	mean	mean	mean	2-4, 30-33	Parent Interview
Parenting Sense of Competence (Satisfaction)	mean	mean	mean	2-4, 30-33	Parent Interview
Hassles Scale	mean	mean	mean	2-4, 30-33	Parent Interview
Percentage of Mothers with Depressive Symptoms (Score of 11 or Higher on Modified CES-D)	% Yes	% Yes	% Yes	2-4, 30-33	Parent Interview
Mother Made a Mental Health Visit Since Child Was Born	% Yes	% Yes	% Yes	30-33	Parent Interview
Mother Took Medication for Depression	% Yes	% Yes	% Yes	30-33	Parent Interview
Mother Needed Help With Sadness Since Child Was Born	% Yes	% Yes	% Yes	30-33	Parent Interview
Mothers Discussed Sadness with Someone in the Practice	% Yes	% Yes	% Yes	30-33	Parent Interview
Respondents Overall Perception of Their Health (excellent/very good)	% Yes	% Yes	% Yes	30-33	Parent Interview

Table 4.15. (Continued) Co-Variates and Outcome Variables, Age at Assessment, and Data Sources[a]

	Step 1	Step 2	Step 3	Child's Age (in months) at Assessment	Data Sources
PARENT KNOWLEDGE, BELIEFS, PSYCHOLOGICAL HEALTH					
Parent underestimates child's development on modified (30-item) Knowledge of Infant Development Inventory (KIDI)[j]	% underestimate development			2-4	Parent Interview
Parent overestimates child's development on modified (30-item) Knowledge of Infant Development Inventory (KIDI)[j]	% overestimate development			2-4	Parent Interview
Modified Parent Behavior Checklist: Nurturing	% more nurturing (≥ 63)	% more nurturing (≥ 63)	% more nurturing (≥ 63)	30-33	Parent Interview
Modified Parent Behavior Checklist: Nurturing	% less nurturing (≤ 44)	% less nurturing (≤ 44)	% less nurturing (≤ 44)	30-33	Parent Interview
Modified Parent Behavior Checklist: Higher Expectations (>1 SD above mean)	% Higher Expectations (>1 SD above mean)	% Higher Expectations (>1 SD above mean)	% Higher Expectations (>1 SD above mean)	30-33	Parent Interview
Modified Parent Behavior Checklist: Lower Expectations (> 1 SD below mean)	%Lower Expectations (>1 SD below mean)	% Lower Expectations (>1 SD below mean)	% Lower Expectations (>1 SD below mean)	30-33	Parent Interview
PRACTICES AND BEHAVIORS					
(Modified): Parent Response to Misbehavior: Severe Physical Discipline: % Slapped Child in Face or Spanked with Object	% yes	% yes	% yes	30-33	Parent Interview
(Modified): Parent Response to Misbehavior: % Using Harsh Discipline (yell in anger, threaten, spank on hand, spank with hand) (≥ 6)	% Using Harsh Discipline (≥6)	% Using Harsh Physical Discipline (≥6)	% Using Harsh Discipline (≥6)	30-33	Parent Interview
(Modified): Parent Response to Misbehavior: % Using More Reasoning (negotiating, explaining the rules or consequences, showing child a more acceptable activity, giving a time-out, withdrawing privileges, and ignoring the misbehavior) (≥ 9)	% Using More Reasoning (≥9)	% Using More Reasoning (≥9)	% Using More Reasoning (≥9)	30-33	Parent Interview
Modified): Parent Response to Misbehavior: Discipline Strategies	Distribution	% often or almost always	% often or almost always		Parent Interview
Mother Used Incorrect Position at Bedtime and Naptime (on stomach)	% Yes	% Yes	% Yes	2-4	Parent Interview
Mother Placed Car Seat in Back Seat	% Yes	% Yes	% Yes	2-4	Parent Interview
Mother Showed Picture Books to Child	Distribution	% every day or more often	% every day or more often	2-4, 30-33	Parent Interview
Mother Played With Child	Distribution	% every day or more often (30-33 months)	% every day or more often (30-33 months)	2-4, 30-33	Parent Interview

Table 4.15. (‘Continued) Co-Variates and Outcome Variables, Age at Assessment, and Data Sources[a]

	Step 1	Step 2	Step 3	Child’s Age (in months) at Assessment	Data Sources
PRACTICES AND BEHAVIORS					
Mother Talked to Child While Working at Home	Distribution			2-4, 30-33	Parent Interview
Mother Sang to Child	Distribution			2-4, 30-33	Parent Interview
Mother Hugged Baby in Past Week	Distribution			2-4	Parent Interview
Family Followed Routines at Bedtime, Naptime, or Mealtime	% 2 or more (2-4 months), % 3 routines (30-33 months)	% 2 or more (2-4 months), % 3 routines (30-33 months)	% 2 or more (2-4 months), % 3 routines (30-33 months)	2-4, 30-33	Parent Interview
Person Who Usually Takes Child to Well Child Visits	Distribution	% Mother and Father Equally or Father usually	% Mother and Father Equally or Father usually	30-33	Parent Interview
Family Lowered Temperature on Water Heater	% Yes	% Yes	% Yes	2-4, 30-33	Parent Interview
Family Used Covers on Electric Outlets	% Yes	% Yes	% Yes	30-33	Parent Interview
Family Had Safety Latches on Cabinets	% Yes	% Yes	% Yes	30-33	Parent Interview
Mother Knows a Number to Call if Concerned Child May have Swallowed Something Harmful	% Yes	% Yes	% Yes	30-33	Parent Interview
Mother Continuing to Breastfeed at 2-4 Months, Proportional Hazards Model at 30-33 Months	% Yes	% Yes	% Yes	2-4, 30-33	Parent Interview
Baby Given Cereal by 2-4 Months	% Yes	% Yes	% Yes	2-4	Parent Interview
Baby Given Water by 2-4 Months	% Yes	% Yes	% Yes	2-4	Parent Interview
Mother Made a Preventive Health Visit Within Past 6 Months	Distribution			30-33	Parent Interview
Mother Resumed Smoking After Baby’s Birth	% Yes	% Yes	% Yes	2-4	Parent Interview
Current Smokers in Household Who Smoke Outside	% Yes	% Yes	% Yes	30-33	Parent Interview
Mother Smokes Outside	% Yes	% Yes	% Yes	30-33	Parent Interview
Mother Made a Postpartum Visit	Distribution			30-33	Parent Interview
Mother Had Check Up or Physical Exam Within Past Year	Distribution	% Yes	% Yes	30-33	Parent Interview
CHILD OUTCOMES					
Child Is Very Healthy	% Yes	% Yes	% Yes	30-33	Parent Interview
Child’s Health Is Excellent	% Yes	% Yes	% Yes	30-33	Parent Interview

Table 4.15. (Continued) Co-Variates and Outcome Variables, Age at Assessment, and Data Sources[a]

	Step 1	Step 2	Step 3	Child's Age (in months) at Assessment	Data Sources
CHILD OUTCOMES					
Since Child Came Home from Hospital S/He Had Been Seriously Ill	% Yes	% Yes	% Yes	30-33	Parent Interview
Age Child Spoke Two-Word Sentences (did not speak 2-word sentences before 24 months of age)	% Yes	% Yes	% Yes	30-33	Parent Interview
Age Child First Walked without Holding On (walked before 12 months of age)	% Yes	% Yes	% Yes	30-33	Parent Interview
Mother's Satisfaction with Child's Eating Habits	% very satisfied	% very satisfied	% very satisfied	30-33	Parent Interview
Mother's Satisfaction with Child's Sleeping Habits	% very satisfied	% very satisfied	% very satisfied	30-33	Parent Interview
Mother's Satisfaction with Child's Bowel Habits	% very satisfied	% very satisfied	% very satisfied	30-33	Parent Interview
Mother's Satisfaction with Progress Walking and Talking	% very satisfied	% very satisfied	% very satisfied	30-33	Parent Interview
Mother Very Satisfied with How Well Child Understands What Mother Says	% very satisfied	% very satisfied	% very satisfied	30-33	Parent Interview
Vocabulary Production (MacArthur CDI/WS)	mean	mean	mean	23-26	CDI-WS
Mean Length of Sentence (MacArthur CDI/WS)	mean	mean	mean	23-26	CDI-WS
Sentence Complexity (MacArthur CDI/WS)	mean	mean	mean	23-26	CDI-WS
Combined Words (MacArthur CDI/WS)	% Yes	% Yes	% Yes	23-26	CDI-WS
Child Behavior Checklist (Aggressive Behavior)	Mean, % More Aggressive ($\geq$14)	Mean, % More Aggressive ($\geq$14)	Mean, % More Aggressive ($\geq$14)	30-33	Parent Interview
Child Behavior Checklist (Anxious Behavior)	Mean, % More Anxious or Depressed ($\geq$ 9)	Mean, % More Anxious or Depressed ($\geq$ 9)	Mean, % More Anxious or Depressed ($\geq$ 9)	30-33	Parent Interview
Child Behavior Checklist (Sleep Problems)	Mean, % More Problems Sleeping ($\geq$ 6)	Mean, % More Problems Sleeping ($\geq$ 6)	Mean, % More Problems Sleeping ($\geq$ 6)	30-33	Parent Interview
Injured Badly Enough to See a Doctor	% Yes	% Yes	% Yes	30-33	Parent Interview
Number of Emergency Room Visits in Past Year (1 or more)	% Yes	% Yes	% Yes	30-33	Parent Interview
One or More Emergency Room Visits for Injury-Related Causes in Past Year	% Yes	% Yes	% Yes	30-33	Parent Interview
Number of Hospitalizations (1 or More Times Since Birth @ 2-4 Months; 1 or More Times in Past Year @ 30-33 Months)	% Yes	% Yes	% Yes	30-33	Parent Interview

Table 4.15. (Continued) Co-Variates and Outcome Variables, Age at Assessment, and Data Sources[a]

	Step 1	Step 2	Step 3	Child's Age (in months) at Assessment	Data Sources
CHILD OUTCOMES					
1 Month Well Child Visit (*Visit within 41 days of birth*)	% Yes	% Yes	% Yes	30-33	Medical Record
2 Month Well Child Visit (*Visit between 42 days (1.5 months) and 92 days (3 months), inclusive*)	% Yes	% Yes	% Yes	30-33	Medical Record
4 Month Well Child Visit (*Visit between 93 days (3 months) and 151 days (5 months), inclusive*)	% Yes	% Yes	% Yes	30-33	Medical Record
6 Month Well Child Visit (*Visit between 152 days (5 months) and 213 days (7 months), inclusive*)	% Yes	% Yes	% Yes	30-33	Medical Record
9 Month Well Child Visit (*Visit between 244 days (8 months) and 305 days (10 months), inclusive*)	% Yes	% Yes	% Yes	30-33	Medical Record
12 Month Well Child Visit *(Visit between 336 days (11 months) and 397 days (14 months), inclusive)*	% Yes	% Yes	% Yes	30-33	Medical Record
15 Month Well Child Visit *(Visit between 427 days (14 months) and 488 days (17 months, inclusive)*	% Yes	% Yes	% Yes	30-33	Medical Record
18 Month Well Child *(Visit between 519 days (17 months) and 580 days (20 months), inclusive*)	% Yes	% Yes	% Yes	30-33	Medical Record
24 Month Well Child Visit *(Visit between 701 days (23 months) and 762 days (28 months)*	% Yes	% Yes	% Yes	30-33	Medical Record
Age-Appropriate DTP 1 (Diphtheria, Tetanus, Pertussis) Vaccination	% Yes	% Yes	% Yes	30-33	Medical Record
Age-Appropriate DTP 3 (Diphtheria, Tetanus, Pertussis) Vaccination	% Yes	% Yes	% Yes	30-33	Medical Record
Age-Appropriate MMR 1 (Measles, Mumps, Rubella) Vaccination	% Yes	% Yes	% Yes	30-33	Medical Record
Up-to-Date at 24 Months (4 DTP, 3 polio, 1 MMR)	% Yes	% Yes	% Yes	30-33	Medical Record

[a] Analyses account for the fact that subjects within sites tend to be more similar to one another than they are to families at other sites. The adjusted analyses further control for site of enrollment (hospital or office), age of the child at interview (2-4 month subsample only), and potential differences in the baseline characteristics of the mother (age, education, race/ethnicity, employment), father (employment), family (marital status, father in household, number of siblings, owned own home) and baby (low birth weight, source of payment for care).

[b] HS services: parent support groups; office visits about baby's development, office visits about taking care of the baby, telephone number to discuss baby's development; letter to prepare for office visits; brochures about baby's development; special health booklet.

[c] Topics discussed at 2-4 Months: calming baby; sleep position; routines; solid foods; and car seat. Topics discussed at 30-33 Months included: importance of regular routines for young children; sleep problems; discipline; language development; toilet training; sibling rivalry; home safety; child's development; child's temperament; ways of helping child learn.

[d] Help from MD/NP: points out what parents do well; acts like parents understand information; makes parents feel like they are doing a good job; suggests things to do with baby in daily life; understands that parents know their baby best; helps parents get needed information; gives parents advice to use at home; gives parents new ideas to do with baby.

[e] MD/NP listens includes: having time to answer questions; understanding main reason for visit; not having other things on their minds; giving parents a chance to ask questions; thinking carefully about questions; not being in a rush; encouraging questions.

[f] MDs and NPs provided "support" to parent: suggested things that I could do for child that fit into my family's daily life; helped me get all the information I need about child's growth and development; helped me get services for child from other agencies about programs;

gave me advice on how to solve problems at home with child; gave me new ideas about things to do with child; pointed out what I did well as a parent.

[g] MDs and NPs "listened" to parent: always had time to answer my questions about child; seemed to have other things on their minds when I talked with them; acted like I couldn't understand information about child's growth and development; seemed to think carefully about my questions about child's development; were always in a rush when they saw child; encouraged me to ask questions about child's growth and development; did not really give me a chance to ask questions about child.

[h] MDs and NPs respected parent's knowledge, knew what was going on with the child, and made them feel like they were doing a good job: understood that I know child better than anyone else does; made me feel like I was doing a good job caring for child; seemed to know what was going on with child.

[i] Parent was asked how much they would be willing to pay one time to receive the following HS services for one year: well child visits with a developmental specialist, a telephone information line about child development, parent groups, brochures on child health and development, letters before well child visits about what to expect at the next visit, and a book designed to keep information about your child's healthcare and development.[j] Knowledge of Infant Development Inventory (KIDI) scores were derived from respondents' incorrect answers to the set of 17 statements about milestones and ages. The first score represents the degree to which respondents *underestimated* development, i.e., the percentage of items for which the respondent incorrectly estimated that children would have to be older to be capable of performing the identified activity. The second score represents the degree to which respondents *overestimated* development, i.e., the percentage of items for which the respondent incorrectly estimated that younger children were capable of performing the activity.

5. Healthy Steps Evaluation Families

Healthy Steps Evaluation Families

This chapter describes the families enrolled in the evaluation and the subsamples of families included in the two core analyses of Healthy Steps outcomes presented in this report. We describe demographic differences between families included in these samples and those not included in them. Demographic differences between intervention and control groups over time are also described.

The Healthy Steps sample is economically and ethnically diverse. It is also diverse with respect to a wide range of other demographic characteristics including mother's age, race, education, marital status, live birth order, insurance during pregnancy, and infant birth weight.

The total sample includes 5,565 infants who were consecutively enrolled in the evaluation at the 15 sites. Of these infants, 2235 were enrolled at randomization sites (51% intervention, 49% control) and 3330 at quasi-experimental sites (55% intervention, 45% control). The numbers of infants enrolled at each site ranged from 273 to 408.

- The two subsamples (used for core analyses) are based on the two interviews each family completed. The first interview was carried out when their child was between 2 and 4 months of age, inclusive. The second was completed when their child was between 30 and 33 months of age, inclusive. The numbers of families in each of these samples is smaller than the number of families originally enrolled. The sample for the first interview includes 4,896 families. The sample for the second interview includes 3,737 families.
- Despite obvious changes in the demographic composition of the samples over time, intervention and control groups at randomization sites remained demographically similar**.** Intervention and control group differences at quasi-experimental sites widened with time. These differences were taken into account when attributing effects of the program.

5. HEALTHY STEPS EVALUATION FAMILIES

5.1. Introduction

This section describes the families who enrolled in the evaluation and the two subsamples of families included in the core analyses of Healthy Steps (HS) outcomes presented in this report. The two subsamples are based on the two interviews each family completed. The first was completed when their child was between two and four months of age, inclusive. The second was completed when their child was between 30 and 33 months of age, inclusive.

The numbers of families in each of the subsamples is smaller than the number of families originally enrolled. The sample for the first interview includes 4,896 families and the sample for the second interview includes 3,737. This is because for each interview, there were families who did not complete interviews and other families who could not be located. In addition, we did not try to interview some families. These included families in which the child had died or had been placed in foster care, families who had moved out of the country, and families we had been unable to reach in the past. Families who completed interviews outside the age range---when the child was either too young or too old--- were excluded, as were families who did not visit the HS practice even though they intended to when they enrolled and may have completed an interview. These reasons are discussed in more detail later.

Demographic differences between families in these samples and those not included in them are described. Demographic differences between intervention and control groups over time also are reported. Despite changes in the demographic composition of the samples over time, intervention and control groups at randomization (RND) sites remained demographically similar. Intervention and control group differences at quasi-experimental (QE) sites widened with time. These differences were taken into account when attributing effects of the program

Evaluation Enrollment

Children enrolled in the intervention and control groups at randomization and quasi-experimental sites.

	N	%
Randomization	2,235	40.2
Intervention (I)	1,133	50.7*
Control (C)	1,102	49.3*
Quasi-Experimental	3,330	59.8
Intervention (I)	1,830	55.0**
Control(C)	1,500	45.0**
Total	5,565	100.0
Intervention (I)	2,963	53.2
Control(C)	2,602	46.8

* % of children at randomization sites
** % of children at quasi-experimental sites

Evaluation Enrollment by Site

Number of children enrolled in the intervention and control groups at randomization and quasi-experimental sites.

Sites	I	C
Randomization	1,133	1,102
1	197	195
2	200	188
3	192	193
4	188	182
5	152	140
6	204	204
Quasi-Experimental	1,830	1,500
7	195	181
8	153	120
9	253	194
10	205	199
11	213	147
12	193	183
13	205	96
14	205	183
15	208	197
Total	2,963	2,502

5.2. The Healthy Steps Total Sample

Of the 6,287 eligible families contacted to participate in HS, 469 (7.5%) declined to participate and 253 (4.0%) deferred participation and did not make a visit to the practice within 4 weeks of birth **(Figure 5.1).** The evaluation total sample includes 5,565 consecutively enrolled infants, 2235 enrolled at RND sites (51% intervention, 49% control) and 3330 at QE sites (55% intervention, 45% control). The numbers of infants enrolled at each site ranged from 273 to 408.

5.2.A. Demographic Characteristics

The total sample is economically and ethnically diverse. It is also diverse with respect to a wide range of other demographic characteristics including mother's age, race, education, marital status, live birth order, insurance during pregnancy, and infant birth weight **(Table 5.1).** Nonetheless, when compared with national birth data, except for maternal age, the distribution of these variables was statistically different than the distribution for U.S. births in 1997. Mothers in the HS sample were somewhat better educated than mothers nationally. They were more likely to be African American, Hispanic, single, and having their first child. Their infants were less likely to be of low birthweight.

5.2.B. Demographic Characteristics of Intervention and Control Groups

At the sites that were selected to use a random assignment evaluation design, randomization appeared effective in equalizing the characteristics of families in the intervention and control groups (**Table 5.2**). There were no statistically significant differences between intervention and control families at these sites on any of the maternal characteristics, insurance status, or infant birth weight. This was not the case at QE sites. At QE sites, although intervention and control groups were statistically similar with respect to insurance coverage, infant birth weight, and birth order, mothers in the control group tended to be younger and less well-educated than their intervention group counterparts. In addition, greater percentages of mothers in the control group were African-American, Hispanic, and unmarried.

Table 5.1. Percentage Distribution of Mother's Demographic Characteristics, Insurance Status, and Baby's Birth Weight for the Healthy Steps National Evaluation Sample and 1997 U.S. Live Births [a,b,c,d,]

	Healthy Steps National Evaluation Sample (n = 5,563)	1997 U.S. Live Births (n = 3,880,894)
Mother's Age		
19 years or less	13.6	12.7
20-24 years	23.6	24.3
25-29 years	27.4	27.6
30-34 years	22.8	22.8
35 years or older	12.6	12.6
Mother's Education		
11 years or less	17.9	22.1
High School Graduate	26.7	32.9
Some College	28.8	22.2
College Graduate	26.6	22.8
Mother's Race		
White	57.9	79.2
Black/African American	24.4	15.4
Asian/Native American	4.5	5.4
Other	13.2	0.0
Mother's Ethnic Origin		
Hispanic	20.2	18.3
Not Hispanic	79.8	81.7
Marital Status		
Married	64.2	67.6
Not Married	35.8	32.4
Live Birth Order		
First	46.4	40.8
Second or More	53.6	59.2
Insurance During Pregnancy		
Medicaid	31.8	33.6
Other Sources	68.2	66.4
Baby's Birth Weight		
Low Birth Weight	6.6	7.8
Normal Birth Weight	93.4	92.2

[a] Data for up to 4% of respondents in the Healthy Steps National Evaluation samples may be missing from the variables. These missing data were excluded from the denominator for purposes of calculating percentages.

[b] For mother's race, many in the 'other' group for the Healthy Steps Evaluation Sample are women of Hispanic origin, most of whom are also likely to be white.

[c] Percentage of Hispanic births may be under-estimated for 1997 U.S. Live Births.

[d] The national U.S. birth data for Medicaid coverage are for women on Medicaid 1991 through 1995 at delivery.

Table 5.2. Percentage Distribution of Mother's Demographic Characteristics, Insurance Status, and Baby's Birth Weight for the Intervention and Control Groups at Randomization and Quasi-Experimental Sites

	Randomization Sites			**Quasi-Experimental Sites**			**All Sites**
	Intervention (n=1133)	Control (n=1102)	All (n=2235)	Intervention (n=1829)	Control (n=1499)	All (n=3328)	(n=5563)
Mother's Age [a,b,d,e]							
19 or less	15.2	15.0	15.1	12.8	12.2	12.6	13.6
20-29	53.0	51.5	52.3	46.6	54.5	50.2	51.0
30 or more	31.8	33.5	32.6	40.6	33.2	37.3	35.4
Mother's Education [a,b,d,e]							
11 years or less	15.8	16.1	16.0	17.1	21.6	19.2	17.9
High School Graduate	30.8	29.2	30.0	22.2	27.1	24.4	26.7
Some College/Vocational	30.3	31.0	30.6	26.4	29.0	27.6	28.8
College Graduate	23.1	23.7	23.4	34.2	22.3	28.8	26.6
Mother's Race [a,b,d,e]							
White	61.8	62.3	62.1	59.6	49.7	55.2	57.9
Black/African American	25.0	24.2	24.6	22.2	26.9	24.3	24.4
Asian/Native American	4.1	4.2	4.2	5.6	3.6	4.7	4.5
Other	9.0	9.3	9.2	12.6	19.8	15.8	13.2
Mother's Ethnic Origin [b,e]							
Hispanic	18.5	20.4	19.5	17.9	24.1	20.7	20.2
Mother's Marital Status [a,b,d]							
Married	61.6	63.4	62.5	67.7	62.6	65.4	64.2
Mother's Employment Status [a,b]							
Worked last month of pregnancy	35.6	37.1	36.3	46.5	39.5	43.3	40.5
Father's Employment Status [a]							
Employed	83.1	85.7	84.4	89.9	89.1	89.6	87.5
Live Birth Order							
First	47.0	45.6	46.4	47.1	45.7	46.5	46.4
Insurance during Pregnancy [a]							
Medicaid	36.3	36.1	36.2	30.0	27.3	28.8	31.8
Baby's Birth Weight [a,d]							
< 2500 grams	7.9	7.1	7.5	6.4	5.6	6.0	6.6

[a] Difference is significant between randomization and quasi-experimental design sites.
[b] Difference is significant between intervention and control families for quasi-experimental design sites.
[c] Difference is significant between intervention and control families for randomization sites.
[d] Data for up to 4% of respondents may be missing for these variables. These missing data were excluded from the denominator for purposes of calculating percentages.
[e] For age, education, and race, the total number of children in the sample is 5565, all children enrolled.

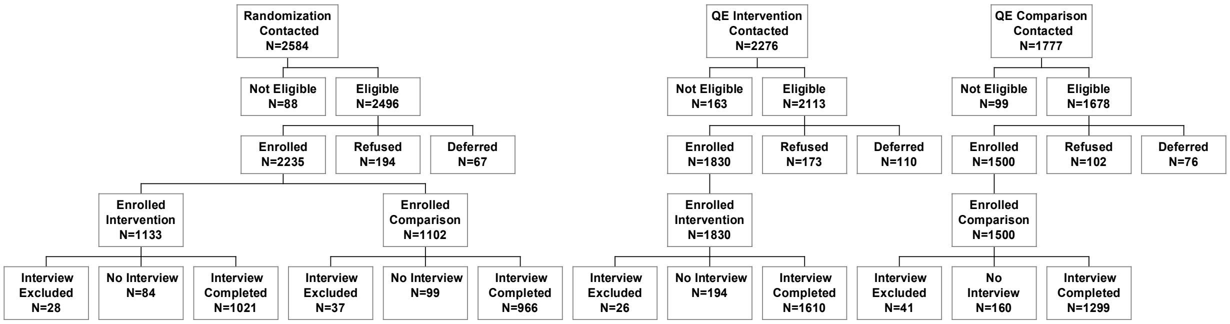
There also were a number of differences between the RND and QE sites. The mothers at the QE sites were slightly older and more likely to be married than were mothers at the RND sites. They were more likely to have 11 years of education or less, but they were also more likely to have graduated from college. Moreover, they were less likely to report being White and more likely to report 'other' racial groups. Families at the QE sites also were less likely to be on Medicaid than were families at RND sites and there was a lower percentage of low birth weight infants at these sites.

Differences between the intervention and control groups at the QE sites appeared to be less substantial than the differences between families enrolled at the RND and QE sites. This finding is reassuring. Comparison sites were selected to minimize differences with their counterpart intervention sites and this matching, although not perfect, did appear to have had a moderating effect on demographic differences. These patterns of differences---similarities between groups at RND sites, differences between intervention and control groups at QE sites, and differences between the two design types---appeared to hold over time, as reflected in the 2-4 month and 30-33 month interview subsamples.

5.3. The 2-4 Month Subsample

Interviews of mothers (or primary caregivers) when their children were 2-4 months updated data on baseline family demographics. The interviews also provided data to evaluate the early impact of HS on service use and on outcomes related to infants.

Figure 5.1. Healthy Steps National Evaluation Flow Diagram: Enrollment and 2-4 Month Interviews



Deferred: Families who deferred participation in Healthy Steps in the hospital or at the first office visit and who did not make a visit or a return visit to the practice within 4 weeks of birth.
Interview Excluded: Includes families who completed the interview outside the age range (8 to 18 weeks); families who required 2 or more sessions to complete the interview where the time from start to finish was 28 days or more; and families who did not make an office visit before the interview.

5.3.A. 2-4 Month Subsample Composition

Of the 5,565 families enrolled in the evaluation, 4,896 (88%) were included in the 2-4 month sample. In each of these families, the mother (or primary caregiver) had participated in a parent telephone interview between two and four months post partum and the child had made at least one visit to the HS practice.

% OF ENROLLED FAMILIES INCLUDED IN 2-4 MONTH PARENT INTERVIEW SUBSAMPLE

Randomization Sites			**Quasi-Experimental Sites**			**All**	
Intervention	Control	All	Intervention	Control	All		
N=1333	N=1102	N=2235	N=1830	N=1500	N=3330	N=5565	
%	%	%	%	%	%	%	N
90.1	87.7	88.9	88.0	86.6	87.4	88.0	4896

Families not included in the sample were: (1) 537 families (10%) who did not complete an interview;[5.1] (2) 53 families (<1%) who completed the interview out of their child's age range (before 8 weeks or after 18 weeks of age) or who required two or more sessions to complete the interview and for whom the time from interview start to finish was 28 days or more; and (3) 79 families (1%) enrolled in the hospital who had not made at least one office visit by the time of the parent interview **(Figure 5.1).**

The proportion of families providing interview data varied from site to site, with a low of 77.7% to a high of 96.7% across the 15 evaluation sites. Although a slightly greater percentage of intervention than control families contributed data to the overall sample (88.8% vs. 87%), contributions were similar at any given site, except for one QE site where the difference in participation was statistically significant. At this site, a greater percentage of intervention families responded to the interview. No significant differences in participation were found between intervention and control groups at RND or QE sites overall.

Number of Children in 2-4 Month Subsample by Site

Sites	I	C
Randomization		
	N (%)	N (%)
1	188 (95.4)	191 (98.0)
2	178 (89.0)	157 (83.5)
3	169 (88.0)	170 (88.1)
4	165 (87.8)	157 (86.3)
5	162 (93.4)	126 (90.0)
6	179 (87.8)	165 (80.9)
Quasi-Experimental		
7	148(75.9)	144 (79.6)
8 *	147 (96.1)	107(89.2)
9	218 (86.2)	171 (88.1)
10	178 (86.8)	176 (88.4)
11	196 (92.0)	135 (91.8)
12	161 (83.4)	141 (77.1)
13	192 (93.7)	90 (93.8)
14	176 (85.9)	158 (86.3)
15	194 (93.3)	177 (89.9)
Total	2631	2265

*Significant difference between intervention and control groups (p<.05)

[5.1] Reasons for not completing an interview varied. Of 5565 families originally enrolled in the evaluation, 5,028 families completed interviews at 2-4 months. Of the 537 families who did not complete the interview, 84 families declined to be interviewed, 333 could not be located in time, and 120 were not eligible.

5.3.B. Demographic Characteristics of Families in 2-4 Month Subsample and Excluded Families

Tables 5.3 and 5.4 compare the baseline demographic characteristics of families included in the subsample and those excluded. At RND sites, sample families were significantly different from excluded families in several respects (**Table 5.3**). For both intervention and control families, a greater percentage of mothers in the sample than those excluded had completed 12 years or more education, were not Hispanic, were married, were having their first child, had not utilized Medicaid for their prenatal care, and had worked during the last month of pregnancy. However, the differences regarding first births did not reach significance for control families.

At QE sites, differences between families included in the subsample and those excluded were greater in the intervention group than in the control group (**Table 5.4**). Within the intervention group, a greater percentage of mothers included in the sample than those excluded were 30 years or older, had continued their education beyond high school, were White, were not Hispanic, were married, were having their first child, did not utilize Medicaid for their prenatal care, worked during the last month of pregnancy, and reported that the baby's father was employed. Differences between families included in the sample and those excluded were noted in the control group only for mother's education, race, insurance coverage during pregnancy, and work status in the last month of pregnancy.

5.3.C. Baseline Characteristics of Intervention and Control Groups in the 2-4 Month Subsample

The intervention and control groups were compared on key baseline characteristics (as measured at enrollment and 2-4 months) that were included as co-variates in analyses of outcomes. Bar graphs in the right margin provide information about the distribution of demographic characteristics, by intervention and control group, at the RND and QE sites. The scatterplots display comparisons of demographic characteristics by site.

Table 5.3. Percentage Distribution of Mother's Demographic Characteristics, Insurance Status, and Baby's Birth Weight for Families Included in the 2-4 Month Subsample and Those Excluded at Randomization Sites[a]

	Intervention			**Control**			**All Sites**
	Sample (N=1021)	Excluded (N=112)	Total (N=1133)	Sample (N=966)	Excluded (N=136)	Total (N=1102)	(N=2235)
Mother's Age							
19 or less	15.5	12.5	15.2	14.5	18.4	14.9	*15.1*
20-29	51.9	63.4	53.0	51.2	53.7	51.5	*52.3*
30 or more	32.6	24.1	31.8	34.3	27.9	33.5	*32.6*
Mother's Education[b,c]							
11 years or less	14.5	27.7	15.8	15.3	21.5	16.1	*16.0*
High School Graduate	30.5	33.9	30.8	27.8	39.3	29.2	*30.0*
Some College/Vocational	30.6	27.7	30.3	31.9	24.4	31.0	*30.6*
College Graduate	24.4	10.7	23.1	25.0	14.8	23.7	*23.4*
Mother's Race							
White	62.0	60.0	61.8	63.4	54.3	62.3	*62.1*
Black/African American	24.9	26.4	25.0	23.8	27.1	24.2	*24.6*
Asian/Native American	4.4	1.8	4.1	3.9	6.2	4.2	*4.1*
Other	8.7	11.8	9.0	8.9	12.4	9.3	*9.2*
Mother's Ethnic Origin[b,c]							
Hispanic	17.6	26.8	18.5	18.4	34.6	20.4	19.5
Mother's Marital Status[b,c]							
Married	62.9	50.4	61.6	64.6	54.8	63.4	62.5
Mother's Employment[b,c]							
Worked Last Month of Pregnancy	36.8	23.8	35.6	38.4	28.0	37.1	36.3
Father's Employment							
Employed	83.4	80.4	83.1	85.8	84.5	85.7	84.3
Live Birth Order[b]							
First	47.3	36.6	46.3	45.9	40.4	45.2	46.7
Insurance during Pregnancy[b,c]							
Medicaid	35.0	47.8	36.3	34.4	48.2	36.1	36.2
Baby's Birth Weight							
< 2500 grams	7.5	11.6	7.9	7.2	6.7	7.1	7.5

[a] Data for up to 3% of respondents may be missing for these variables. These missing data were excluded from the denominator for purposes of calculating percentages.

[b] Difference is significant between sample and excluded groups in the intervention group ($p < .05$)

[c] Difference is significant between sample and excluded groups at in the control group ($p < .05$)

Table 5.4. Percentage Distribution of Mother's Demographic Characteristics, Insurance Status, and Baby's Birth Weight for Families Included in the 2-4 Month Subsample and Those Excluded at Quasi-Experimental Sites[a]

		Intervention			**Control**		**All**
	Sample (N=1610)	Excluded (N=220)	Total (N=1830)	Sample (N=1299)	Excluded (N=201)	Total (N=1500)	(N = 3330)
Mother's Age [b]							
19 or less	12.1	18.4	12.8	12.1	12.9	12.2	*12.6*
20-29	46.3	48.6	46.6	54.2	56.7	54.5	*50.2*
30 or more	41.6	33.0	40.6	33.7	30.4	33.2	*37.3*
Mother's Education [b,c]							
11 years or less	14.7	34.9	17.1	19.7	34.3	21.6	*19.2*
High School Graduate	22.1	23.4	22.2	27.2	26.8	27.1	*24.4*
Some College/Vocational	27.0	21.6	26.4	29.0	28.8	29.0	*27.6*
College Graduate	36.2	20.2	34.2	24.2	10.1	22.3	*28.8*
Mother's Race [b,c]							
White	61.8	44.0	59.6	51.0	41.2	49.7	*55.2*
Black/African American	21.7	25.7	22.2	26.9	26.6	26.9	*24.3*
Asian/Native American	5.3	7.3	5.6	3.4	5.0	3.6	*4.7*
Other	11.2	22.9	12.6	18.7	27.1	19.8	*15.8*
Mother's Ethnic Origin [b]							
Hispanic	16.8	25.4	17.9	23.3	29.4	24.1	20.7
Mother's Marital Status [b]							
Married	70.0	50.7	67.7	63.0	59.9	62.6	65.4
Mother's Employment Status [b,c]							
Worked Last Month of Pregnancy	48.4	32.9	46.5	40.8	31.0	39.5	43.3
Father's Employment Status [b]							
Employed	91.2	79.5	89.9	89.8	84.5	89.1	89.5
Live Birth Order [b]							
First	47.3	39.1	46.3	44.7	48.8	45.3	45.8
Insurance during Pregnancy [b,c]							
Medicaid	27.9	45.5	30.0	26.2	35.0	27.3	28.8
Baby's Birth Weight							
< 2500 grams	6.3	7.0	6.4	5.5	6.1	5.6	*6.0*

[a] Data for up to 3% of respondents may be missing for these variables. These missing data were excluded from the denominator for purposes of calculating percentages.

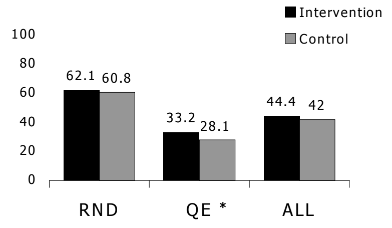
[b] Difference is significant between sample and excluded groups in the intervention group ($p < .05$)

[c] Difference is significant between sample and excluded groups at in the control group ($p < .05$)

5.3.C.1. Site of Enrollment

Families enrolled either in the hospital or at the practice within four weeks postpartum. Hospital enrollment was preferred to promote early contact with the HS Specialist, an early home visit, and other program services. However, not all sites found it feasible to contact every or even any family in the hospital. Because intervention families who enrolled in the hospital may have benefited from earlier contacts with the HS Specialists and because families who enrolled in the hospital might differ from families who enrolled in the office in other important ways that could influence the evaluation outcomes, we accounted for the site of enrollment in analyzing outcomes.

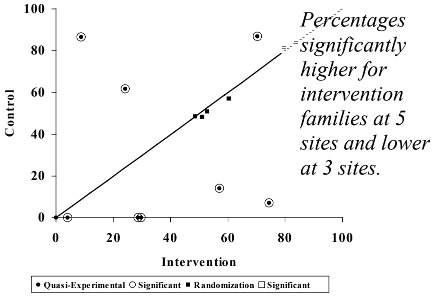
Percentage of families that enrolled in the hospital (vs. office) (n = 4896)



* p <.05

More than 40% of the children were enrolled in the hospital. A significantly greater percentage of families at RND sites than at QE sites were hospital-enrolled (61% vs. 31%). No differences were found in site of enrollment between intervention and control groups overall or between groups at RND sites. However, at QE sites, greater percentages of intervention families than control families were enrolled in the hospital. The scatterplot shows that at the RND sites, there was little variability in site of enrollment and there were no significant differences between intervention and control families. At the QE sites, there was substantial variability in enrollment place, with significant differences at 8 of 9 QE sites; the direction of the differences, however, varied across the sites.

Percentage of families that enrolled in the hospital (vs. office) (n = 4896)



Percentages significantly higher for intervention families at 5 sites and lower at 3 sites.

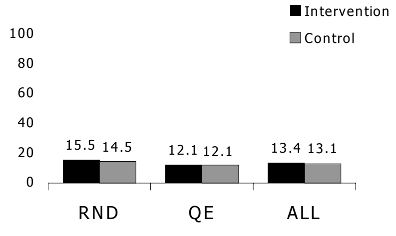
5.3.C.2. Mother's Characteristics

At the time of the child's birth, more than 13% of the mothers were teenagers while 36.1% were aged 30 or older. Eighteen percent had less than a high school education and 28% had completed college. Twenty-four percent reported their race as African American or black and almost 20% reported being of Hispanic origin. Altogether, close to 65% of mothers were married and living with their baby's father. At 2-4 months postpartum, more than one-third of mothers worked outside the home. Slightly less than half of mothers were first-time mothers. There were no significant differences between intervention and control families at RND sites on any of the maternal demographic characteristics (**Figure 5.2**). At QE sites, mothers at comparison

Characteristics of Mothers in the 2-4 Month Subsample at Randomization and Quasi-Experimental Sites

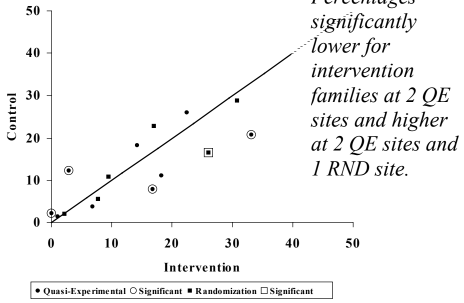
Figure 5.2. Percentage of mothers in the intervention and control groups at Randomization and Quasi-Experimental Sites who were teenagers or 30 years of age or older at child's birth, who had less than 12 years of education or who were college graduates at child's birth, who were black or African American, who were Hispanic, who were married and living with the child's father at the child's birth, who were employed 2-4 months postpartum, and who were first-time mothers.

Percentage of mothers 19 years or younger at baseline (n = 4896)



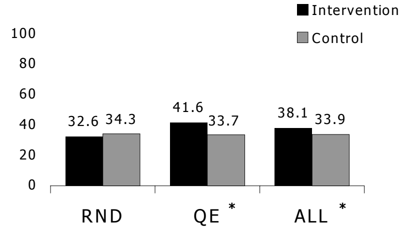
* p <.05

Percentage of mothers 19 years or younger at baseline (n = 4896)



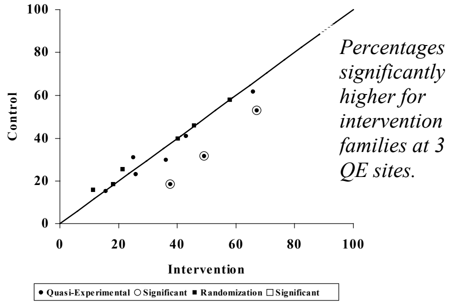
Percentages significantly lower for intervention families at 2 QE sites and higher at 2 QE sites and 1 RND site.

Percentage of mothers more than 30 years of age at baseline (n = 4896)



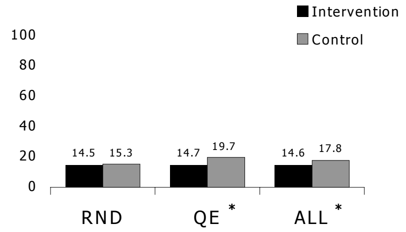
* p <.05

Percentage of mothers more than 30 years of age at baseline (n = 4896)



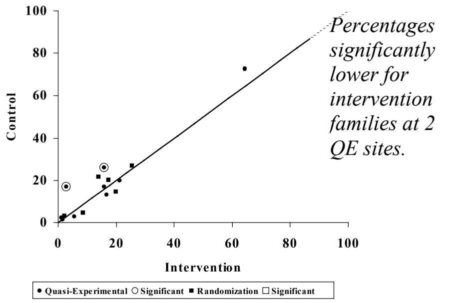
Percentages significantly higher for intervention families at 3 QE sites.

Percentage of mothers who had less than 11 years of education at baseline (n = 4896)



* p <.05

Percentage of mothers who had less than 11 years of education at baseline (n = 4896)



Percentages significantly lower for intervention families at 2 QE sites.

Characteristics of Mothers in the 2-4 Month Subsample at Randomization and Quasi-Experimental Sites

Figure 5.2. (Continued) Percentage of mothers in the intervention and control groups at Randomization and Quasi-Experimental Sites who were teenagers or 30 years of age or older at child's birth, who had less than 12 years of education or who were college graduates at child's birth, who were black or African American, who were Hispanic, who were married and living with the child's father at the child's birth, who were employed 2-4 months post-partum, an who were first-time mothers.

Percentage of mothers who were college graduates at baseline (n = 4896)

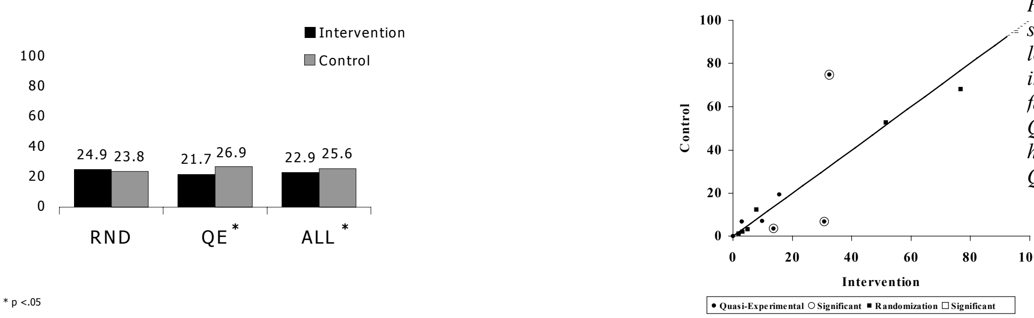
Percentage of mothers who were college graduates at baseline (n = 4896)

* p <.05

Percentages significantly lower for intervention families at 1 QE site and 1RND site.

Percentage of mothers who were African American (n = 4896)

Percentage of mothers who were African American (n = 4896)



* p <.05

Percentages significantly lower for intervention families at 1 QE site and higher at 2 QE sites.

Percentage of mothers of Hispanic origin (n = 4896)

Percentage of mothers of Hispanic origin (n = 4896)

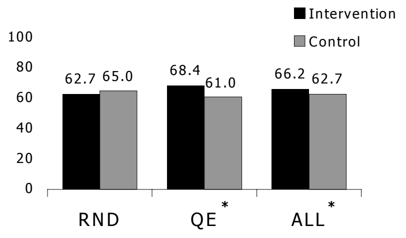
* p <.05

Percentages significantly lower for intervention families at 3 QE sites and 1RND site, and higher at 1 QE site.

Characteristics of Mothers in the 2-4 Month Subsample at Randomization and Quasi-Experimental Sites

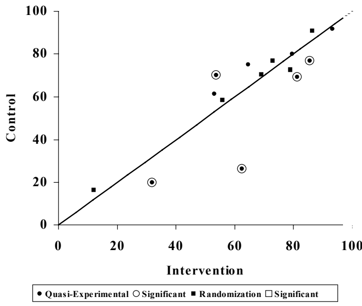
Figure 5.2. (Continued) Percentage of mothers in the intervention and control groups at Randomization and Quasi-Experimental Sites who were teenagers or 30 years of age or older at child's birth, who had less than 12 years of education or who were college graduates at child's birth, who were black or African American, who were Hispanic, who were married and living with the child's father at the child's birth, who were employed 2-4 months post-partum, and who were first-time mothers.

Percentage of mothers married and living with baby's father at baseline (n = 4896)



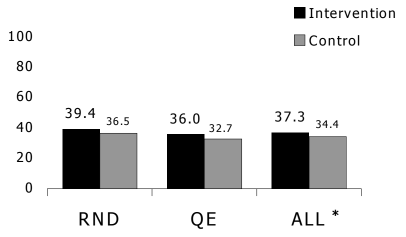
* p <.05

Percentage of mothers married and living with baby's father at baseline (n = 4896)



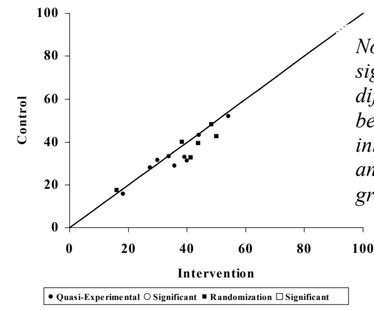
Percentages significantly lower for intervention families at 1 QE site and higher at 4 QE sites.

Percentage of mothers employed outside the home 2-4 months postpartum (n = 4896)



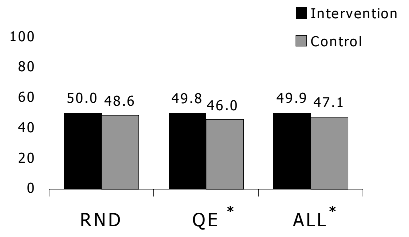
* p <.05

Percentage of mothers employed outside the home 2-4 months postpartum (n = 4896)



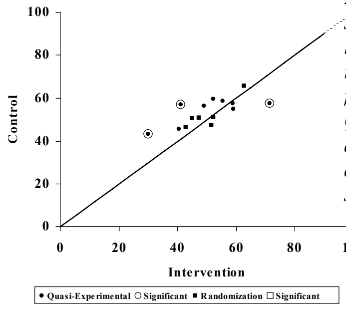
No significant differences between intervention and control groups.

Percentage of mothers who were first-time parents at baseline (n = 4896)



* p <.05

Percentage of mothers who were first-time parents at baseline (n = 4896)



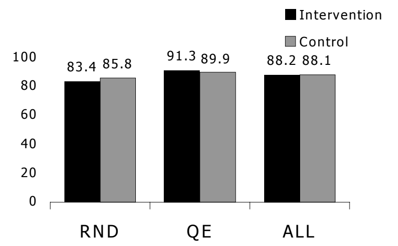
Percentages significantly lower for intervention families at 2 QE sites and higher at 1 QE site.

sites were younger and less well-educated. They were more likely to be African American or Hispanic. They were also less likely to be having their first child, and to be married or living with their baby's father. The scatterplots for these variables (**Figure 5.2**) indicate fewer significant differences at the individual QE sites, which are sometimes in opposite directions, and significant differences at an occasional RND site.

5.3.C.3. Father's Employment

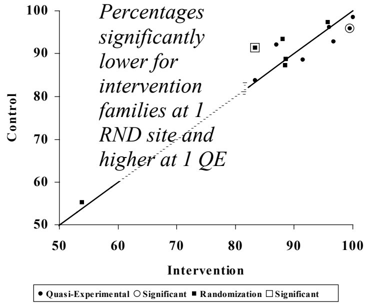
Almost 90% of fathers in the 2-4 month subsample were employed at baseline. Percentages were similar in the intervention and control groups. The scatterplot shows significant differences at two sites but in opposite directions.

Percentage of fathers employed at baseline (n = 4896)



* p <.05

Percentage of fathers employed at baseline (n = 4896)

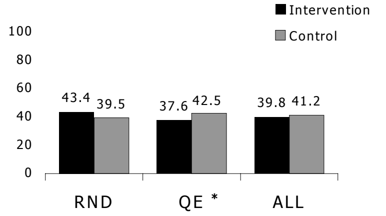


Percentages significantly lower for intervention families at 1 RND site and higher at 1 QE

5.3.C.4. Child's Characteristics

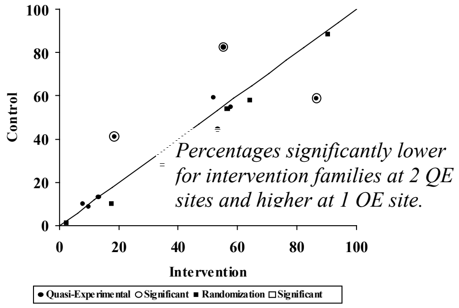
Approximately 40% of families reported Medicaid as the source of insurance coverage for their baby's medical care. The percentage of families on Medicaid was similar at RND and QE sites. There were no differences between intervention and control families at RND sites, but at QE sites a smaller percentage of infants at the intervention sites were insured through Medicaid. The scatterplot shows that at two QE sites significantly more infants in the control practice than the intervention practice were covered by Medicaid while at one QE site, the difference was in the opposite direction.

Percentage of children insured by Medicaid 2-4 months post partum (n = 4896)



* p <.05

Percentage of children insured by Medicaid 2-4 months post partum (n = 4896)



Percentages significantly lower for intervention families at 2 QE sites and higher at 1 OE site.

Six and a half percent of infants weighed 2500 grams or less (*data not shown*). There were no significant differences between intervention and control groups overall, within design type, or at the site level in the percentage of infants with low birth weights.

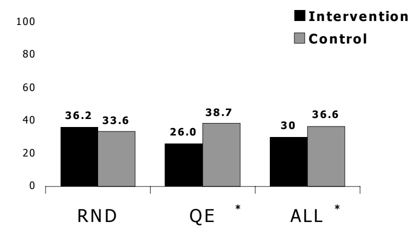
5.3.C.3. Economic Characteristics of Families

Household income for approximately one-third of families was less than $20,000 and for another third was $50,000 or more. Just over half of families owned their home (**Figure 5.3**). There were significant intervention-control group differences with a smaller percentage of intervention than control families reporting low incomes (less than $20,000) and a greater percentage reporting high incomes ($50,000 or more). This same pattern occurred at QE sites and RND sites, although the difference in the percentage of low income families was not significant at RND sites. Significant differences between groups in home ownership were found only at the QE sites with a greater percentage of intervention than control families owning their homes. The scatterplots (**Figure 5.3**) show smaller percentages of intervention families with low incomes at four sites and greater percentages with high incomes at five sites. Significant site level differences in home ownership are present at four sites but in opposite directions.

Economic Characteristics of Families in the 2-4 Month Subsample at Randomization and Quasi-Experimental Sites

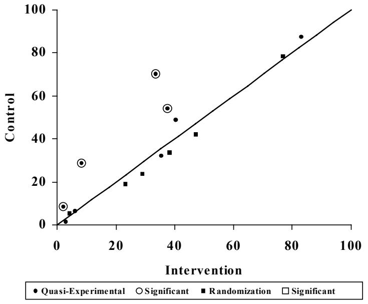
Figure 5.3. Percentage of families in the intervention and control groups at Randomization and Quasi-Experimental Sites whose household incomes fell in the low-income or high income tertiles or that owned their homes.

Percentage of families with low-income (<$20,000) at baseline (n = 4896)



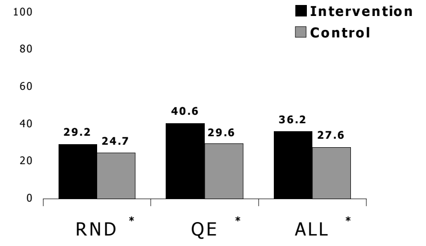
* p <.05

Percentage of families with low-income (<$20,000) at baseline (n = 4896)



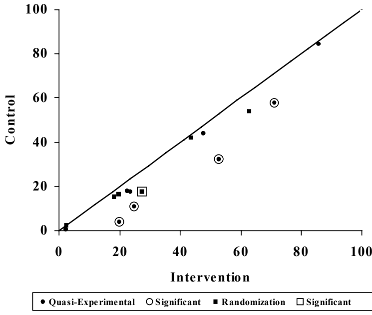
Percentages significantly lower for intervention families at 4 QE sites.

Percentage of families with high-income ($50,000 or More) at baseline (n = 4896)



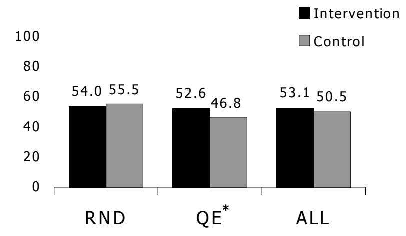
* p <.05

Percentage of families with high-income ($50,000 or More) at baseline (n = 4896)



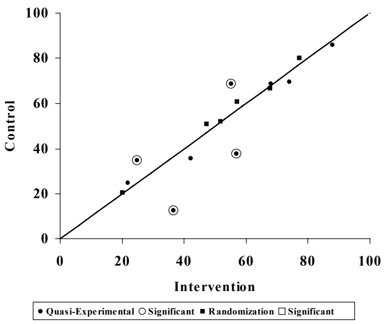
Percentages significantly higher for intervention families at 4 QE sites and 1 RND site.

Percentage of families that owned their home at baseline (n = 4896)



* p <.05

Percentage of families that owned their home at baseline(n = 4896)

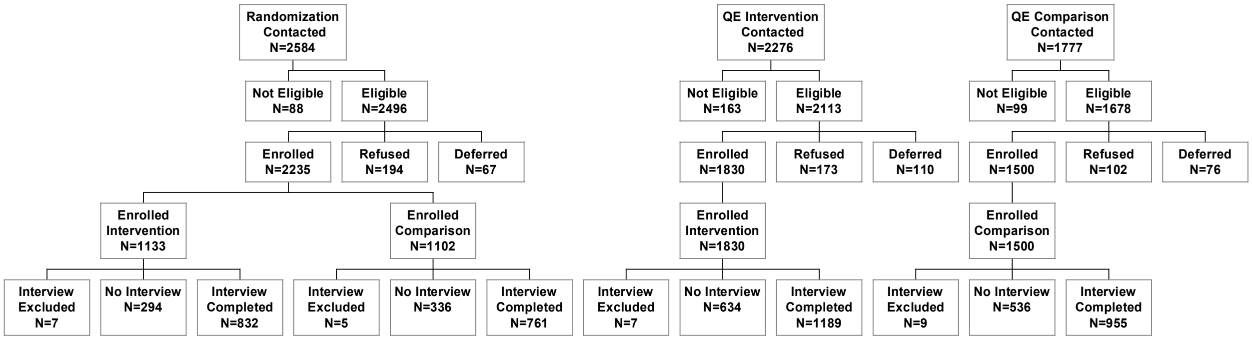


Percentages significantly lower for intervention families at 2 QE sites and higher at 2 QE sites.

5.4. The 30-33 Month Subsample

Interviews of mothers (or primary caregivers) when children were 30 to 33 months of age provided the principal data to evaluate the effects of HS on parents and their children. Overall, 68.2% of intervention families vs. 65.9% of control families contributed data to the 30-33 month subsample.

Figure 5.4. Healthy Steps National Evaluation Flow Diagram: Enrollment and 30-33 Month Interviews



<u>Deferred</u>: Families who deferred participation in Healthy Steps in the hospital or at the first office visit and who did not make a visit or a return visit to the practice within 4 weeks of birth.
<u>Interview Excluded</u>: Families who completed the interview outside the age range of 30-33 months; respondents who were not the child's caretaker and did not live with the child; and children enrolled in the hospital who never made a visit to the site.

Number of Children in 30-33 Month Subsample by Site

Sites	I	C
Randomization		
	N (%)	N (%)
1	170 (86.3)	161 (82.6)
2	133 (66.5)	124 (66.0)
3	136 (70.8)	119 (61.7)
4	137 (72.9)	120 (65.9)
5	116 (76.3)	118 (84.3)
6 *	140 (68.6)	119 (58.3)
Quasi-Experimental		
7	102 (52.3)	89 (49.2)
8	103 (67.3)	75 (62.5)
9	151 (59.7)	133 (68.6)
10	136 (66.3)	114 (57.3)
11 *	171 (80.3)	102 (69.4)
12	109 (56.5)	118 (64.5)
13	142 (69.3)	72 (75.0)
14	126 (61.5)	115 (62.8)
15	149 (71.6)	137 (69.5)
Total	2021	1716

* Significant difference between intervention and control groups (p<.05)

The proportion of families providing interview data varied at the 15 sites, from a low of 50.8% to a high of 86.3%. Significantly greater percentages of intervention than control families contributed to the subsample at one RND site and one QE site.

5.4.A. 30-33 Month Subsample Composition

At 30-33 months, 3737 (67.2%) of enrolled families comprised the sample for analysis. At RND sites, significantly greater percentages of intervention than control families contributed data to the sample; at QE sites, no significant intervention-control group differences in participation were found.

The 30-33 month subsample excluded: 1800 families (32.3% of the 5565 enrolled in the evaluation) who did not complete an interview[5.2]; four families (< 1%) who completed interviews out of the age range (when child was less than 30 months or more than 33 months); three respondents (<1%) who completed interviews but who were neither a primary nor secondary caretaker for the child and who were not living in the same household as the child; and 21 (<1%) families who enrolled in the hospital, intending to come to the practice, but for whom there was reasonable evidence to believe that they never made a visit to the practice **(Figure 5.4.)**

% OF ENROLLED FAMILIES INCLUDED IN 30-33 MONTH PARENT INTERVIEW SUBSAMPLE

Randomization Sites			Quasi-Experimental Sites			All	
Intervention	Control	All	Intervention	Control	All		
N=1333	N=1102	N=2235	N=1830	N=1500	N=3330	N=5565	
%	%	%	%	%	%	%	N
73.4	69.1	71.3	65.0	63.7	64.4	67.2	3737

5.4. B. Demographic Characteristics of Families in the 30-33 Month Sample and Excluded Families

Families in the subsample at 30-33 months differed from families not included in the subsample on many demographic characteristics. (**Tables 5.5 and 5.6**). When compared with mothers not included in the sample, mothers in the sample tended to have more years of education. They also were more likely to be White, to be non-Hispanic, to be married, to report that the baby's father was employed, and not to have utilized Medicaid for their prenatal care. In addition, at the RND sites (**Table 5.5**), mothers in the sample were older and less likely to be Hispanic. At QE sites (**Table 5.6**), sample mothers also were less likely to be Hispanic. In addition, they were more likely to be working within a month of their child's birth.

[5.2] Reasons for not completing an interview are varied. Of 5565 families originally enrolled in the evaluation, 223 families were not eligible for the survey. These were families who had moved out of the country, had formerly withdrawn from the evaluation, had been lost to contact, i.e., those families who have not been located 2 times in a row (interview or tracking contact), or families in which the child had died or entered foster care. Of 5342 families eligible to participate in the 30-33 month survey, 3765 (70.4%) completed interviews, 260 (4.9%) declined the interview, and 1,317 (24.7%) could not be located.

Table 5.5. Percentage Distribution of Mother's Demographic Characteristics, Insurance Status, and Baby's Birth Weight for Families Included in the 30-33 Month Subsample and Those Excluded at Randomization Sites[a]

	Intervention			**Control**			**All Sites**
	Sample (N=832)	Excluded (N=301)	Total (N=1133)	Sample (N=761)	Excluded (N=341)	Total (N=1102)	(N=2235)
Mother's Age [b]							
19 or less	13.7	19.3	15.2	13.4	18.5	15.0	15.1
20-29	52.0	55.8	53.0	49.0	57.2	51.5	52.3
30 or more	34.3	24.9	31.8	37.6	24.3	33.5	32.6
Mother's Education[b,c]							
11 years or less	13.2	22.9	15.8	13.5	21.8	16.1	15.9
High School Graduate	29.6	34.2	30.8	27.5	32.9	29.2	30.0
Some College/Vocational	31.2	27.9	30.3	30.7	31.8	30.9	30.6
College Graduate	26.0	15.0	23.1	28.3	13.5	23.7	23.4
Mother's Race[b,c]							
White	65.4	52.0	61.8	65.3	55.4	62.3	62.1
Black/African American	23.7	28.6	25.0	22.0	29.2	24.2	24.6
Asian/Native American	3.7	5.4	4.1	4.1	4.2	4.2	4.1
Other	7.2	14.0	9.0	8.5	11.1	9.3	9.2
Mother's Ethnic Origin [b,c]							
Hispanic	16.0	25.6	18.5	18.1	255	20.4	19.5
Mother's Marital Status [b,c]							
Married	65.2	51.8	61.6	68.8	51.2	63.4	62.5
Mother's Employment Status							
Worked Last Month of Pregnancy	37.7	29.8	35.6	39.3	32.2	37.1	36.3
Father's Employment Status [b,c]							
Employed	84.8	78.0	83.1	86.9	82.8	85.7	84.4
Live Birth Order							
First	47.5	42.9	46.2	45.2	45.2	45.2	45.7
Insurance during Pregnancy[a] [b,c]							
Medicaid	34.4	41.6	36.3	32.1	44.9	36.1	36,2
Baby's Birth Weight							
< 2500 grams	7.4	9.1	7.9	7.0	7.4	7.1	7.5

[a] Data for up to 3% of respondents may be missing for these variables. These missing data were excluded from the denominator for purposes of calculating percentages.

[b] Difference is significant between sample and excluded groups in the intervention group (p <.05)

[c] Difference is significant between sample and excluded groups at in the control group (p <.05)

Table 5.6. Percentage Distribution of Mother's Demographic Characteristics, Insurance Status, and Baby's Birth Weight for Families Included in the 30-33 Month Subsample and Those Excluded at Quasi-Experimental Sites[a]

		Intervention			**Control**		**All Sites**
	Sample	Excluded	Total	Sample	Excluded	Total	
	(N =1189)	(N =641)	(N=1830)	(N = 955)	(N = 545)	(N=1500)	(n=3330)
Mother's Age[b.c]							
19 or less	9.4	19.2	12.8	10.7	14.9	12.2	12.6
20-29	45.3	49.1	46.6	52.4	58.3	54.5	50.2
30 or more	45.3	31.8	40.6	36.9	26.8	33.2	37.3
Mother's Education[b.c]							
11 years or less	13.0	24.8	17.1	18.5	27.2	21.6	19.2
High School Graduate	21.6	23.4	22.2	26.0	29.0	27.1	24.4
Some College/Vocational	27.0	25.3	26.4	28.2	30.3	29.0	27.6
College Graduate	38.4	26.5	34.3	27.3	13.5	22.3	28.9
Mother's Race[b.c]							
White	63.0	53.4	59.6	53.3	43.5	49.7	55.2
Black/African American	21.1	24.2	22.2	25.8	28.8	26.9	24.3
Asian/Native American	4.9	6.8	5.6	3.5	3.7	3.6	4.7
Other	11.0	15.6	12.6	17.4	24.0	19.8	15.9
Mother's Ethnic[c] *Origin*							
Hispanic	16.9	19.7	17.9	21.0	29.5	24.1	20.7
Mother's Marital Status [b.c]							
Married	73.5	57.0	67.7	65.7	57.1	62.6	65.0
Mother Employed[b.c]							
Worked Last Month of Pregnancy	51.2	37.8	46.5	41.9	35.3	39.5	43.3
Father Employed[b.c]							
	91.4	87.0	89.9	90.1	87.5	89.1	89.5
Live Birth Order							
First	46.8	45.4	46.3	44.4	46.8	45.3	45.8
Insurance during Pregnancy[a] [b.c]							
Medicaid	24.3	40.6	30.0	24.5	32.3	27.3	28.8
Baby's Birth Weight							
< 2500 grams	6.2	6.9	6.4	5.6	5.6	5.6	6.0

[a] Data for up to 3% of respondents may be missing for these variables. These missing data were excluded from the denominator for purposes of calculating percentages.

[b] Difference is significant between sample and excluded groups in the intervention group (p <.05)

[c] Difference is significant between sample and excluded groups at in the control group (p <.05)

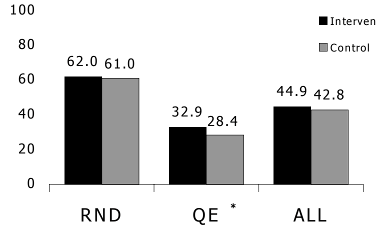
5.4.C. Baseline Characteristics of Intervention and Control Groups in the 30-33 Month Subsample

Intervention and control groups at RND and QE sites were compared on key baseline co-variates that were controlled for in the analyses. The bar graphs show the percentage in each group at the RND and QE sites and scatterplots display comparisons at the site level.

5.4.C.1. Site of Enrollment

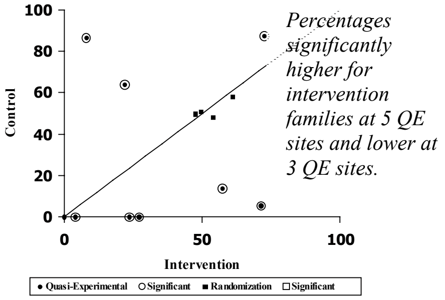
Among families with interviews at 30-33 months, 43.9% were enrolled in the evaluation before they left the hospital. A significantly greater percentage of families at the RND sites than at the QE sites were hospital-enrolled (61.5% vs. 30.9%). No differences were found in site of enrollment between intervention and control groups at RND sites. At QE sites, intervention families were more likely to be enrolled in the hospital than were control families. The scatterplot shows that at the RND sites, there was little variability in site of enrollment and there were no significant differences between intervention and control families. At the QE sites, there was substantial variability in enrollment place, with significant differences at eight of nine QE sites; the direction of the differences, however, varied across the sites.

Percentage of families that enrolled in the hospital (vs. office) (n = 3737)



p <.05

Percentage of families that enrolled in the hospital (vs. office) (n = 3737)



Percentages significantly higher for intervention families at 5 QE sites and lower at 3 QE sites.

5.4.C.2. Mother's Characteristics

Among families interviewed at 30-33 months, 11.5% of the mothers were teenagers and 39.1% were 30 years or older at the time of their child's birth. Almost fifteen percent (14.6%) had less than a high school education; 30.7% had completed college. Almost one-fourth (23.1%) reported their race as black or African American and 18% reported being of Hispanic ethnic origin. More than two-thirds (67.6%) of mothers were married and living with their baby's father, and more than one-third (36.2%) were employed outside the home within 2-4 months after the birth of their child. Slightly fewer than half of mothers (46%) had no other children at the time of their child's birth.

There were no significant differences between intervention and control families at RND sites on any of the maternal demographic characteristics (**Figure 5.5**). At QE sites, significantly greater percentages of intervention than control mothers were 30 years of age or older, were college graduates, were married and living with their baby's father when their child was born and smaller percentages were teen mothers, were black/African American or Hispanic origin. There were no significant differences in whether the child was the mother's first, or in mother's education. The scatterplots for these variables (**Figure 5.5**) show significant differences at RND sites for two variables. At one RND site smaller percentages of intervention than control mothers were married and living with the baby's father and at two RND sites, there were significant differences (in opposite directions) in the percentage of mothers who were teenagers at their child's birth. For each of the maternal characteristics, there were significant differences at some of the QE sites, sometimes in opposite directions.

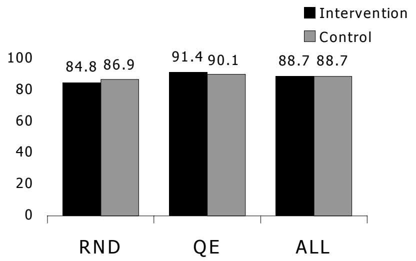
5.4.C.3. Father's Employment

Almost 90% of fathers in the 30-33 month subsample were employed at baseline. There were no significant differences between intervention and control groups in the percentage of fathers who were employed. At the site level, greater percentages of intervention than control fathers at two QE sites were employed.

5.4.C.4. Child's Characteristics

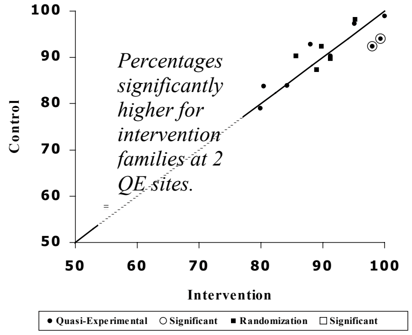
For 36.6% of children in the 30-33 month subsample, Medicaid was the source of insurance coverage for their medical care (measured at 2-4 months). There were significant differences at both RND and QE sites but in opposite directions. At RND sites, intervention families were more likely to be insured by Medicaid than control families. At QE sites, the reverse was true. The scatterplot shows that at two QE sites, significantly more infants in the control practice than the intervention practice were covered by Medicaid while at one QE site and one RND site, differences were in the opposite direction.

Percentage of fathers employed at baseline (n = 3737)

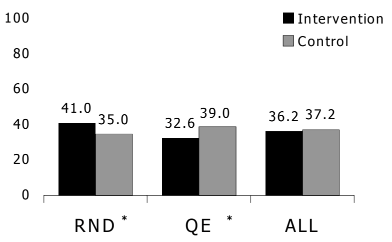


* p <.05

Percentage of fathers employed at baseline (n = 3737)

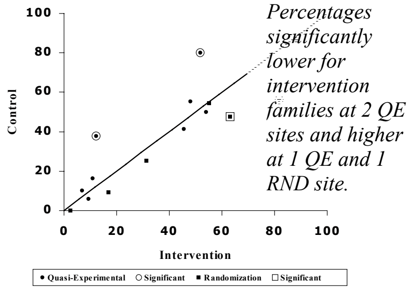


Percentage of children insured by Medicaid or other pubic insurance 2-4 months post partum (30-33 months)



p <.05

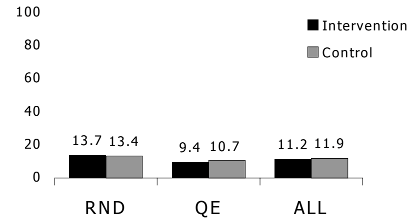
Percentage of children insured by Medicaid or other pubic insurance 2-4 months post partum (30-33 months)



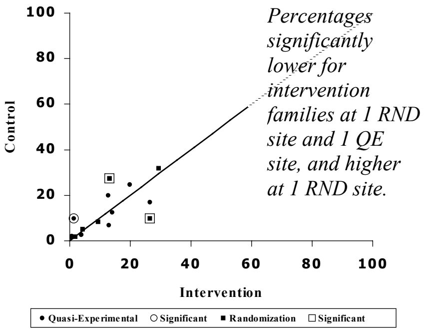
Characteristics of Mothers in the 30-33 Month Subsample at Randomization and Quasi-Experimental Sites

Figure 5.5. Percentage of mothers in the intervention and control groups at Randomization and Quasi-Experimental Sites who were teenagers or 30 years of age or older at child's birth, who had less than 12 years of education or who were college graduates at child's birth, who were black or African American, who were Hispanic, who were married and living with the child's father at the child's birth, who were employed 2-4 months postpartum, and were first time parents at baseline.

Percentage of mothers who were teenagers at baseline (n = 3737)

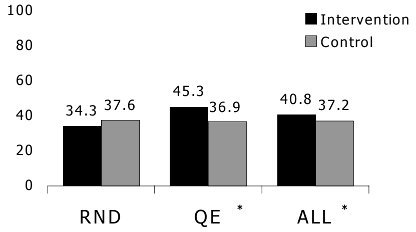


Percentage of mothers who were teenagers at baseline (n = 3737)



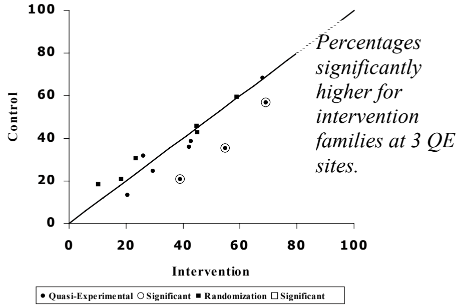
Percentages significantly lower for intervention families at 1 RND site and 1 QE site, and higher at 1 RND site.

Percentage of mothers who were more than 30 years of age at baseline (n = 3737)



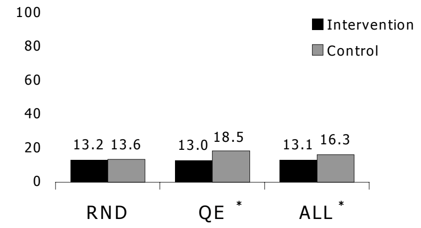
*** p <.05**

Percentage of mothers who were more than 30 years of age at baseline (n = 3737)



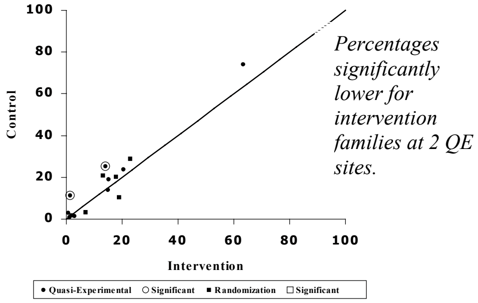
Percentages significantly higher for intervention families at 3 QE sites.

Percentage of mothers with 11 years or less education at baseline (n = 3737)



*** p <.05**

Percentage of mothers with 11 years or less education at baseline (n = 3737)

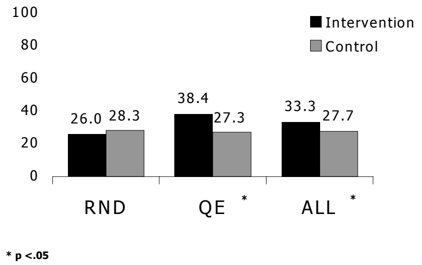


Percentages significantly lower for intervention families at 2 QE sites.

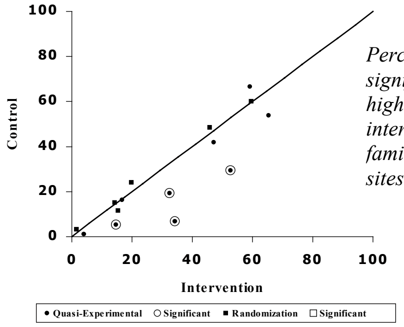
Characteristics of Mothers in the 30-33 Month Subsample at Randomization and Quasi-Experimental Sites

Figure 5.5. (Continued) Percentage of mothers in the intervention and control groups at Randomization and Quasi-Experimental Sites who were teenagers or 30 years of age or older at child's birth, who had less than 12 years of education or who were college graduates at child's birth, who were black or African American, who were Hispanic, who were married and living with the child's father at the child's birth, who were employed 2-4 months postpartum, and were first-time parents at baseline.

Percentage of mothers who were college graduates at baseline (n = 3737)

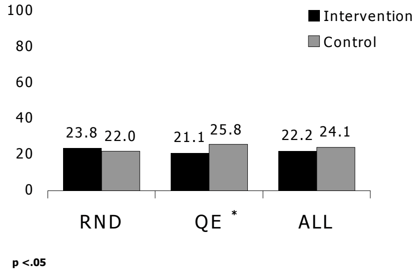


Percentage of mothers who were college graduates at baseline (n = 3737)

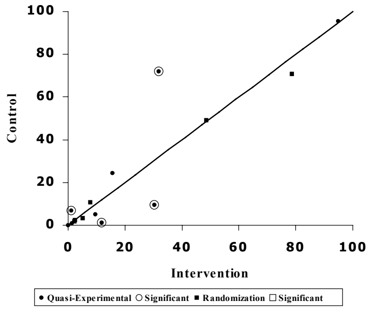


Percentages significantly higher for intervention families at 4 QE sites.

Percentage of mothers who were African-American (n = 3737)

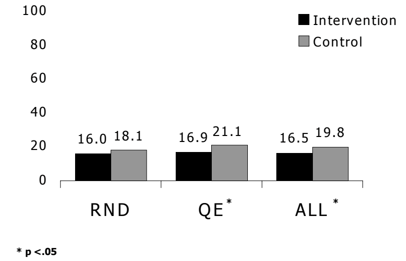


Percentage of mothers who were African-American (n = 3737)

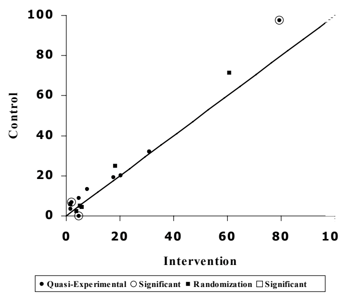


Percentages significantly higher for intervention families at 2 QE sites and lower at 2 QE sites.

Percentage of mothers who were Hispanic (n = 3737)



Percentage of mothers who were Hispanic (n = 3737)

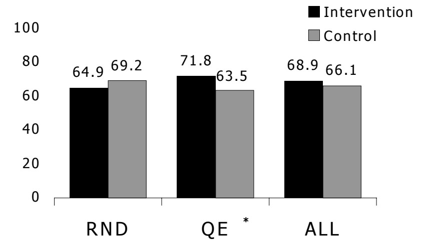


Percentages significantly lower for intervention families at 2 QE sites and higher at 1 QE site.

Characteristics of Mothers in the 30-33 Month Subsample at Randomization and Quasi-Experimental Sites

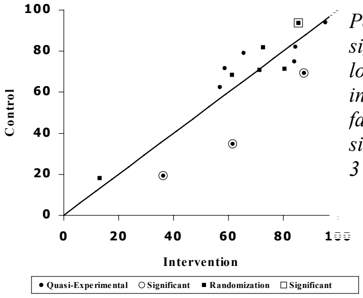
Figure 5.5. (Continued) Percentage of mothers in the intervention and control groups at Randomization and Quasi-Experimental Sites who were teenagers or 30 years of age or older at child's birth, who had less than 12 years of education or who were college graduates at child's birth, who were black or African American, who were Hispanic, who were married and living with the child's father at the child's birth, who were employed 2-4 months postpartum, and were first-time parents at baseline.

Percentage of mothers married and living with baby's father at baseline (n = 3737)



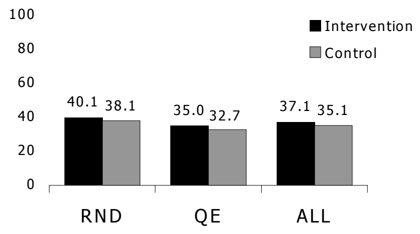
* p <.05

Percentage of mothers married and living with baby's father at baseline (n = 3737)



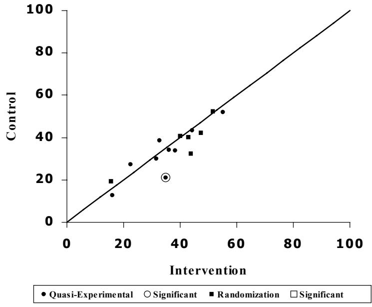
Percentages significantly lower for intervention families at 1 RND site and higher at 3 QE sites.

Percentage of mothers employed 2-4 months post partum (n = 3737)



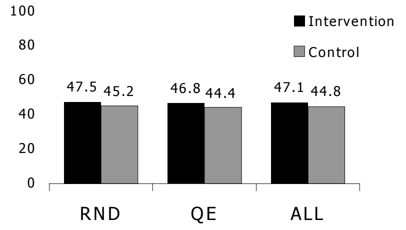
p <.05

Percentage of mothers employed 2-4 months post partum (n = 3737)

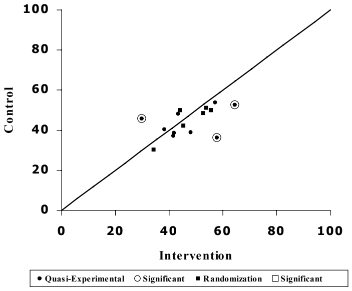


Percentages significantly higher for intervention families at 1 QE site.

Percentage of mothers who were first-time parents at baseline (n = 3737)



Percentage of mothers who were first-time parents at baseline (n = 3737)



Percentages significantly higher for intervention families at 2 QE sites and lower at 1 QE site.

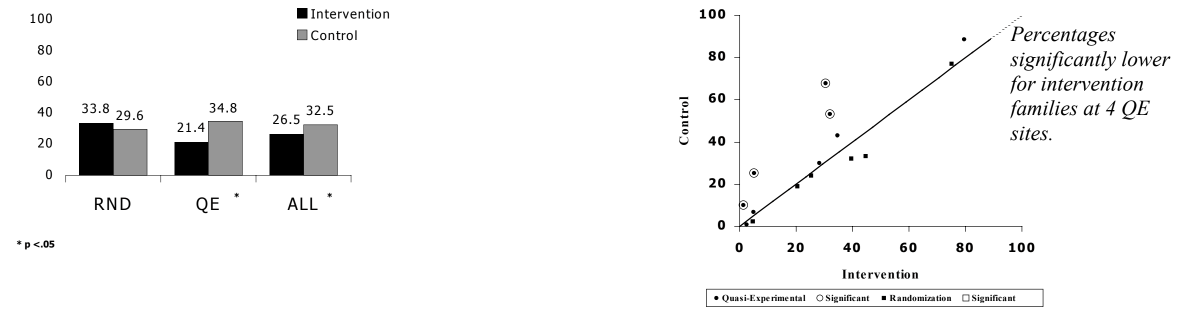
Overall, 6.3% of children in the 30-33 subsample weighed less than 2500 grams at birth. (*data not shown*) No significant differences were found between intervention and control groups in the percentage of children with low birth weights.

5.4.C.5. Economic Characteristics of Families

Less than one-third of families in the 30-33 month subsample reported incomes (at 2-4 months) of below $20,000 and more than one-third, incomes of $50,000 or more. More than half owned their home. Intervention-control differences were similar to those described for the 2–4 month subsample with a smaller percentage of intervention than control families having low incomes and a greater percentage, high incomes. This same pattern occurred at QE sites but not at RND sites, where no significant intervention-control group differences in income status were found. As was the case for the 2-4 month subsample, significant differences between groups in home ownership were found only at the QE sites with a greater percentage of intervention families owning their homes. The scatterplots (**Figure 5.6**) show smaller percentages of intervention than control families having low incomes at four QE sites and greater percentages having higher incomes at five sites. Significant site level differences in home ownership are seen at three sites but in opposite directions

Economic Characteristics of Families in the 30-33 Month Subsample at Randomization and Quasi-Experimental Sites

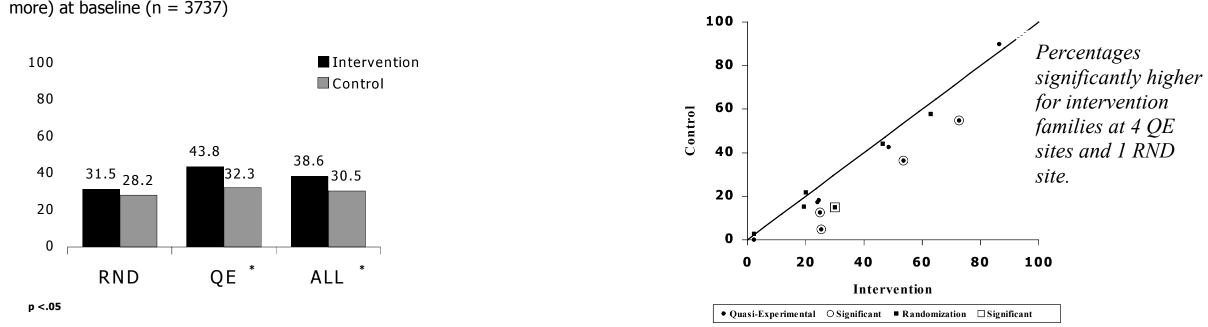
Figure 5.6. Percentage of families in the intervention and control groups at Randomization and Quasi-Experimental Sites whose household incomes fell in the low-income or high income tertiles or that owned their homes.


Percentage of families with low-income (<$20,000) at baseline (n = 3737)

Percentage of families with low-income (<$20,000) at baseline (n = 3737)

Percentages significantly lower for intervention families at 4 QE sites.

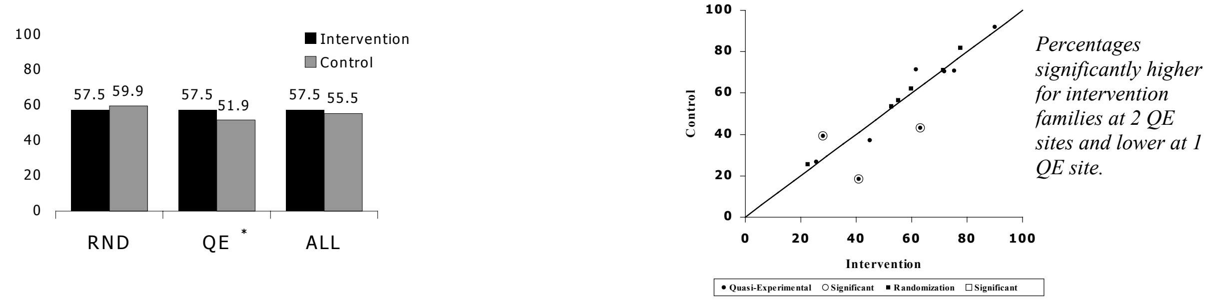
* p <.05


Percentage of families with high-income ($50,000 or more) at baseline (n = 3737)

Percentage of families with high-income ($50,000 or more) at baseline (n = 3737)

Percentages significantly higher for intervention families at 4 QE sites and 1 RND site.

p <.05


Percentage of families that owned their home at baseline (n = 3737)

Percentage of families that owned their home at baseline (n = 3737)

Percentages significantly higher for intervention families at 2 QE sites and lower at 1 QE site.

HEALTHY STEPS℠

6. Implementation

Implementation

This chapter of the report describes the implementation of the Healthy Steps program as reported by lead physicians, site administrators, and Healthy Steps Specialists at the 15 national evaluation sites. Through questionnaires administered at baseline and 30 months after start-up, they responded to objective and open-ended questions about the context within which the Healthy Steps program was set, the implementation of the program, and the perceived benefits and challenges the program provided. It is evident that:

- Healthy Steps was a unique program in which all components were made available at the start of the program and were implemented at all 15 sites.

- Despite the challenges of implementation, all informants reported that Healthy Steps benefited families and that families "loved" the program.

We also focus on the Healthy Steps Specialists' perspectives of what Healthy Steps services were provided to families as recorded in their logs of contacts with families. The Healthy Steps Specialists' logs provide in-depth information about the types of contacts between the Healthy Steps Specialists and families, the topics discussed with families, and the number of services delivered to families. They provide insight into what actually happened between the HS Specialist and the family.

As expected, families received more services during the first year (through 14 months of age) than the second to third years (between 15 and 32 months of age) of the program. According to the Healthy Steps Specialists, the average family who participated in the program at least 15 months was provided:

  - 9 office visits with their Specialist;
  - 6 telephone calls with their Specialist;
  - 2 home visits from their Specialist;
  - 2 other contacts from their Specialist such as mailings; and
  - Less than 1 parent group (only 20% of families attended at least one parent group during the program)

- Healthy Steps Specialists attended most, if not all, of each child's well child visits during the first three years of life.

- The level of home visiting was lower than the recommended schedule, although the Healthy Steps Specialists' records do not indicate if a family refused a home visit or the Healthy Steps Specialist failed to offer it.

- Child development was almost universally discussed with families, and other important topics such as child nutrition and health, injury prevention, family and maternal health and support were addressed with a large proportion of families.

6. IMPLEMENTATION

6.1. Introduction

This chapter describes the implementation of the Healthy Steps (HS) program as reported by key informants, including lead physicians, HS Specialists, and site administrators at the 15 national evaluation sites. It addresses the first objective of the evaluation:

1. *How did clinicians and local foundations implement the Healthy Steps program in their sites and what were the factors that facilitated or impeded implementation?*

Questionnaires were administered at baseline and 30 months after start-up to key informants. Informants responded to both objective and open-ended questions about the context within which the HS program was set, the implementation of the program, and the perceived benefits and challenges the program provided.

The implementation of HS is also described from the perspective of the HS Specialists. Types of contacts, topics discussed and patterns of contacts in relation to the HS protocols are described using data from logs of contacts between HS Specialists and families. Differences in the types of HS services provided to families by HS Specialists with nursing, social work, or child development/early education backgrounds were also examined.

6.2. Implementing Healthy Steps: The Site Perspective

As viewed from the perspective of those responsible for implementing the HS program within their practices, HS was implemented in a changing environment for health care. Despite many challenges for practices outside of the HS program, informants at most sites judged their practice environments to be good at baseline and generally even better at 30 months. They noted many structural changes in the HS practices over the course of the program such as changes in practice ownership, administration and staffing. Despite shifting practice environments, all program components were made available at the start of the program and were implemented at all 15 sites. In addition, despite experiencing challenges in implementation, all informants reported that HS benefited families and that families "loved" the program.

6.2.A. Data Sources and Methods

Key informant interviews and objective questionnaires were administered at baseline and 30 months after start-up. These instruments comprised the primary sources of data regarding how the sites experienced implementation. The interviews were conducted using structured questionnaires and were administered at baseline and at 30 months to HS Specialists, lead physicians, and site administrators at the 15 HS intervention sites.[6.1] Seventy interviews were completed at baseline with 31 HS Specialists, 19 lead physicians and 20 site administrators. At 30 months, 68 interviews were completed with 32 HS Specialists, 18 lead physicians and 18 site administrators. The number of interviews completed at each site varied according to the site's administrative structure. The response rate was 100% of those informants identified to participate. The site questionnaire, an objective paper-and-pencil instrument, was completed at baseline and at 30 months to capture the practice context before HS and to address changes in the practice subsequent to the initiation of HS.

Responses to specific key informant interview questions were summarized under topic areas. Topic areas were then organized into summaries of responses across sites by informant category (HS Specialist, lead physician, site administrator). Responses were also summarized within sites across informant category. This resulted in two summarized data sets for each time period. The organization of responses by informant type and by site provided a framework for describing the content of the interviews. Consistencies and differences in responses could thus be determined within each site as well as across sites.

6.2.B. The Practice Context

To fully understand how HS was implemented, it is necessary to appreciate the context within which the program took place.

6.2.B.1. The Healthy Steps Practices

Several criteria were used to select practices to implement the HS program. Some of these criteria were related to the requirements of the national evaluation. These criteria included the desire to participate in the program and the evaluation, practice type and size, source of local funding and the ability to identify an appropriate comparison practice. The 15 sites chosen included eight group practices, three hospital-based clinics and four staff-

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[6.1] In addition to the key informant interviews mentioned above, interviews were conducted with lead funders at baseline. These data contributed to the assessment of the potential for HS sustainability.

model health maintenance organizations (HMOs). Practices were located in 13 states. Twenty-seven health care practices comprised the 15 evaluation sites at baseline, seven randomization (RND) practices and 20 with a quasi-experimental (QE) evaluation design (10 intervention practices and 10 comparison practices). At the ninth QE site, two practices combined to form one intervention site and two practices, the comparison site. For the 30-month site questionnaire, 26 practices responded (6 randomization practices, 10 QE intervention practices and 10 QE control practices).

At baseline, most practices reported that they were of moderate size in terms of the number of clinicians (physicians and nurse practitioners) employed, with between three and 10 clinicians. Most of the practices had contractual arrangements with more than one type of managed care organization: 85% had contractual arrangements with managed care organizations and 70% with preferred provider organizations. Only 4% of practices reported no contractual agreements with managed care organizations.

The decision to participate in HS was generally "top down" at most sites. Many of the lead physicians indicated that they played an active role in deciding that HS was a program of which they wished to be a part. Many of the site administrators reported, however, that they played no role in the decision to implement HS but were expected to “make it work.”

An issue that was raised repeatedly by key informants at the start of HS was the extent to which clinicians and clinical, administrative and other staff “bought in” to the HS program. In a few cases, site informants reported that staff was initially openly hostile to the program. Often this appeared to be due to issues of additional demands on staff time, perceived discrepancies in compensation, and misunderstandings regarding sources of funds for HS. Some informants indicated that this resistance resolved during planning for and the initial stages of implementation. Others, however, indicated that clinicians and staff continued to resist changes resulting from the implementation of HS.

6.2.B.2 Changes in Practice Experience from Implementation to 30 Months

During the course of the HS program, the participating health care practices changed. For some, these changes were quite dramatic. For example, 50% of RND practices reported changes in practice ownership as compared with 40% of QE intervention sites and 30% of QE control sites. Sixty percent of control sites reported changes in management or administrative personnel in the practice or home institution, as compared with 50% of QE intervention and RND practices.

Retention of Clinicians and Staff from Baseline to 30 Months after Start-Up

	QE - I %	QE - C %	RND %	All Sites %
	N = 146	N = 74	N = 72	N = 292
Clinicians	48.6	82.4	87.5	66.8
	N = 89	N = 59	N = 93	N = 241
Nurses and Other Clinical Staff	52.8	61.0	60.2	57.7
	N = 65	N = 63	N = 53	N = 181
Clerical and Administrative Staff	40.0	39.7	35.8	38.7

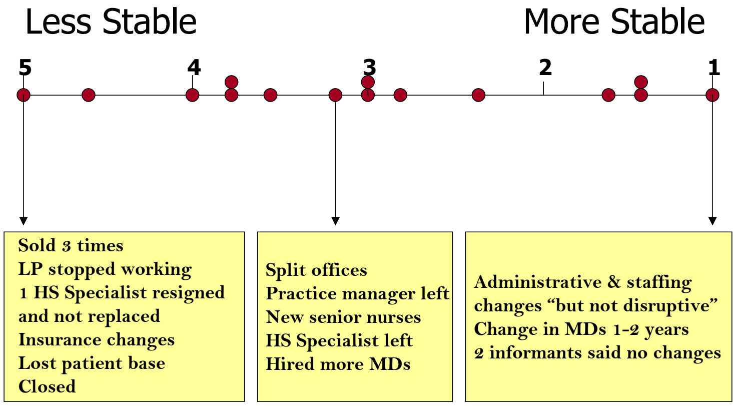
I = Intervention
C = Control

The retention rate of clinicians (physicians and nurse practitioners) from start-up to 30 months was about 88% at the RND sites and 82% for QE control sites, as compared to 49% for QE intervention sites. Massive practice changes over time at two sites and the turnover of resident physicians at one site influenced the figures for the QE intervention sites. The retention rate of nurses and other clinical staff was lower than for clinicians, with the exception of the QE intervention practices. Clerical and administrative staff had the lowest retention rates.

> *HS was implemented in a changing environment for health care and there were many structural changes in the HS practices over the time of the program. These included changes in practice ownership, administration and staffing.*

To characterize the stability of the 15 intervention sites over time and the background context within which the HS program was implemented, five members of the evaluation team rated each HS intervention site. Ratings were based on the key informants' reports of the major administrative, financing and staffing changes that occurred at the site during the program and how disruptive they were to the program. On a scale of 1 to 5 (1 more stable to 5 less stable), the raters made a qualitative assessment of the stability of the site over time. To give qualitative meaning to the placement of the sites on the continuum, responses from the key informants were summarized for the most stable, least stable and "average" sites. Eight sites (53%) were rated between 1 and 3 (more stable), with the remainder ranking above 3 on the continuum. From the key informants' reports, it is evident that the HS program was

Major Administrative, Financing and Staffing Changes Since Start-Up at the 15 National Evaluation Sites

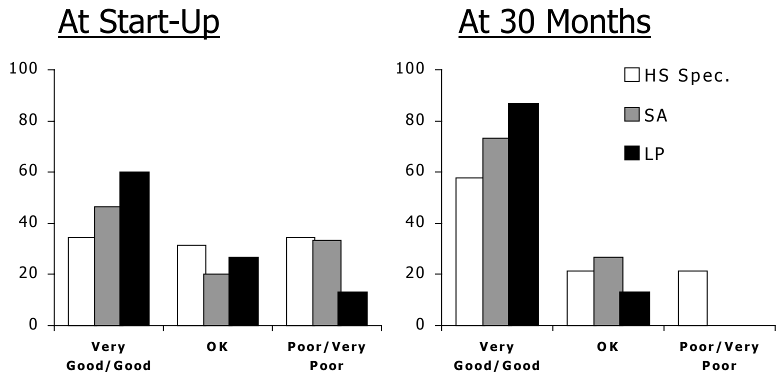


implemented in a "real world" setting and that there was considerable variation among sites in the changes that took place.

6.2.C. Practice Environment

There was substantial variation across and within sites with regard to the practice environment. Practice environment was defined as the extent to which conflicts were resolved fairly, other team members were consulted when appropriate in meeting the needs of families, information was shared in a timely manner, and the opinions of others were considered in making decisions.

Percentage of Lead Physicians, Site Administrators, and HS Specialists Reporting the Practice Environment as *Very Good/Good*, *OK*, and *Poor/Very Poor* at Baseline and 30 Months



> *"I have felt ignored a lot by the administration. [I] tried face-to-face, then memos, but never received a response back. Communication has been just one way, never comes back. That's the way the administration has always functioned."*
>
> *HS Specialist*

Overall, most informants reported a *good/very good* environment at 30 months. Despite administrative, staffing, and other changes at sites over time, over 85% of lead physicians, 75% of site administrators and 60% of HS Specialists reported that the practice environment was *good/very good.* Almost all informants perceived the practice environment as better at 30 months than at start up. The lead physicians were the most positive at both time periods and the HS Specialists the least positive. At 30 months, 20% of HS Specialists felt the practice environment was *poor/very poor*. These HS Specialists represented informants from five different sites. At no site was there consensus between HS Specialists that the practice climate was *poor/very poor*. When informants specified reasons for a less positive environment, practice changes were frequently mentioned.

All informants were asked directly about the practice environment. In addition, the HS Specialists were asked about the clinical and administrative support they received. At start-up, most of the HS Specialists who were new to the practice reported that their orientation to the practice was inadequate. These HS Specialists indicated that more extensive, formal orientation to both clinical and administrative aspects of the practice would have been of great value to them as they established themselves in the HS Specialist's role. Sites at which orientation was more thorough also seemed to report fewer problems with communication between the HS Specialist and other personnel. To a large extent, the HS Specialists relied heavily on the support of the other HS Specialist in the practice. By 30 months, almost all HS Specialists expressed satisfaction with the clinical/professional support received, but fewer than half were satisfied with the administrative support received.

" We hit a bump in the road when the office administration changed…"

HS Specialist

Despite many challenges for practices outside of the HS program, informants at most sites judged the practice environment to be good at baseline and generally even better at 30 months. Lead physicians and site administrators rated the practice environment somewhat higher than did the HS Specialists. Scheduling and space were the greatest challenges facing practices in accommodating HS.

6.2.D. What Was the Spectrum of Program Implementation?

Program implementation included the acceptance of the HS philosophy of care, the adoption of a team approach to providing pediatric care, and the implementation of individual program components. Facilitators and barriers to smooth implementation such as staff training and orientation, leadership and buy in, space, scheduling, and integration into the practice are addressed below.

6.2.D.1. The Introduction of the HS Program

At baseline, informants characterized the implementation of HS into their ongoing practices as challenging. The implementation issues for the program were significant, especially as reported by "front-line" staff such as site administrators and HS Specialists. Informants interviewed during the first weeks of HS indicated that many changes had to be made in practice operations to implement HS. These changes included establishing space for the program, making changes in appointment scheduling to accommodate the joint/linked visits, reassigning job responsibilities, and introducing regular team meetings. Of these, scheduling difficulties seemed to be the most salient and difficult to resolve at start-up. Although some sites reported that these issues were manageable, other sites conveyed the opinion that the implementation barriers were on-going and unlikely to be resolved easily.

Implementation was defined as putting into place and maintaining a philosophy of pediatric practice and a set of services as defined by the Healthy Steps program protocols.

Within the first few months of HS, smooth implementation was related to the strong cooperation and support of practice administrators and staff in making all of the changes mentioned above. Factors cited as important in integrating the HS program into the ongoing practice system included: one or more strong advocates (champions) with power to institute change; the training from Boston University School of Medicine (for program purposes) and Johns Hopkins University (for evaluation purposes); and the ability of the site staff to work together to implement the program.

Staff buy-in to the concept of HS and the reality of its implementation was critically important. The issue of buy-in was somewhat dependent on the thoroughness of orientation to the program that was provided, as well as leadership within the site.
The importance of strong leadership, administrative support and integration of the HS philosophy was recognized by informants in the early months of implementation. These factors continued to be associated with smooth implementation over the course of the program. Administrative support for HS was withdrawn at a few sites, compounding the difficulties of implementing or continuing with the program. Many informants commented on the importance of strong leadership for HS at the site to maximize a positive practice environment and to facilitate problem solving in the face of marked change.

The experience of two sites illustrates the impact of differing levels of medical and administrative leadership in the face of structural change that affected the two sites differentially over time.

- Site A merged with another practice, but kept the same strong HS leadership in terms of philosophy of care as well as medical and administrative support for the program. This support and enthusiasm for the program among all staffing levels translated into the successful orientation and training of administrative and clinical staff new to the HS program. Thus, the structural and staffing changes reported by the practice did not adversely affect the HS program. All informants rated the practice environment as *very good*, and the HS program was considered integral to the practice over time.

- Site B changed ownership and administrators repeatedly. Although champions were mentioned, comments were that *"they did what they could."* There was no one on-site in a position of power to oversee and advocate for HS. The HS Specialists were left to orient each new set of staff, and the priorities of the practice were not favorable to any consideration of the HS program. There was little or no administrative buy-in and no real practice support available in coping with staffing changes. The HS Specialists felt they were working not in the practice but outside a chaotic system.

6.2.D.2. Integration of the HS Specialist into the Practice

As mentioned previously, the cornerstone of the program was the addition of a new professional, the HS Specialist, into the pediatric practice. Therefore, a measure of success in implementing the program would be how well the HS Specialists had been integrated into the practice.

"[Healthy Steps is] well integrated now. At the beginning though, the HS Specialists were intruding but now [we are] glad they are here. Doctors had difficulty adjusting in the beginning. Schedulers [were] not used to having others involved."

Site Administrator

At start-up, when asked which staff would be most affected by the introduction of the HS Specialists, many key informants identified the pediatricians and the nurse practitioners, primarily because of "turf" issues and overlapping responsibilities. Several respondents identified pediatricians as most affected because the HS Specialists might be "looking over their shoulder" and because the HS Specialists may develop stronger relationships with families. Other respondents identified nurse practitioners as most affected by the introduction of the HS Specialists because of potential role conflict and overlapping responsibilities. In addition to pediatricians and nurse practitioners, some respondents identified support staff as most affected because of increased administrative demands resulting from the program.

At 30 months, HS Specialists were asked how well overall they thought they, as professionals with a focus on child development, had been integrated into the pediatric practice. The vast majority of their responses were positive: 75% said they felt that they had been integrated into the practice.

When asked the same question, 66% of lead physicians and 72% of site administrators responded positively. Within sites, all respondents at six (40%) sites reported positive integration. At four additional sites (27%), the majority of the respondents reported positive integration. At four sites (27%), integration was considered poor (negative) by the majority of informants.

Integration of the Healthy Steps program and the HS Specialists was challenging, but by 30 months most of the HS Specialists felt that they and the program were well integrated into the practice. Additionally, positive integration of the HS Specialists was reported by 66% of lead physicians and 72% of site administrators.

As another measure of the integration of the HS Specialist into the practice, during the 30-month interview the HS Specialists were asked objective questions characterizing their relationship with others in the practice. The majority of HS Specialists characterized their overall relationship with the clinicians at the site as *good* or *very good*. They reported the most positive relationships with the nurse practitioners at the site. They had the least positive overall relationships with the administrative staff at the practice. Overall, only 40% of HS Specialists felt that their relationship with the site administrator was *good* or *very good*. Because the site administrator and other administrative staff were pivotal in facilitating or impeding implementation of some of the structural elements needed for the program (such as space and scheduling), good relationships with those staff were very important.

6.2.D.3. The Role of the Healthy Steps Specialist

At 30 months, the HS Specialists and the lead physicians were asked about the role of the HS Specialist and what changes, if any, had occurred over time. Although many HS Specialists thought their role had evolved, they generally commented that they had become more efficient, knowledgeable and confident, assertive, and accepted within the practice and within their role. One stated: "I have grown with HS." They were also asked how they would design the HS Specialist role. Some responded that they would make no changes. Others commented that they would begin providing services prenatally, would want to be physically based

"I would have paid to have this job."

"Best job I've ever had."

"I'm grateful everyday that I have this job."

HS Specialists

in the practice, would want more emphasis on team building, and would want to be seen as a partner -- not an assistant-- in the practice.

Overall, lead physicians rated the role of HS Specialists as the most valuable component of the program. After that, both lead physicians and HS Specialist rated the joint/linked visits and home visits as the most valuable components. Community linkages and parent groups were considered the least valuable components and parent groups were discontinued at some sites.

The issue of supervision of the HS Specialists was raised by several site administrators. Generally, they felt the HS Specialists should be accountable to administration. The HS Specialists perceived themselves as accountable to the physicians with whom they worked. This confusion of role responsibility was an indication of an issue that had to be addressed with the advent of the HS Specialists into the practice.

The structure of the HS Specialist role was dependent in part on the personality and characteristics of the person filling the role. There was considerable variation and no consensus among lead physicians, HS Specialists and site administrators regarding the ideal background of the HS Specialist, with some informants preferring backgrounds in child development, while others felt nurse practitioners, or social workers were preferable.

Although lead physicians were not unanimous about what backgrounds they would prefer the HS Specialist to have, important experiences and skills mentioned by some included experience in lactation counseling, case management, teaching residents, screening, and "doing health care". In practices where resident training took place, most informants commented on the

The role of the HS Specialist was a new one for the practices. The role was not immediately defined or understood. This led to some confusion for staff about how the HS Specialists would fit in, and who should supervise them. The structure of the role was in part dependent on the personality and characteristics of the person filling the role. There was variation and no consensus among informants about what background a HS Specialist should have, whether nurse, child development specialist, or social worker. All could be successful. Generally, the HS Specialists stated they loved the job and would not change their role.

expanding role of HS Specialists in that training and the value of that use of HS Specialists' talent.

Overall, despite difficulties they may have encountered, HS Specialists commented on how much they "loved" their job.

6.2.D.4. The Integration of the HS Program into the Pracitce

6.2.D.4.A. Implementing a Team Approach

An important aspect of the HS program was the adoption of a team approach as part of an overall philosophy of service provision. Although the concept of a multidisciplinary team for the provision of health care is not new, most of the practices did not use a team approach to patient care prior to the HS program. Thirty months after the program started, however, 86% of HS Specialists reported that a team existed for providing clinical services to families. At two sites, the HS Specialists reported that clinicians, practice staff and HS Specialists no longer worked as a team, although they had worked as a team initially. In the great majority of sites where the team approach continued the HS Specialists reported changes in how the team worked together over time, including changes in the composition of team members and changes in the frequency of team meetings. Most HS Specialists agreed that there was increased team cohesion over time.

> *"The decision to divide the whole practice into clinical care teams grew out of the HS experience."*
>
> *Lead Physician*

6.2.D.4.B. Implementing the Components of the HS Program

In addition to the HS Specialist, the HS program featured a package of services to expand pediatric care. A brief description of each service follows. In addition, based on information provided by the 32 HS Specialists and 18 lead physicians who responded to the 30-month key informant interview, we summarize the implementation of each component in terms of its fidelity to program protocols and the informants' perceived value of the components in meeting the goals of the HS program, the needs of the families served, and the practice of pediatrics. **Tables 6.1a through 6.6** at the end of this chapter elaborate on these results.

6.2.D.4.C. Enhanced Strategies of Pediatric Care

A number of activities were included within the rubric of enhanced strategies in well-child care. Informants were asked specific questions about each, including the use of specific child development assessment tools, anticipatory guidance, teachable moments, linkages with obstetric care, counseling about breastfeeding, and the *Reach Out and Read Program* (ROAR). In addition, informants were asked to comment about some of the written materials developed for the program and to indicate whether the HS Specialists' practice included identification and referral of families for evaluation and treatment of maternal depression, smoking, family violence or substance use as detailed in the HS program protocols.

Developmental assessment tools used in the HS program included the Neonatal Behavioral Assessment Scale (NBAS), the Denver Developmental Screening Tool (DDST), the Temperament scale, the Behavioral Assessment of Baby's Emotional and Social Style (BABES),[6.2] the Family History and the MacArthur Communicative Development Inventories.[6.3] Of these, only the DDST was reported to have been implemented completely and neither modified nor discontinued at any site. The HS Specialists consistently perceived the DDST as very valuable to families, to the practice, and in meeting HS goals.

Other developmental assessment tools were modified or their use was discontinued over the course of program implementation. For example, 31% of HS Specialists reported that they had implemented the BABES, then discontinued its use. Comments about the BABES generally related to the time it took to administer and a lack of training about the tool. HS Specialists felt that it was more efficient to use some of the items in a discussion format with families. Another modification noted was that the instrument was used at 15 months instead of 12 months because of the busy schedule at the 12 month visit.

Although most of the HS Specialists initially used the Temperament scale, many modified or discontinued its use. Again, HS Specialists considered it easier to discuss the topic areas rather than ask the questions in a scale format. Time constraints and feelings that the scale should be done at an older age than guidelines suggested also contributed to the decision to modify or discontinue. Several HS Specialists cited problems with cultural specificity and the high literacy requirements of the scale as other difficulties in its use.

HS Specialists and lead physicians were asked about HS program materials, including Linkletters, Parent Prompt Sheets, Quick Checks, and the Child Health and Development Record. The

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[6.2] Copyright 1994 by Karen M. Finello and Marie Kanne Poulsen. For further information or assistance, contact: Dr. Karen Finello, California School of Professional Psychology-LA, 1000S. Fremont Ave., Alhambra, CA 91803 or Dr. Marie Kanne Poulsen, USC University Affiliated Program, Childrens Hospital, P.O. Box 54700, Mail Stop #53, Los Angeles, CA 90054.

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Linkletters were implemented by all practices with about two thirds of HS Specialists reporting that the value for HS goals, needs of the families, and the practice was high. A smaller proportion of lead physicians (50%) felt that the value to the practice was high. Although the Linkletters were almost universally liked, Parent Prompt Sheets, and the Quick Checks were less completely implemented and were considered less valuable for families and the practice.

"...only a handful of parents remembered to bring them [Child Health and Development Record] in to be filled out..."

HS Specialist

"...one was given at the hospital that contained a photo of each baby, and was more attractive and easier to use."

HS Specialist

The Child Health and Development Record was implemented by three fourths of the HS Specialists. However, there were consistent reports that it was not successful in terms of family use, meeting HS goals, or in value to the practice.

All practices implemented teachable moments and developmental counseling without modification. The Reach Out and Read Program was very well received and the only modification made was to start earlier than six months of age. Although counseling about breastfeeding was implemented across all sites, several HS Specialists commented that by the time they saw families, decisions about breastfeeding had been made and their only role was to support what was already happening. Several HS Specialists recommended seeing families in the prenatal period to better influence decisions about breastfeeding.

Creating linkages with obstetrical care was considered a difficult element to implement. Only one third of the HS Specialists and lead physicians felt there were any links. This was in part because of the large number of obstetricians to deal with and a variety of structural problems related to the way practices were organized.

On the other hand, HS Specialists reported that the identification of problems with maternal depression, smoking, family violence, and substance use, and counseling and/or referral for these problems were well implemented.

Overall, *Enhanced Pediatric Strategies* encompassed a wide range of activities. Most but not all of those activities were implemented by the HS Specialists, although some were later modified or discontinued because of practice requirements, or family need or interest.

6.2.D.4.D. Joint/Linked Visits

Joint/linked well child visits with physicians and HS Specialists participating together were expression of the team approach to care. Joint/linked visits were implemented at all the sites. There was considerable trial and error in determining the particular format of the visit, with many sites trying more than one option. The final routine depended on factors such as scheduling, time constraints, participant personalities, and caseload size. A plan that was flexible and allowed the use of both linked and joint visits depending on circumstance appeared to be the most popular solution at most sites. This flexible approach was considered more valuable for reaching HS program goals, and for benefiting families and the practice.

"...because of space, time and differences in personalities, my initial preferences were for linked visits. I now enjoy joint visits with the HS Specialist sharing the caseload with me. I enjoy the fact that linked or joint or combination visits [work]".

Lead Pediatrician

6.2.D.4.E. Home Visits

During the first year home visits were implemented at all sites. Both HS Specialists and lead physicians reported that the first year home visit was important to HS goals, families and the practice.

"[Home visits helped] build a closer bond with [the] HS Specialist, practice, and parents."

HS Specialist

Home visits in the second and third years were considered important but there were modifications in scheduling to meet the needs and wishes of families. Almost all of the comments from HS Specialists (no lead physicians commented) related to diminishing interest and increasing scheduling problems with families as the children grew older. Scheduling problems appeared to be related primarily to families' perceived lack of need for the visits or to difficulties arising from parents' work schedules. Overall, there appeared to be high variability in families' reactions to the home visits. Thus, although there was consensus among the informants in terms of the importance of home visits for the family and for the practice, after the first year home visiting was considered dependent on family need, availability and interest.

"Give us an eyeball into families' home life."

Site Administrator

6.2.D.4.F. Child Development Telephone Line

The child development telephone line was a medium for helping families to obtain answers to their questions about development. The concept was universally embraced. However, the form taken varied across sites and changed over time. Some sites had a dedicated telephone line installed, and some used the regular HS Specialist or practice phone lines with an answering machine or a paging system that allowed HS Specialists freedom of movement. Official call-in hours were implemented in some places, but usually abandoned in favor of calling anytime and leaving a message when necessary.

"The telephone line was well utilized but not at specified hours".

HS Specialist

Eighty-seven percent of the HS Specialists felt the telephone line was valuable in meeting HS goals and for families, with 81% also reporting that it was *good* or *very good* for the practice. The lead physicians were somewhat less enthusiastic, although over half reported that the telephone line worked well in meeting HS program goals. However, more than 70% felt that the telephone line was *good* or *very good* in meeting the needs of families and practice goals.

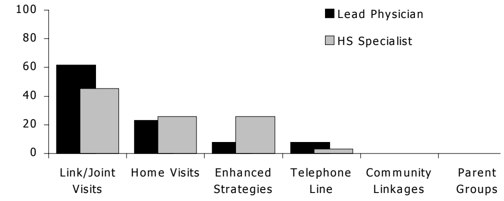
6.2.D.4.G. Parent Groups

The implementation of and follow through with parent groups was the most problematic component of the HS intervention. Parent groups were tried at all sites. Several HS Specialists, however, reported that attendance dwindled over time. One reason given was that parents were working. For those families, evening groups were not conducive to maintaining baby's bedtime or routines. Transportation was another issue mentioned. On the other hand, parent groups with special interest topics such as CPR training and social groups such as birthday parties and playgroups were well attended at some sites. Overall, informants reported that only a small proportion of families participated in any parent groups. The National Program Office (NPO) permitted sites to discontinue parent groups once it became clear that a good faith effort had been made to promote this program component.

6.2.D.4.H. Linkages to Community Resources

Respondents were asked about the availability of a book of community services or a bulletin board with information about resources for families. Over 80% of HS Specialists reported having a book of community services/resources. The bulletin board idea was implemented by less than 50% of HS Specialists. Most felt the book worked well, whereas space and the requirements of the evaluation at the RND sites made the bulletin board idea more difficult to implement.

Percentage of lead physicians and HS Specialists ranking Healthy Steps Program components as "most valuable"



6.2.D.4.I. Ranking the Value of the Components

Lead physicians and HS Specialists were asked to rank the six services in terms of their value to families. In addition to the six services described above, lead physicians were given one additional component to rank, which was the role of the HS Specialists. Nearly all lead physicians (95%) ranked the role of HS Specialist as the most valuable component. After that, joint/linked visits were ranked highest, with home visits, enhanced pediatric strategies, the development telephone line, community links and parent groups following in that order. Interestingly, 28% of the lead physicians felt that the joint/linked visits were the least valuable component.

The HS Specialists rated the joint/linked visits as the most valuable component, with the home visit component ranked second. The HS Specialists were somewhat more enthusiastic about enhanced pediatric strategies than the lead physicians. All Specialists ranked either the parent groups or community linkages as the least valuable component.

We have focused on the context within which the HS program was implemented, and some of the specific issues of implementation of the program and its components. We now turn our attention to informants' perceptions of the HS program as a whole and its impact on clinicians, families and practices. Informants' assessments of the future of the program are discussed briefly.

6.2.E. Strengths, Benefits and Challenges of Healthy Steps

The great majority of staff members interviewed about the HS program believed it provided some important benefits as well as challenges for families, clinicians, and practices. Staff comments about some of those benefits and challenges follow.

6.2.E.1. Strengths, Benefits and Challenges of Healthy Steps for Families[6.4]

A major benefit of the HS program was the opportunity it provided to strengthen relationships between the practice and the families served. HS Specialists reported that the most important thing they did was to build strong relationships with their families. Having the time to build trust, personalize service, and be a sympathetic listener facilitated relationship-building. With more time to devote to families than was available to the pediatricians, the HS Specialists had time to listen.

"Parents have a place to go with questions and concerns. HS Specialists developed good relationships with families. Families [are] more confident in their medical care."

Site Administrator

"More openness than with physician. [The] HS Specialist is the person parents talk to openly."

Lead Pediatrician

As expressions of the impact of stronger relationships with families, many HS Specialists spoke of receiving letters, thank-you cards, and calls from families expressing appreciation of the help received. They also reported receiving letters and phone calls from people who had been told about HS and wanted to participate in the program. One HS Specialist said she was continually asked, *"What happens after three years?"* Families

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[6.4] There are two obvious caveats to the generally positive perceptions of parents' attitudes: (1) they are filtered through the perceptions of staff; and (2) families who did not find HS helpful or for some other reason didn't want the services, have selected themselves out of the program. Therefore, it is not surprising that there was very little negative reaction to the program from the parents as reported by staff. In the words of one HS Specialist, "some families who need HS the most left the practice."

wanted to enroll newborns. They told friends and relations to call the HS Specialist for help. Parents asked how they could help in keeping HS going and promote the program! On the other hand, the HS Specialists stated that building relationships with families took time.

Another benefit of HS for families that was mentioned across all three types of informants was a sense that involvement in HS provided the practice with a deeper knowledge and insight about the families. Lead physicians and site administrators in particular referred to the degree to which the home visits provided insights for the practice, and thus how much more helpful the practice could be to the family. Informants believed that HS allowed earlier identification of psychosocial problems.

HS Specialists did report challenges in working with families. They commented on the need to relate to families with a broad range of cultural backgrounds and experiences with which they had no prior experience. One HS Specialist said she never got used to raising substance abuse issues if the parent had no obvious problem. Others said they had to learn that it is essential to work with the whole family, not to be judgmental with families, and that one gets more involved than one thought possible.

HS Specialists seem to have met these challenges through a combination of keen attention to and flexibility about the needs of each family, and by giving evidence over a period of time that they could be counted on. Making connections with families early was seen as important. HS Specialists used strategies such as constantly encouraging and reinforcing parents, persistently maintaining contact with reminders of future appointments, responding to calls in a timely way, touching base when families had an office visit for a sibling, being flexible about scheduling and rescheduling home visits, and concentrating on "teachable moments."

Factors associated with smoother implementation included: strong consistent leadership with the power to assure the structural changes needed to accommodate HS; orientation and buy in at all levels of staff; and a well-developed training and orientation program within the practice for new staff.

6.2.E.2. Strengths, Benefits and Challenges of Healthy Steps for the Provider

Lead physicians and site administrators reported that HS had helped them become more sensitive to non-medical issues and in some ways had changed the way they practiced medicine.

"There is increased awareness of other staff clinicians in the practice about child development."

Site Administrator

Many lead physicians welcomed the chance, with linked or joint visits, to cut back on their own time with their patients and leave things to the HS Specialist. However, slightly more than half of the lead physicians in the RND sites reported that they did *not* cut back on their time. In general, lead physicians felt they now had more quality time with the families and the knowledge to approach a wider variety of issues.

There was also a noticeable tendency of practitioners to develop ever-stronger working relationships with the HS Specialist. Lead physicians began to consult HS Specialists on developmental or behavioral issues of non-HS children.

An overwhelming majority of lead physicians said HS had an effect on their own practice of pediatrics. They reported learning to use a team approach, becoming more attentive to a wider range of family and child issues including maternal depression, developing an increased awareness of some inadequacies of residency training in real-world pediatrics, and expanding their focus from sick to preventive care.

The challenges for clinicians were also apparent. At the beginning of the program, virtually no clinicians, even those who were champions of HS, were fully ready to embrace it in all its complexities. They did not always find it easy to give it the time and support the program and the HS Specialists initially needed. In the view of one lead physician, the mistake of not getting pediatric buy-in at the beginning had made conditions chaotic.

Some HS Specialists felt that the older physicians were less open to the value of HS. Some HS Specialists also felt that some physicians gave lip service to HS but really did not change much. Occasionally, there was the view from physicians that the masters-trained HS Specialists had trouble communicating with them. There was also some discomfort among physicians and nurse practitioners that the HS Specialists had partially eclipsed the relationship between them and the family, and some envy that the HS Specialists had relatively so much time. Other HS Specialists encountered more than simple disinterest or inattention. Some encountered a negative attitude from above and an unfriendly reception from peers. One lead physician referred to it as *"bunker mentality,"* sometimes with the physician being called in to mediate. One site administrator noted that "People think [HS] will go away." Another was surprised there was so much resistance from staff.

6.2.E.3. Benefits and Challenges to the Practice

"It's changed the practice environment. Every staff person has become more intimately involved with the practice and knowledgeable about child development."

There were several ways in which informants reported that the practices—not just the practitioners within them—benefited from HS. Bonding families to the practice was mentioned above in connection with benefits to the families. However, it appeared to have merit in its own right as a benefit to the practice. It was seen as a way of keeping families in the practice as well as encouraging regular attendance for well child checkups. One HS Specialist said she had been told HS was the only reason some of her families had stayed with the practice. Therefore both retention rate and a perception of regular attendance were reported by informants as benefits to the practice.

Some site administrators saw the HS Specialists as a resource to the whole clinic, changing the way physicians practice and creating a team with the physicians. Informants from several sites emphasized the increasing use of HS Specialists as a resource in teaching residents about child development and family psychosocial issues. They saw clear financial as well as substantive benefits to the practice for this.

The challenges of HS to the practice related primarily to the issues in implementing HS as discussed above. HS was no ordinary medical research study or clinical trial. Both the program and its evaluation required a transformation of the way in which many staff—whether officially part of HS or not—related to the practice and to each other. In most cases, the practices had not envisioned the degree to which the project

A major hallmark of the program and benefit of Healthy Steps were the relationships that the Healthy Steps Specialists were able to build with families. This relationship allowed the provision of enhanced services to families and strengthened the relationship between families and clinicians and the practice. Lead Physicians reported that Healthy Steps affected the way they practiced pediatrics in terms of using the team approach, being more understanding of family's needs, allowing a greater focus on child development, and broadening the focus of care from sick to preventive care. The major challenges of Healthy Steps related primarily to the issues of implementation.

would disrupt long established procedures. Scheduling difficulties and logistics, record keeping systems, space problems, patient flow, lack of support staff, length of doctor visits, lack of role definition, threats to the roles of nurses, nurse practitioners and residents, and unexpected costs of the program were some of the specific difficulties that were handled in a variety of ways across practices.

6.2.F. The Future of Healthy Steps

Although the benefit of HS to the field of pediatrics and the future of HS are different, they are in many ways related and thus are discussed together. A major possible benefit of HS to the field relates to the philosophy of practice to which HS adheres. Thus, HS could become a major marketing tool for practices in addition to being an important vehicle for delivering preventive health and developmental services to families.

"Healthy Steps has the potential to raise the bar about what services families expect from their pediatric practice."

Lead Physician

All informants agreed that funding was the overriding impediment to continuation of HS. Suggestions for funding included additional foundation funding, funding through the home institution, marketing to parents and billing for services, and inclusion as a part of a health insurance package. Informants agreed that the program as identified would have to be changed or modified to be viable, given the funding challenges of today's medical environment. They saw a need to enlarge the HS Specialists' caseloads and to involve managed care and insurance companies to make the HS Specialist position billable.

6.3. Implementing Healthy Steps: The Healthy Steps Specialists' Contacts with Families

Next, we focus on the HS Specialists' perspectives of what HS services were offered to families as recorded on their logs of contacts with families. The HS Specialists' logs provide in-depth information about the types of contacts between the HS Specialists and families, the actual topics discussed with families, and the number of services delivered to families.

6.3.A. Methods

At the beginning of the HS evaluation, each HS Specialist was provided with contact logs and instructions for documenting contacts with the families receiving HS services. Each form was labeled with the child's name and HS identification number, and sent to the HS Specialist for completion. HS Specialists were asked to document every contact they had with the family, including home visits, office visits, telephone calls from or to families, parent groups, mailings and other contacts. Information requested about each contact included: the date of contact, whether the contact was completed or not, the person(s) contacted and subjects discussed with the family during the encounter. Up to 15 individual topics could be recorded by the HS Specialist for any one encounter with a family.

A comprehensive list of topics discussed was developed. These topics were grouped into six larger categories by members of the team at Boston University School of Medicine who designed the intervention. For purposes of the analysis the sample of logs was truncated at 32 months. The data were split into two time periods. The first period, birth to 14 months, reflected contacts made with families during the child's first year of life. This period was extended to 14 months in an attempt to capture the child's 12-month well child visit. The second time period consisted of contacts with the family between 15 and 32 months. Two units of analysis were considered. We conducted some analyses *by contact* in order to give a snapshot of the information collected on the contact logs. Most analyses were conducted *by family* in order to determine what services were provided to families.

Of the 2,963 intervention families enrolled in the national evaluation, 2,731 (92%) had a log of contacts. The sample for analysis excludes 33 families that actively withdrew from the evaluation, left the practice, or whose child died before two months. An additional ten families were excluded because they had not made a visit to the practice by two months. In addition, families at one site were not included in the sample as data were available from only one of the HS Specialists. The final sample included 2,688 families (91% of the total enrolled). The distribution of families varied across sites, reflecting the number of families enrolled at each site.

6.3.B. Healthy Steps Specialist Contacts

HS Specialists reported a total of 48,210 completed contacts of all types with families during the first 32 months of the program. Office visits accounted for 46% of all contacts between families and the HS Specialists from birth through 32 months. Telephone contacts were the next largest proportion of contacts (30%). Telephone contacts included those initiated by the family, those initiated by the HS Specialist, and those made through the

List of Topics and Categories

Promoting Health and Safety
Abuse/neglect
Chronic illness includes hearing and vision problems,
Heart murmur
Immunizations
Medical problems (rashes, thrush, colic, earaches, fever etc)
Teething/oral health
Well baby, no concerns discussed

Injury Prevention
Injury/poisoning/accident
Safety issues/emergency procedures/CPR

Promoting Development and Behavior
Crying/fussing
Daycare/nursery school adjustment /issues
Discipline issue/limits/spoiling
General baby issues (self-calming issues, eliminating bowels)
Problem behavior (biting, thumb sucking, etc.)
routines/schedules
Separation issues/anxiety/stranger anxiety
Sleep issues/scheduling/prone position
Sibling health/behavior (outside of relationship to HS baby)
Sibling relationships/adjustment of sibs to new baby
Sociability /withdrawn/shy
Temperament/behavior
Temper tantrums
Toilet training
Follow-up
Quick Check visit/Prompt Check
Development, testing (NBAS/DDST/etc.)
Development, general
Development, language/cognitive/brain
Development, motor
Infant stimulation issues/early intervention
Play activities
Reading/ROAR
Nurturing/parenting

Nutrition
Feeding issues/diet/nutrition/schedule
Weight/height/growth issues
Breastfeeding issues

Maternal Health and Safety
Discussed issues related to maternal depression
Maternal employment/childcare arrangements
Maternal issues with sibling of HS baby only
Maternal physical health
Maternal mental health (other than depression)
Maternal smoking
Maternal stress/anxiety
Maternal substance use
Other maternal issues
Pregnant
Partner violence

SEE NEXT PAGE FOR MORE TOPICS.

HS information line. Because not all sites had a dedicated warm line, all telephone contacts reported in the logs were included. The telephone contacts could have been substantive in terms of topics discussed, or could have been for the purposes of making appointments, confirming appointments, etc.

Home visits with families accounted for 12% of the total number of contacts. Parent groups were 4% of the overall number of encounters. Other contacts, such as mail contacts for appointments or to send information, or encounters in other places such as the hospital of birth, accounted for 8% of total contacts.

The pattern of contacts was fairly consistent over the two time periods. At both time periods, office visits accounted for the largest proportion of contacts followed by telephone contacts. The third most common type of contact during the first time period was home visits. During the second time period, the third most common type of contact was other contacts.

6.3.C. Person(s) Involved in the Contact

During the first year, we revised the contact log form to include a column to record the person with whom the HS Specialist spoke. The first contact log forms did not record this information. For these logs, the person contacted was coded from the HS Specialist's comments only if the log form specified all the family members involved in the encounter. Occasionally, it was possible to discern and code the respondent's identity in a telephone encounter. However, at office visits or home visits, all those who might be present generally could not be ascertained and the person contacted was coded as missing. As a result, in the first time period, approximately 29% of data are missing on this variable.

Of all contacts where the person contacted was recorded, 53% of contacts were made with the mother alone; 3% of contacts were with the father alone. Twenty-one percent of total contacts were made with either both parents or with either parent and another relative such as a grandparent or a sibling of the child. The remaining encounters (24%) were either made with a non-relative, generally a babysitter or a professional with whom the HS Specialist has spoken on behalf of the family, or they were missing this variable.

List of Topics and Categories

Paternal health
Paternal issues with sibling of HS baby only
Paternal mental health
Paternal physical health
Paternal smoking
Paternal stress/anxiety
Paternal substance abuse
Other paternal issues

Family Support and Information
Family adjustment to new baby
Family finances/supplies/community resources-WIC, transport, formula, counseling, etc.
Family history
Family issues with sibling of HS baby only
Family planning/child spacing/family size
General family relationships/situation/travel issues
Housing issues/moving
In-law/other relative conflict/relationship/health
Interactions with health system: getting, continuing, changing health care/forms filled out/prescriptions
Participation in Healthy Steps/enrollment/termination
Second hand smoke issues/family smoking
Other family issues
Paternal employment
Paternal involvement with baby

6.3.D. Handouts and Referrals

A handout was given or mailed to the family in 42% of encounters and a referral was made at 7% of the contacts. Over 62% of referrals were to a medical provider. Community and unspecified referrals represented the remainder. Community referrals were made for supplies such as breast pumps or baby supplies, and for WIC services, financial assistance, housing assistance, or occasionally for other community or counseling resources.

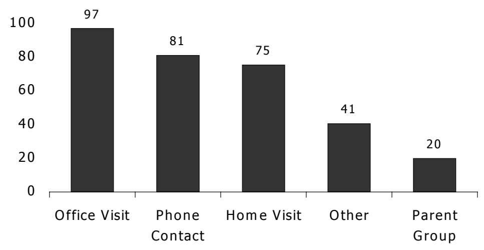
6.3.E. Attempted Contacts

In addition to the completed contacts, HS Specialists recorded 6,859 attempted contacts with families. Most consisted of attempts to reach the family by telephone, although occasionally a family would be a *"no show"* for a scheduled home visit. These attempted contacts provide some measure of the additional time and effort invested in tracking and follow up to provide quality service to families.

6.3.F. Family Contacts with the Healthy Steps Specialist

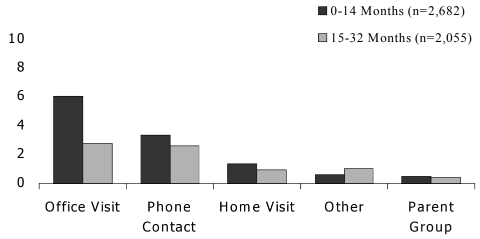
The following results are presented as a percentage of families having a contact or discussing a particular topic with the HS Specialist. During the first time period the sample included 2,682 families. For the second time period, the sample was limited to those families who had a contact log at 15 months or later. This sample included 2,055 families. The number and types of encounters with the HS Specialists varied considerably across families. However, the topics discussed during the encounters were very consistent.

Percentage of families with one or more contacts with the HS Specialist during the child's first 32 months of life by type of contact



The HS Specialists had an office visit with 97% of families at least once during the first 32 months of life. Altogether, 81% of families had at least one telephone contact with the HS Specialist and 75% had at least one home visit during the same period. Many fewer families were involved in parent groups or had other kinds of contacts, such as mail, or those based in the hospital or elsewhere.

Mean number of contacts between families and the HS Specialist by time period



Three families were removed from the sample to calculate the mean number of contacts due to extreme values.

During the first 14 months, the HS Specialist saw each family in the office on average six times and three times from 15 to 32 months. The number of office visits with the HS Specialist varied greatly from family to family, with a range of 2 to 25 office visits per family during the first time period and 0 to 20 visits during the second time period.

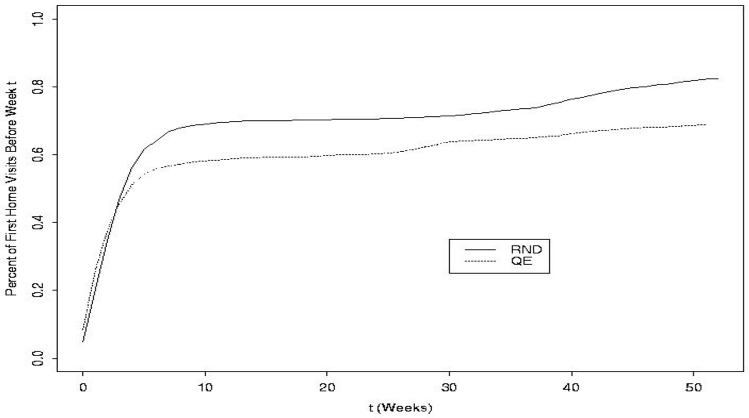
The level of office contacts during the child's first three years of life closely matched the recommended well child visit schedule of the American Academy of Pediatrics. The Academy recommends between six and eight visits during the first year of life and four visits during the second to third years (Academy of Pediatrics, 1997). The level of office contacts during the second to third years was slightly lower than the four recommended visits during this period. However, because the sample of contact logs was truncated at 32 months, we may not have captured the third year visit at 36 months for many families. These results would suggest that the HS Specialists attended most, if not all, the child's well child visits during the first three years of life.

During both time periods, the average family received or made three phone calls with the HS Specialists. Again, there was considerable variation among families. HS Specialists had up to 65 phone contacts with a family from birth through 14 months and up to 90 calls with a family from 15 through 32 months.

On average, HS Specialists made one home visit per family during both time periods (1.39 during first year and 0.95 during second to third years). Home visiting, especially a very early home visit, was considered one of the important elements of the HS intervention and an important indicator of how the HS program was implemented at each site.

The HS protocols specified that each family receive three home visits in the first year and three in the second and third years. As previously reported, many sites discontinued the home visit at nine months because it was too hard for the HS Specialist to schedule and complete it before the 12-month visit. Even with this caveat, it would appear that the overall level of home visiting was lower than the recommended level.

Distribution of the First Home Visit during the First Year of Life



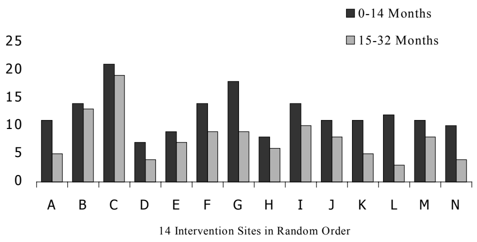
It also was recommended that the first home visit be as early as possible, preferably within the first two weeks of the baby's life. Slightly less than half of the families who had a home visit within the first year had it within the first two weeks of life; nearly 60% had it within the first two months of life. The timing of this first home visit varied across sites in part because of different enrollment patterns.

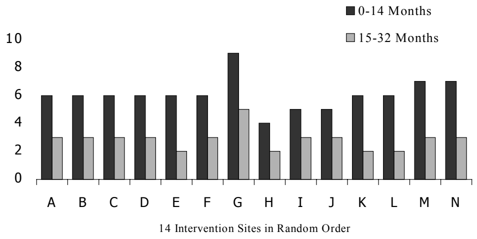
Forty percent of families had a home visit between 8 - 14 months of life and over one quarter (28%) had a visit between 15 to 32 months. It is not possible to tell from these data whether the family refused the home visit or the HS Specialist failed to offer it. However, it would appear that both the total number and timing of the home visits did not meet the recommended schedule. These data have not been adjusted for the family's exact time in the practice. That is, some families may not have been active in the practice, but may still have been considered eligible to receive the later home visits.

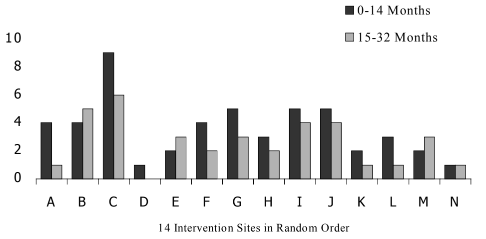
6.3.G. Family Contacts with the Healthy Steps Specialist by Site

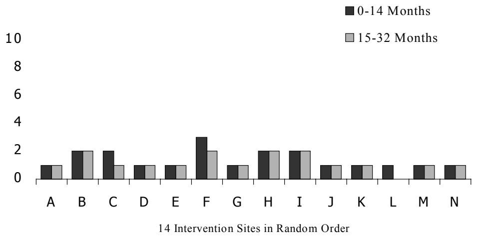
Just as there was considerable variation among families in the number of contacts with the HS Specialists, there also was variation across sites. From a low of seven contacts at one site to a high of 21 contacts at another site during the first year, the variation is apparent. As expected, all sites experienced a marked decrease in average number of total contacts from the first to the second time period. During the second to third years, the average number of contacts by site ranged from 3 to 19. Although some differences in the completeness and consistency with which the HS Specialist recorded their contacts with families were anticipated, it is not known if the differences among sites are a function of differential reporting or represent population or procedural differences at different sites.

Sites also varied somewhat in terms of the average number of different types of contacts offered. For example, the average number of office visits per family was relatively consistent across sites. The average number of office contacts varied by site from 3.6 to 9.3 during the first year and 1.6 to 4.6 during the second to third years. However, at eleven sites the average family had 5.5 to 6.5 office visits during the first year and 2.5 to 3.0 visits during the second to third years.


Mean number of *total* contacts with the HS Specialist per family by site and time period


Mean number of *office visits* with the HS Specialist per family by site and by time Period


Mean number of *phone contacts* with the HS Specialist per family by site and by time period

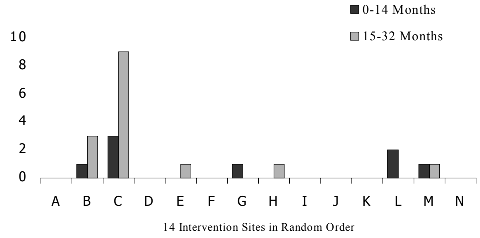

Mean number of *home visits* with the HS Specialist per family by site and by time period


Mean number of *parent groups* with the HS Specialist per family by site and by time period

There was considerably more variation by site in the average number of telephone contacts per family. The average number varied by site from 0.7 to 8.6 during the first year and 0 to 5.8 in the second to third years. Interestingly, at three sites, the average number of telephone contacts was higher during the second period than the first.

Overall, there was less variation across sites in terms of the average number of home visits during the two periods (0.5-2.6 and 0-1.8, respectively) and parent groups (0-2.1 and 0-1.0, respectively). Three sites had more parent contacts with families during the second to third years of the program than the first. The average number of other contacts was remarkably consistent across all but three sites. One site had 3.3 other contacts, on average, per family during the first year and 9.4 during the second to third years.

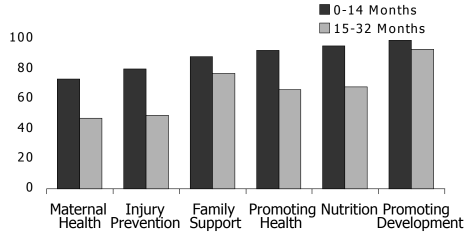
Mean number of *other contacts* with the HS Specialist per family by site and by time period



6.3.H. Topics Discussed at Family Contacts with the HS Specialists

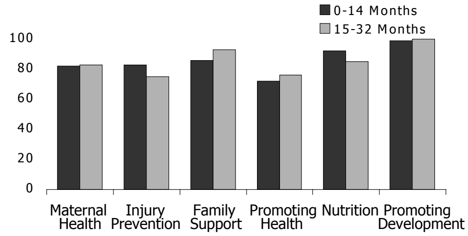
The HS Specialists also recorded the topics discussed at each contact. Within the context of any one encounter between the HS Specialist and a family, up to 15 individual topics could have been recorded. As mentioned previously, the individual topics coded from the log forms were categorized into six topic areas including: promoting development; nutrition; promoting health; providing family support; injury prevention; and maternal health.

Percentage of families that discussed six topics with the HS Specialist by time period



The HS Specialists reported that development issues were discussed with over 99% of all families during the first year. In fact, during the first year, HS Specialists discussed five of the six topic areas with at least 80% of families with whom they had a contact. Maternal health was the least frequently discussed issue. It was discussed with 73% of families who had a contact during the first year.

Percentage of families that discussed six topics with the HS Specialist at home visits by time period



Differences in topics discussed existed between the two time periods. While HS Specialists continued to discuss development with 93% parents who had a contact from 15 to 32 months, they discussed nutrition, child's health and injury prevention with far fewer families. Because we do not know who initiated the discussions, it is not possible to determine whether parents had fewer questions regarding these topics or HS Specialists did not cover these topics during this time period.

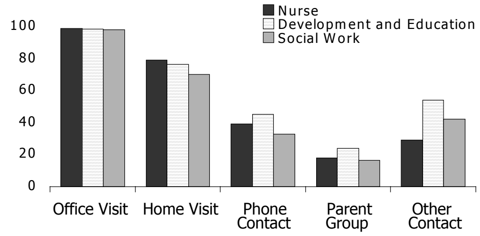
Topics at home visits were also examined to see if the topics discussed differed by contact type and if they conformed to the program guidelines. The pattern of topics discussed was slightly different at home visits. However, it also would appear that HS Specialists were addressing the recommended issues at the appropriate home visits. For example, nearly all families discussed ways to promote their child's development with the HS Specialist at all home visits. Secondly, a greater percentage of families discussed nutrition and injury prevention/safety at a home visit during their child's first year of life than second to third years. Nutritional issues to be addressed during the first year of life included breastfeeding and introducing solid foods. A home visit during the first year was dedicated to safety proofing the home. More families discussed family support during a home visit made between 15 and 32 months than during the first year.

6.3.I. The Healthy Steps Specialist's Backgrounds and the Type of Contacts and Topics Discussed

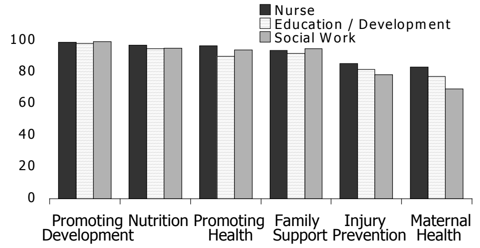
HS Specialists represent a range of professional backgrounds. In this sample, seven were social workers, 13 had backgrounds in education or development, and 15 were nurses or nurse practitioners. The question of whether the type of contacts or topics discussed with families differed by professional group was examined. It is important to note that differences among HS Specialists with nursing, social work or child development/ education backgrounds in the topics they discussed during their contacts with families may not be representative of HS Specialists with similar backgrounds. This is because the number of HS Specialists in each category is small. Moreover, these comparisons do not take into account other possible explanations such as differences in the characteristics of the families served or differences among sites. Nonetheless, these data are helpful in describing the nature of the contacts between families and HS Specialists.

HS Specialists, regardless of their professional background, reported office contacts with nearly all families. There was more variability among professional groups in other types of contacts. HS Specialists with formal training in education or child development recorded telephone, parent group, and other contacts with significantly more families than did HS Specialists with backgrounds in nursing or social work. HS Specialists with backgrounds in

Percentage of families with one or more contacts with the HS Specialist during the first 32 months by type of contact and background of HS Specialist



Percentage of families that discussed six topic areas with HS Specialist by Specialist's background



education/development or nursing made home visits to significantly more families than those with a background in social work. Whether this pattern represents meaningful differences in the types of services provided by these three groups of HS Specialists cannot be determined. Clearly, however, a child development/education background does not appear to have been a disadvantage in providing services to families in a health care setting.

Overall there were few differences among groups of HS Specialists in terms of topics addressed at least once with individual families. Regardless of the background of their HS Specialist, the majority of families discussed development. HS Specialists with a background in nursing appeared to discuss health related topics with a greater number of families than HS Specialists with a background in education, child development or social work. Again, it is important to note that the logs of contacts do not indicate who initiated the topics discussed.

The percentage of contacts in which the HS Specialist made a referral or gave a handout to families was also examined by Specialists' professional background. The formal training of the HS Specialist did not appear to influence whether they gave handouts to families. However, HS Specialists with a background in social work made a medical referral at significantly more of their contacts with families than did HS Specialists with a background in nursing or education/development.

6.3.J. Summary

The purpose of the Healthy Steps logs of contacts was to document, from the perspective of the HS Specialist, the services provided to intervention families including topics discussed. These logs provided one measure of the scope and intensity of services offered to families and one assessment of the fidelity of the implementation of the HS intervention.

Logs of contacts for 2,688 families from 14 intervention sites were included in this study. HS Specialists reported 48,210 completed contacts with these families during the three years of the program. Nearly half (46%) of these contacts were office visits but also included telephone calls, home visits, parent groups and mail encounters. Slightly over half (53%) of the contacts were made with the mother alone, although the father and other relatives were involved in some contacts. Handouts were given in 42% of encounters with 7% of encounters involving referrals to medical practitioners and community resources.

Nearly all families (97%) had at least one office visit with the HS Specialist during the first 32 months of their child's life. In addition, 81% made or received at least one phone call, 75% received at least one home visit, and 41% had an other kind of contact such as a mailing. Only 20% of families attended at least one parent group.

As expected, families received more services during the first year than the second to third years of the program. Based on the contact logs, during the first year of the program, the average family had six office visits with the HS Specialist, made or received three telephone calls, had one home visit, and received one other contact such as a mailing or visit in another location. During the first year of the program, the average family did not attend a parent group. During the second to third years, the average family had three office visits with the HS Specialists and made or received three telephone calls. The average number of home visits, other contacts and parent group contacts was less than one during this period. Based on these levels of contacts, it would appear that the HS Specialists attended most, if not all, the child's well child visits during the first three years of life.

Regardless of the type of contact, the topics for discussion that were considered essential to the HS intervention were discussed with families. Child development was almost universally discussed with families. The other important topics such as child nutrition and health, injury prevention, family and maternal health, and support were addressed with a large proportion of families.

Sites varied considerably in the type and number of contacts with families. This variation may reflect differences in populations served across sites, differential recording of contacts, and/or other factors in the practices undetected by these log data.

The contact logs indicate that all components of the HS program were being offered to families. They also indicate that the topics covered during contacts with the families were consistent with the HS program goals. In the next chapter, parents' reports of services received and their satisfaction with these services are examined.

Table 6.1a. Enhanced Strategies in Well Child Care: Child Development Assessments

	Percent Implemented Not Modified or Discontinued		Percent Implemented and Modified		Percent Implemented and Discontinued		Percent Not Implemented or No Response		Percent Viewing Component as Working *Very Well/Well* in Meeting HS Goals*		Percent Viewing Component as Being *Very Good/Good* in Meeting Needs of Family*		Percent Viewing Component as Being *Very Good/Good* in Meeting Goals of Practice*	
	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP
Neonatal Behavioral Assessment Scale (Within 1st Month)	(19) 59.38%	(14) 77.78%	(9) 28.13%	(2) 11.11%	(2) 6.25%	(0) 0.0%	(2) 6.25%	(2) 11.11%	(23) 82.14%	(15) 93.75%	(21) 75.00%	(14) 87.50%	(25) 89.29%	(10) 62.50%
Temperament Scale (At 4 Month)	(20) 62.50%	(10) 55.56%	(7) 21.88%	(4) 22.22%	(4) 12.50%	(2) 11.11%	(1) 3.13%	(2) 11.11%	(19) 70.37%	(8) 57.14%	(15) 55.56%	(9) 64.29%	(16) 59.26%	(9) 64.29%
Denver Developmental Screening Test (At 6 & 12 Months)	(32) 100%	(17) 94.44%	(0) 0.0%	(0) 0.0%	(0) 0.0%	(0) 0.0%	(0) 0.0%	(1) 5.56%	(29) 90.63%	(14) 82.35%	(30) 93.75%	(14) 82.35%	(29) 90.63%	(12) 70.59%
BABES (At 12 Months)	(17) 53.13%	(10) 55.56%	(5) 15.63%	(3) 16.67%	(10) 31.25%	(3) 16.67%	(0) 0.0%	(2) 11.11%	(12) 54.55%	(8) 61.54%	(11) 50.00%	(7) 53.85%	(10) 45.45%	(7) 53.85%
Family History	(17) 53.13%	(14) 77.78%	(11) 34.38%	(3) 16.67%	(0) 0.0%	(0) 0.0%	(4) 12.50%	(1) 5.56%	(19) 67.86%	(14) 82.35%	(14) 50.00%	(14) 82.35%	(20) 71.43%	(13) 76.47%
Macarthur - Language	(26) 81.25%	(11) 61.11%	(5) 15.63%	(5) 27.78%	(1) 3.13%	(0) 0.0%	(0) 0.0%	(2) 11.11%	(14) 45.16%	(9) 56.25%	(6) 19.35%	(8) 50.00%	(10) 32.26%	(7) 43.75%

* Percents include only implemented or modified components.
LP (lead physicians): N=18
HSS (HS Specialists): N=32

Table 6.1b. Enhanced Strategies: Written Materials for Parents that Emphasize Prevention

	Percent Implemented Not Modified or Discontinued		Percent Implemented and Modified		Percent Implemented and Discontinued		Percent Not Implemented or No Response		Percent Viewing Component as Working *Very Well/Well* in Meeting HS Goals*		Percent Viewing Component as Being *Very Good/Good* in Meeting Needs of Family*		Percent Viewing Component as Being *Very Good/Good* in Meeting Goals of Practice*	
	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP
Linkletters	(28) 87.50%	(17) 94.44%	(2) 6.25%	(1) 5.56%	(2) 6.25%	(0) 0.0%	(0) 0.0%	(0) 0.0%	(23) 76.67%	(13) 72.22%	(22) 73.33%	(11) 61.11%	(23) 76.67%	(9) 50.00%
Parent Prompt Sheets	(14) 43.75%	(13) 72.22%	(3) 9.38%	(0) 0.0%	(12) 37.50%	(3) 16.67%	(3) 9.38%	(2) 11.11%	(12) 70.59%	(9) 69.23%	(9) 52.94%	(6) 46.15%	(9) 52.94%	(5) 38.46%
Quick Check	(21) 65.63%	(13) 72.22%	(4) 12.50%	(1) 5.56%	(5) 15.63%	(3) 16.67%	(2) 6.25%	(1) 5.56%	(21) 84.00%	(8) 57.14%	(18) 72.00%	(6) 42.86%	(18) 72.00%	(8) 57.14%
Child Health and Development Record	(24) 75.00%	(13) 72.22%	(2) 6.25%	(3) 16.67%	(2) 6.25%	(0) 0.0%	(4) 12.50%	(2) 11.11%	(8) 30.77%	(6) 46.15%	(6) 23.08%	(6) 46.15%	(11) 42.31%	(8) 61.54%
Distributed	(29) 90.63%	(16) 88.89%	(0) 0.0%	(0) 0.0%	(2) 6.25%	(1) 5.56%	(1) 3.13%	(1) 5.56%	(13) 44.83%	(7) 43.75%	(10) 34.48%	(6) 37.50%	(9) 31.03%	(7) 43.75%
Updated/ completed	(9) 28.13%	(7) 38.89%	(6) 18.75%	(2) 11.11%	(12) 37.50%	(3) 16.67%	(5) 15.63%	(6) 33.33%	(4) 26.67%	(3) 33.33%	(4) 26.67%	(3) 33.33%	(5) 33.33%	(3) 33.33%
Other Parent Handouts	(27) 84.38%	(10) 55.56%	(0) 0.0%	(1) 5.56%	(0) 0.0%	(0) 0.0%	(5) 15.63%	(7) 38.89%	(23) 85.19%	(8) 72.73%	(20) 74.07%	(9) 81.82%	(23) 85.19%	(7) 63.64%
From Boston University	(28) 87.50%	(11) 61.11%	(4) 12.50%	(4) 22.22%	(0) 0.0%	(0) 0.0%	(0) 0.0%	(3) 16.67%	(28) 87.50%	(11) 73.33%	(26) 81.25%	(13) 86.67%	(27) 84.38%	(9) 60.00%
From Other Sources	(29) 90.63%	(15) 83.33%	(1) 3.13%	(1) 5.56%	(0) 0.0%	(0) 0.0%	(2) 6.25%	(2) 11.11%	(27) 90.00%	(12) 75.00%	(26) 86.67%	(13) 81.25%	(27) 90.00%	(11) 68.75%

* Percents include only implemented or modified components.

LP (lead physicians): N=18
HSS (HS Specialists): N=32

Table 6.1c. Enhanced Strategies in Well Child Care: Encouraging Breast Feeding, Linkages with Obstetrical Care, Anticipatory Guidance, Reach out and Read, and Teachable Moments

	Percent Implemented Not Modified or Discontinued		Percent Implemented and Modified		Percent Implemented and Discontinued		Percent Not Implemented or No Response		Percent Viewing Component as Working *Very Well/Well* in Meeting HS Goals*		Percent Viewing Component as Being *Very Good/Good* in Meeting Needs of Family*		Percent Viewing Component as Being *Very Good/Good* in Meeting Goals of Practice*	
	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP
Encouraging Breast Feeding	(29) 90.63%	(17) 94.44%	(3) 9.38%	(0) 0.0%	(0) 0.0%	(0) 0.0%	(0) 0.0%	(1) 5.56%	(19) 59.38%	(11) 64.71%	(18) 56.25%	(11) 64.71%	(23) 71.88%	(15) 88.24%
Linkages with Obstetrical Care	(11) 34.38%	(6) 33.33%	(3) 9.38%	(2) 11.11%	(8) 25.00%	(4) 22.22%	(10) 31.25%	(6) 33.33%	(4) 28.57%	(3) 37.50%	(4) 28.57%	(4) 50.0%	(10) 71.43%	(6) 75.00%
Anticipatory Guidance/ Developmental Counseling	(32) 100%	(15) 83.33%	(0) 0.0%	(1) 5.56%	(0) 0.0%	(0) 0.0%	(0) 0.0%	(2) 11.11%	(29) 90.63%	(15) 93.75%	(29) 90.63%	(16) 100%	(29) 90.63%	(14) 87.50%
Reach out and Read Program (Beginning at 6 Months)	(27) 84.38%	(16) 88.89%	(5) 15.63%	(1) 5.56%	(0) 0.0%	(0) 0.0%	(0) 0.0%	(1) 5.56%	(32) 100%	(16) 94.12%	(32) 100%	(17) 100%	(32) 100%	(15) 88.24%
Teachable Moments	(32) 100%	(14) 77.78%	(0) 0.0%	(3) 16.67%	(0) 0.0%	(0) 0.0%	(0) 0.0%	(1) 5.56%	(31) 96.88%	(15) 88.24%	(31) 96.88%	(14) 82.35%	(30) 93.75%	(14) 82.35%

* Percents include only implemented or modified components.
LP (lead physicians): N=18
HSS (HS Specialists): N=32

Table 6.1d. Enhanced Strategies in Well Child Care: Identification/ Counseling and / or Referral

	Percent Implemented Not Modified or Discontinued		Percent Implemented and Modified		Percent Implemented and Discontinued		Percent Not Implemented or No Response		Percent Viewing Component as Working *Very Well/Well* in Meeting HS Goals*		Percent Viewing Component as Being *Very Good/Good* in Meeting Needs of Family*		Percent Viewing Component as Being *Very Good/Good* in Meeting Goals of Practice*	
	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP
Maternal Depression	(28) 87.50%	(12) 66.67%	(3) 9.38%	(3) 16.67%	(0) 0.0%	(0) 0.0%	(1) 3.13%	(3) 16.67%	(26) 83.87%	(11) 73.33%	(24) 77.42%	(14) 93.33%	(26) 83.87%	(13) 86.67%
Smoking Cessation	(26) 81.25%	(13) 72.22%	(5) 15.63%	(3) 16.67%	(0) 0.0%	(0) 0.0%	(1) 3.13%	(2) 11.11%	(19) 61.29%	(9) 56.25%	(14) 45.16%	(10) 62.50%	(22) 70.97%	(12) 75.00%
Family Violence	(25) 78.13%	(10) 55.56%	(5) 15.63%	(5) 27.78%	(1) 3.13%	(0) 0.0%	(1) 3.13%	(3) 16.67%	(20) 66.67%	(8) 53.33%	(14) 46.67%	(7) 46.67%	(22) 73.33%	(12) 80.00%
Substance Use	(23) 71.88%	(11) 61.11%	(6) 18.75%	(4) 22.22%	(1) 3.13%	(0) 0.0%	(2) 6.25%	(3) 16.67%	(13) 44.83%	(5) 33.33%	(10) 34.48%	(7) 46.67%	(19) 65.52%	(10) 66.67%

* Percents include only implemented or modified components.
LP (lead physicians): N=18
HSS (HS Specialists): N=32

Table 6.2. Linked/Joint Well Child Visits

	Percent Implemented Not Modified or Discontinued		Percent Implemented and Modified		Percent Implemented and Discontinued		Percent Not Implemented or No Response		Percent Viewing Component as Working *Very Well/Well* in Meeting HS Goals*		Percent Viewing Component as Being *Very Good/Good* in Meeting Needs of Family*		Percent Viewing Component as Being *Very Good/Good* in Meeting Goals of Practice*	
	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP
Linked Visits	(14) 43.75%	(7) 38.89%	(2) 6.25%	(3) 16.67%	(2) 6.25%	(0) 0.0%	(14) 43.75%	(8) 44.44%	(10) 62.50%	(7) 70.00%	(13) 81.25%	(9) 90.00%	(12) 75.00%	(6) 60.00%
Joint Visits	(16) 50.00%	(5) 27.78%	(3) 9.38%	(5) 27.78%	(0) 0.0%	(1) 5.56%	(13) 40.63%	(7) 38.89%	(17) 89.47%	(8) 80.00%	(17) 89.47%	(8) 80.00%	(17) 89.47%	(6) 60.00%
Combination Linked/Joint Visits	(21) 65.63%	(10) 55.56%	(5) 15.63%	(5) 27.78%	(1) 3.13%	(0) 0.0%	(5) 15.63%	(3) 16.67%	(22) 84.62%	(13) 86.67%	(22) 84.62%	(14) 93.33%	(21) 80.77%	(11) 73.33%
Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

* Percents include only implemented or modified components.
LP (lead physicians): N=18
HSS (HS Specialists): N=32

Table 6.3. Home Visiting

	Percent Implemented Not Modified or Discontinued		Percent Implemented and Modified		Percent Implemented and Discontinued		Percent Not Implemented or No Response		Percent Viewing Component as Working *Very Well/Well* in Meeting HS Goals*		Percent Viewing Component as Being *Very Good/Good* in Meeting Needs of Family*		Percent Viewing Component as Being *Very Good/Good* in Meeting Goals of Practice*	
	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP
Home Visits in First Year	(29) 90.63%	(16) 88.89%	(2) 6.25%	(2) 11.11%	(0) 0.0%	(0) 0.0%	(1) 3.13%	(0) 0.0%	(29) 93.55%	(18) 100%	(28) 90.32%	(17) 94.44%	(30) 96.77%	(15) 83.33%
Home Visits in Second Year	(26) 81.25%	(17) 94.44%	(6) 18.75%	(1) 5.56%	(0) 0.0%	(0) 0.0%	(0) 0.0%	(0) 0.0%	(26) 81.25%	(18) 100%	(26) 81.25%	(16) 88.89%	(25) 78.13%	(13) 72.22%
Home Visits in Third Year	(25) 78.13%	(15) 83.33%	(5) 15.63%	(2) 11.11%	(0) 0.0%	(0) 0.0%	(2) 6.25%	(1) 5.56%	(21) 70.00%	(16) 94.12%	(18) 60.00%	(14) 82.35%	(21) 70.00%	(13) 76.47%

* Percents include only implemented or modified components.
LP (lead physicians): N=18
HSS (HS Specialists): N=32

Table 6.4. Child Development Telephone Information Line

	Percent Implemented Not Modified or Discontinued		Percent Implemented and Modified		Percent Implemented and Discontinued		Percent Not Implemented or No Response		Percent Viewing Component as Working *Very Well/Well* in Meeting HS Goals*		Percent Viewing Component as Being *Very Good/Good* in Meeting Needs of Family*		Percent Viewing Component as Being *Very Good/Good* in Meeting Goals of Practice*	
	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP
Telephone Information Line	(28) 87.50%	(15) 83.33%	(3) 9.38%	(2) 11.11%	(1) 3.13%	(1) 5.56%	(0) 0.0%	(0) 0.0%	(27) 87.10%	(10) 58.82%	(27) 87.10%	(12) 70.59%	(25) 80.65%	(12) 70.59%
Established, Publicized Call-in Hours	(11) 34.38%	(9) 50.00%	(12) 37.50%	(2) 11.11%	(7) 21.88%	(5) 27.78%	(2) 6.25%	(2) 11.11%	(13) 56.52%	(7) 63.64%	(13) 56.52%	(8) 72.73%	(15) 65.22%	(9) 81.82%
Calls Documented	(28) 87.50%	(17) 94.44%	(4) 12.50%	(1) 5.56%	(0) 0.0%	(0) 0.0%	(0) 0.0%	(0) 0.0%	(28) 87.50%	(12) 66.67%	(23) 71.88%	(10) 55.56%	(25) 78.13%	(14) 77.78%

* Percents include only implemented or modified components.
LP (lead physicians): N=18
HSS (HS Specialists): N=32

Table 6.5. Parent Groups

	Percent Implemented Not Modified or Discontinued		Percent Implemented and Modified		Percent Implemented and Discontinued		Percent Not Implemented or No Response		Percent Viewing Component as Working *Very Well/Well* in Meeting HS Goals*		Percent Viewing Component as Being *Very Good/Good* in Meeting Needs of Family*		Percent Viewing Component as Being *Very Good/Good* in Meeting Goals of Practice*	
	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP
Parent Groups	(22) 68.75%	(8) 44.44%	(0) 0.0%	(1) 5.56%	(4) 12.50%	(2) 11.11%	(6) 18.75%	(7) 38.89%	(12) 54.55%	(3) 33.33%	(11) 50.00%	(4) 44.44%	(15) 68.18%	(6) 66.67%
Weekly	(3) 9.38%	(0) 0.0%	(2) 6.25%	(0) 0.0%	(0) 0.0%	(0) 0.0%	(27) 84.38%	(18) 100%	(4) 80.00%	(0) 0.0%	(4) 80.00%	(0) 0.0%	(4) 80.00%	(0) 0.0%
Bi-monthly	(3) 9.38%	(2) 11.11%	(0) 0.0%	(0) 0.0%	(1) 3.13%	(0) 0.0%	(28) 87.50%	(16) 88.89%	(2) 66.67%	(2) 100%	(2) 66.67%	(2) 100%	(2) 66.67%	(2) 100%
Monthly	(16) 50.00%	(6) 33.33%	(2) 6.25%	(1) 5.56%	(3) 9.38%	(1) 5.56%	(11) 34.38%	(10) 55.56%	(13) 72.22%	(1) 14.29%	(15) 83.33%	(4) 57.14%	(8) 44.44%	(3) 42.86%
Every other Month	(4) 12.50%	(1) 5.56%	(0) 0.0%	(2) 11.11%	(1) 3.13%	(0) 0.0%	(27) 84.38%	(15) 83.33%	(0) 0.0%	(1) 33.33%	(0) 0.0%	(1) 33.33%	(0) 0.0%	(1) 33.33%
Other	(11) 34.38%	(6) 33.33%	(0) 0.0%	(1) 5.56%	(0) 0.0%	(0) 0.0%	(21) 65.63%	(11) 61.11%	(5) 45.45%	(1) 14.29%	(7) 63.64%	(3) 42.86%	(7) 63.64%	(2) 28.57%
Parent Referrals to parent groups outside of practice	(23) 71.88%	(5) 27.78%	(1) 3.13%	(2) 11.11%	(0) 0.0%	(0) 0.0%	(8) 25.00%	(11) 61.11%	(13) 54.17%	(3) 42.86%	(12) 50.00%	(4) 57.14%	(16) 66.67%	(3) 42.86%

* Percents include only implemented or modified components.
LP (lead physicians): N=18
HSS (HS Specialists): N=32

Table 6.6. Linkages to Community Resources

	Percent Implemented Not Modified or Discontinued		Percent Implemented and Modified		Percent Implemented and Discontinued		Percent Not Implemented or No Response		Percent Viewing Component as Working *Very Well/Well* in Meeting HS Goals*		Percent Viewing Component as Being *Very Good/Good* in Meeting Needs of Family*		Percent Viewing Component as Being *Very Good/Good* in Meeting Goals of Practice*	
	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP	HSS	LP
Book of Community Services	(26) 81.25%	(15) 83.33%	(2) 6.25%	(2) 11.11%	(3) 9.38%	(0) 0.0%	(1) 3.13%	(1) 5.56%	(21) 75.00%	(13) 76.47%	(17) 60.71%	(13) 76.47%	(23) 82.14%	(13) 76.47%
Bulletin Board	(15) 46.88%	(10) 55.56%	(5) 15.63%	(3) 16.67%	(3) 9.38%	(3) 16.67%	(6) 28.13%	(2) 11.11%	(13) 65.00%	(7) 53.85%	(10) 50.00%	(6) 46.15%	(14) 70.00%	(7) 53.85%
Other	(7) 21.88%	(1) 5.56%	(0) 0.00%	(0) 0.0%	(0) 0.00%	(1) 5.56%	(25) 78.13%	(16) 88.89%	(5) 71.43%	(1) 100%	(5) 71.43%	(1) 100%	(4) 57.14%	(1) 100%

* Percents include only implemented or modified components.
LP (lead physicians): N=18
HSS (HS Specialists): N=32

7. Healthy Steps Program Participation

Healthy Steps Program Participation

This chapter includes reports on families' participation in the program and their views of the services they received. The reports from families support those of the sites. They indicate that Healthy Steps families participated to varying degrees in the full range of services provided under the program and that families were particularly pleased with services the HS Specialist provided.

7. PROGRAM PATICIPATION

7.1. Introduction

The previous section described types of contacts between the Healthy Steps (HS) Specialist and families, topics they discussed, and patterns of contacts with families in relation to the goals of the HS program. This chapter includes reports on families' participation in the program and their views of the services they received. The reports from families support those of the sites: They indicate that HS families participated to varying degrees in the full range of services provided under the program and that families were particularly pleased with services the HS Specialist provided.

The HS program sought to offer a number of services to families and to tailor those services to families' needs. Evidence from sites indicates that the full range of services was offered to families from the inception of the program. With time, experience, and feedback from the families, sites adapted some of these services. The mothers' self-reports of services they received (as was true for family contacts and topics discussed that were documented by the HS Specialists) reflect the services the families chose to accept at any given time out of the full range of services offered by the sites. For example, families could decide to participate in parent groups or not, or to accept a home visit or not. Thus, a mother's self-report captures not only whether the site offered the service but whether the family took advantage of that offer and remembered receiving the service. The self-reports also reflect the families' length of stay in the HS practice and their availability to receive the services.

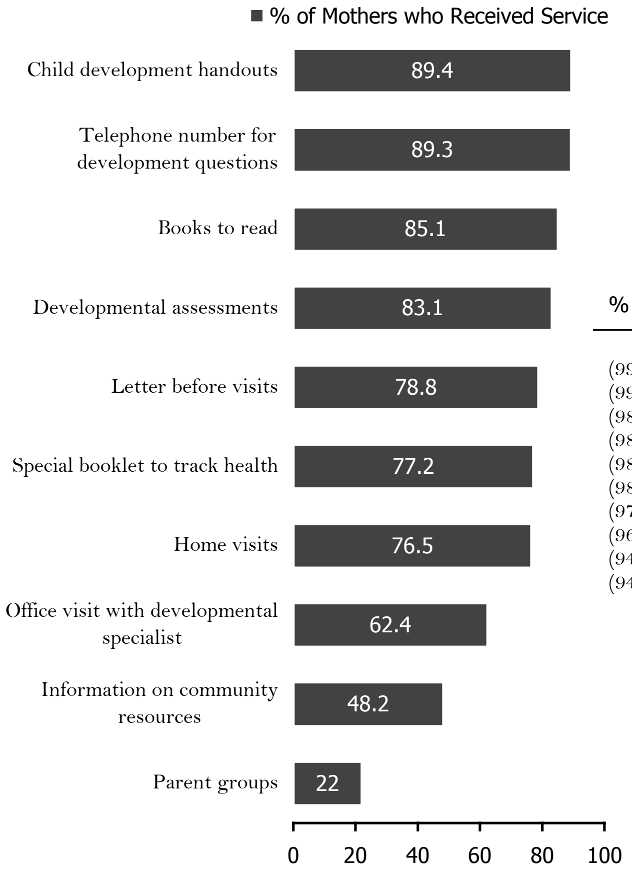
7.2. Receipt of Healthy Steps Services

In their 30-33 month interviews, mothers reported their participation in a wide variety of services associated with the HS program. Among the 3737 mothers interviewed at 30-33 months were mothers still using the practice for their child as well as those who withdrew their child from care sometime between nine months of age and the time of their interview. (Mothers of children who left the practice prior to nine months were not asked to recall their receipt of services.) Of course, the longer the family continued at the practice, the more services they could be expected to receive.

Mothers reported taking advantage of some program services more than others (**Figure 7.1, Table 7.1**). For example, more than 80% of mothers said they had received child development handouts, a telephone number to call with questions on development, books to read to their child, and developmental assessments. Smaller percentages reported receiving information on community resources and participating in parent groups offered by the practice. This variation in uptake of program services also was reflected in the HS Specialists' records of contacts with families and reported by HS Specialists in their key informant interviews. The HS Specialists reported, for example, that despite considerable effort to make parent groups accessible by altering hours and topics offered, these activities tended to be popular primarily with a core group of families that found them very helpful. Similarly, not all families could be expected to need information on community resources.

Contrary to office visits recorded by the HS Specialist in their logs, which showed at least one office visit with the HS Specialist for 97% of families, only 62.4% of mothers reported receiving an office visit with a developmental specialist. It is possible that the mother did not discern the HS Specialist as a "special person who

Figure 7.1. Question: Some doctors' offices give services to parents that help them take better care of their children. These services are in addition to check-ups and sick visits. Please tell me if you have received any of these services from [HS practice]. How useful was this [service]? Would you say very useful, somewhat useful, or not at all useful (n = 2021)



% who Found Service Useful

(99.6%)	Books to read to child
(99.5%)	Office visit with developmental specialist
(98.8%)	Developmental assessment
(98.6%)	Child development handouts
(98.5%)	Letter before visits
(98.1%)	Parent Groups
(97.5%)	Telephone number for development questions
(96.9%)	Home visit since 6 months of age
(94.3%)	Special booklet to track health
(94.1%)	Information on community resources

Table 7.1. Percentage of Intervention Mothers Who Received Services, and Received Information On or Discussed Topics Considered Part of the Healthy Steps Program

	2-4 Months		30-33 Months	
	N = 2631		N=2021	
	%	N	%	N
HS services (excluding home visits)				
4 or more HS services	71.0	1868	77.0	1397
Handouts about Baby's Development	87.4	2286	89.4	1647
Special Booklet to Keep track of Child's Health Information	88.8	2318	77.2	1401
Letter Before Well Child Visits	65.6	1714	78.8	1439
Office Visit with Special Person who Teaches Parents about Child's Development	48.1	1258	62.4	1133
Telephone number to call with questions about child's development	94.3	2425	89.3	1609
Parent group	6.2	163	22.0	406
Books to read to your child	NA	NA	85.1	1568
Information on community cervices	NA	NA	48.2	835
Developmental assessment by someone in practice	NA	NA	83.1	1464
Home visits				
Home Visits (% any from practice) within first 2-4 months and since 6 months of age (measured at 30-33 months)	65.4	1714	76.5	1403
Number of Home Visits from Practice				
1	78.1	1337	26.8	375
2	15.5	265	31.1	436
3	3.8	65	21.0	294
4 or more	2.7	46	21.2	297
Services Provided at Home Visits				
Show you activities that you could do with baby to help her/him grow and learn	84.2	1438	NA	NA
Check the progress of the baby	95.3	1627	NA	NA
Provide emotional support or help you cope with stress	83.9	1424	NA	NA
Show you how to take care of the baby, like how to bathe him/her	41.4	707	NA	NA
Show you how to make your house safe	53.6	913	NA	NA
Tell you about the kinds of things baby will be doing in the next few weeks	91.3	1559	NA	NA
Help you with understanding child's development	NA	NA	96.9	1357
Help with child's behavior	NA	NA	93.4	1305
Help with safety in the home	NA	NA	91.9	1285
Help with family issues or concerns	NA	NA	72.7	1012
Offered any home visit that decided not to take	NA	NA	36.7	132
HS topics discussed or given information on by anyone in the practice				
How to bathe baby (2-4 months only)	49.0	1275	NA	NA
How to calm baby (2-4 months only)	66.5	1734	NA	NA
Sleep positions for baby (2-4 months only)	87.3	2284	NA	NA
Always using an infant car seat (2-4 months only)	91.8	2394	NA	NA
When to give solid foods (2-4 months only)	68.4	1788	NA	NA
Importance of regular routines (2-4 months/30-33 months)	72.2	1878	83.3	1504
Sleep problems (30-33 months)	NA	NA	70.8	1278
Discipline (30-33 months)	NA	NA	82.7	1515
Language development (30-33 months)	NA	NA	82.3	1501
Toilet training (30-33 months)	NA	NA	76.7	1404
Sibling rivalry (30-33 months)	NA	NA	57.2	1027
Home safety (30-33 months)	NA	NA	90.5	1662
Child's development (30-33 months)	NA	NA	91.7	1688
Child's temperament (30-33 months)	NA	NA	77.0	1404
Ways of helping child learn (30-33 months)	NA	NA	83.3	1519

teaches about development" but viewed the HS Specialist in broader terms or thought of the HS Specialist simply as one of her child's providers.

At 30-33 months, the majority of mothers (76.5%) reported receiving a home visit in the time since their child was six months old. Of those who received a home visit, 73.3% received two or more visits. The topics most frequently discussed during home visits were help with understanding their child's development (96.9%), their child's behavior (93.4%), and safety in the home (91.9%). Family issues and concerns (72.7%) were raised as well. Slightly more than one-third of mothers (36.7%) had been offered a home visit that they declined to take. The reasons mothers most often cited for declining the home visit were inconvenience (22.0%), didn't need the visit (18.9%), preferred to go to the office or did not want anyone to come to their home (11.4%), could not take time off from school or work (9.9%), and miscellaneous other reasons (37.8%) such as marital problems, illness, being busy, living far away, and scheduling problems.

During the course of their participation, mothers reported receiving information or discussing a wide range of topics considered part of the HS program. The two topics reported most often were the child's development (91.7%) and home safety (90.5%). These were followed by the importance of routines (83.3%), ways of helping their child learn (83.3%), discipline (82.7%), and language development (82.3%). Their child's temperament (77.0%), toilet training (76.7%), and sleep problems (70.8%) were next, followed by sibling rivalry (57.2%). This latter topic would likely not be of concern to all families as about half of the children in this sample had no siblings at baseline.

7.3. Mothers' Views of Healthy Steps Services They Received

Mothers held very positive views of the HS program as reflected in their opinions of HS services and their appreciation of the care they received from the HS Specialist. Mothers participating in the 30-33 month interview were asked to rate the services they had received from their child's practice. From 94.1% to 99.6% of mothers perceived the services as *useful* or *very useful*, depending on the service in question (**Figure 7.1**).

Mothers reported being highly satisfied with the care provided by the HS Specialist. More than half of mothers (61.5%) reported that *someone in the practice went out of the way to help them* or their child; for the majority (65.5%) of these families, this person was the HS Specialist. Overall, 93% of mothers found the HS Specialist to be *helpful or very helpful.*

Mothers were asked about twelve specific services that HS Specialists were expected to provide. These were combined into one scale representing overall receipt of HS services. Approximately 97% of mothers *agreed* or *strongly agreed* that they received the services (detailed in **Fig. 7.2**) from the HS Specialist. Mothers agreed most about receiving progress checks as well as counseling on learning activities for the child, expected behaviors, and safety proofing the house. They agreed least about receiving help with organizing daily routines, referrals for emotional problems, and help with making child care arrangements.

Mothers were asked specifically about nine areas of care provided by the HS Specialists. These areas of care were combined into a composite scale representing mother's satisfaction. On this scale, almost all mothers (99.3%) were *satisfied* or *very satisfied* with the care they received from the HS Specialist in the nine areas presented in **Figure 7.3.**

Mothers' willingness to pay for the kinds of services they received also reflected their satisfaction with the program. They were asked how much they would be willing to pay <u>one time</u> for a package of services offered at their child's doctor's office that included well child visits with a child development specialist, home visits with the HS Specialist, a telephone information line about child development, parent groups, brochures on child health and development, letters before well child visits about what to expect at the next visit, and a book designed to keep information about that child's health care and development. Almost half of mothers (48.3%) were willing to make a one-time payment of $100 or more.

Willingness to Pay for Enhanced Services by Families in the Healthy Steps Program

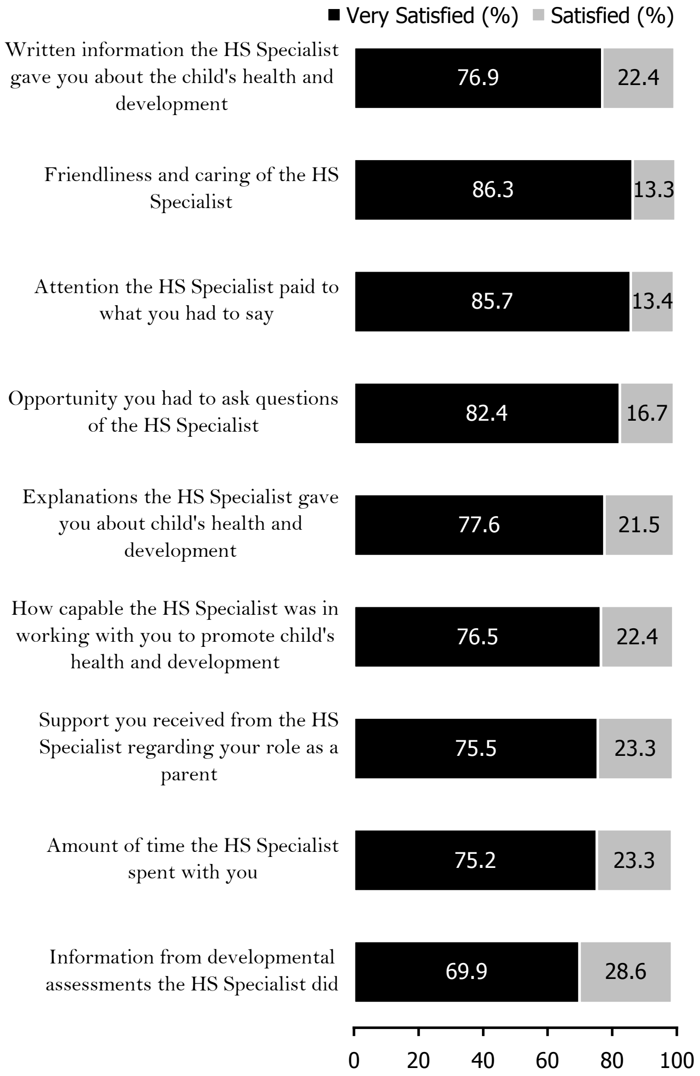
	%	N
One-Time Amount		1774
Not Willing to Pay	2.2	40
$15	5.4	95
$25	12.9	229
$50	22.2	394
$75	9.0	160
$100	21.3	377
$125 or more	27.0	479

247 mothers did not report willingness to pay

Figure 7.2. Question: I would like you to tell me how strongly you agree or disagree that you received the following services from the HS Specialist? (N=2021)

Source: 30-33 Month Interview

Figure 7.3. Question: Now I am going to ask you how satisfied you are with the care you receive from the HS Specialist. [Are you] very satisfied, satisfied, dissatisfied, very dissatisfied? (N=2021)



Source: 30-33 Month Interview

HEALTHY STEPS℠

8. The Impact of Healthy Steps on Clinicians and Staff

The Impact of Healthy Steps on the Attitudes and Practices of Clinicians and Staff

- Written provider surveys of physicians and nurse practitioners (clinicians), nurses and other clinical staff, clerical and administrative staff, and the Healthy Steps Specialists working at the evaluation sites supplemented the interviews of key informants. The self-administered surveys provided information about a variety of topics including their perceptions of the barriers to providing the best well child care to their patients, their opinions about the care they provided to their clientele, their satisfaction with their ability to meet the needs of parents, their views of the Healthy Steps Specialists, and the topics they discussed with parents. This element of the evaluation represents an assessment of the ability of the Healthy Steps program to change the attitudes and practices of Healthy Steps clinicians and practice staff regarding the content and scope of pediatric care for young children.

- Clinicians reported greater satisfaction with the ability of their clinical staff to meet the needs of intervention parents than control parents. It is likely that the clinical staff related to this change in perception was the Healthy Steps Specialist. This finding indicates that clinicians viewed the Healthy Steps Specialists and Healthy Steps activities as effective means to pay more attention to behavior and development during routine pediatric care.

- All those in the practice with whom the Healthy Steps Specialists worked acknowledged the benefits that this new professional brought to the practice and to families. This finding reinforces reports by lead physicians and other key informants in interviews conducted concurrently with the provider survey.

- The perceptions of clinicians and staff varied by respondent type, with those of clinicians, the most favorable followed by clinical staff and in turn by non-clinical staff. Families may have had more opportunities to share their favorable comments with clinicians than with others. This finding also may reflect a sense of competition among some clinical staff with the role of the Healthy Steps Specialist. Given the variation in perceptions among clinicians and staff, failing to assess the perspectives of staff may lead to underestimates of the complexity of implementing change within pediatric practices.

- Clinicians serving intervention families at randomization sites may have compensated for the presence of the Healthy Steps Specialist. Over time, they were more likely to discuss the importance of routines – a topic emphasized in Healthy Steps – with control families than with intervention families. Nonetheless, the amount of time clinicians reported spending with their patients in well child visits was not affected by Healthy Steps.

8. Impact on Clinicians and Staff

8.1. Introduction

Lead physicians and other key informants who were interviewed 30 months after starting Healthy Steps (HS) at their sites (concurrently with the provider survey) reported that no matter how the program was implemented, HS benefited families. Virtually all lead physicians said that the HS Specialist was the most valuable component of HS. A majority of lead physicians, site administrators, and HS Specialists indicated that the HS Specialists had been at least somewhat integrated into the practice. The provider surveys, which assess the extent to which HS changed the attitudes and practices of HS clinicians and practice staff working at evaluation sites, reinforce these reports.

Thirty months after the HS Specialists began caring for families, all those in the practice with whom the HS Specialists worked acknowledged the benefits that this new professional brought to the practice and to families. Over 80% of clinicians (physicians and nurse practitioners), nurses and other clinical staff, and clerical and administrative personnel agreed that the HS Specialist contributed to the practice by talking with parents about child behavior and development. In addition, clinicians' perceptions of the HS Specialists at their sites improved over time, as reflected in their acknowledgement of services the HS Specialists provided to families and increased satisfaction (when compared with controls) with the care provided by clinical staff overall.

There were some indications that clinicians serving intervention families may have compensated for the presence of the HS Specialist. Over time, clinicians were more likely to discuss specific topics with control families, such as importance of routines, than with intervention families at randomization (RND) sites. However, there is no evidence that the amount of time clinicians spent with their patients in well child visits was affected by HS. This finding is consistent with lead physicians' reports that HS affected the way they practiced pediatrics, not by limiting time spent with families, but rather by making them better listeners, more understanding of family's needs, and broadening their focus on prevention.

8.2. Data Sources and Analysis

The content of the provider questionnaires varied depending on the clinical or administrative position of the individual at the site. Three separate questionnaires were used--one for clinicians (physicians and nurse practitioners), one for nurses and other clinical staff, and one for administrative and clerical staff. The HS Specialists responded to the survey for nurses and other clinical staff; results of their self-reports are described separately because of their intimate involvement in the program. The number of completed questionnaires varied from site to site depending on staffing structure and response rates.

Data for analysis were available for clinicians and staff from 14 of the 15 evaluation sites.[8.1] At baseline, the sample included 118 (73.8%) clinicians, 139 (77.2%) nurses and other clinical staff, 129 (84.3%) clerical and administrative staff, and 32 (100%) HS Specialists. At 30 months, the sample included 99 (72.3%) clinicians, 126 (71.6%) nurses and other clinical staff, 100 (75.2%) clerical and administrative staff, and 27 (96.4%) HS Specialists.

One important aspect of the sample is the number of respondents who completed questionnaires at both baseline and 30 months. In all, 60 clinicians (50.8% of the baseline sample; 60.6% of the 30-month sample), 55 nurses/other clinical staff (39.6% of the baseline sample; 43.7%% of the 30-month sample), 37 clerical/administrative staff (28.7% of the baseline sample; 37% of the 30-month sample); and 23 HS Specialists (71.9% of the baseline sample; 85.2% of the 30-month sample) completed questionnaires at both baseline and 30 months.

Analyses were conducted to evaluate whether: (1) the attitudes and perceptions of clinicians and practice staff about developmental services for young children changed between baseline and 30 months; and (2) the change was different between HS and control. Analyses were conducted separately for RND and QE sites because of the different sampling structures. Clinicians at the RND sites cared for both the intervention and control families. This phenomenon did not occur at QE sites where the intervention and control practices were geographically separate.

With the exception of the continuous response for time spent at well child visits, all responses were dichotomous. First, data were

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[8.1] One quasi-experimental site was excluded due to incomplete data. Resident physicians were excluded as their disproportionate representation at only 2 sites would skew the results. Further, because these analyses focused on changes among HS providers only, physicians not participating in HS were excluded.

pooled across control and across intervention groups separately at the QE sites and at the RND sites. Changes in attitudes and practices from baseline to 30 months, were compared using chi square tests for dichotomous variables and a t-test for the continuous variable. Second, marginal regression models (logistic models for the dichotomous outcomes and a linear model for the continuous outcome), fit using generalized estimating equations (Liang and Zeger, 1986; Diggle et al., 1994), were used to estimate the effects of interest. These models account for correlation of responses within individual respondents. This correlation exists for two reasons. First, at RND sites, the same clinicians served intervention and control families and, accordingly, answered some questions for both groups. Second, the same individual, whether located at a RND or QE site, may have responded at both baseline and 30 months. The marginal models also accounted for the fact that clinicians and staff at the same site tended to respond more similarly than their counterparts at other sites through the inclusion of site-specific indicator variables.

For the continuous outcome (time spent at well child visits), effects are reported as a difference of means between 30 months and baseline. The effect of HS on these changes is reported as a difference in the differences between intervention and control groups. For the dichotomous outcomes, the effects are reported as odds ratios between 30 months and baseline. The effect of HS on these ratios is reported as the ratio of the odds ratio for HS to the odds ratio for control groups. P-values based on Wald-type tests of the null hypotheses of no temporal changes (baseline to 30 months) and no effect of HS are computed, and 95% confidence intervals are presented, as appropriate. These tests and confidence intervals were computed using robust standard errors. In one instance in which all respondents in one or more of the time-by-treatment strata provided a positive response, the models did not converge.

8.3. Characteristics of Clinicians and Non-Clinicians

8.3.A. Positions in Practice

Table 8.1. presents the positions that respondents held within the practice and the numbers of respondents at QE and RND sites for each group surveyed at baseline and 30 months. A total of 103 physicians, 15 nurse practitioners, and 2 physician's assistants completed the clinicians baseline survey. A total of 86 physicians and 13 nurse practitioners completed the 30-month clinicians survey. There were 139 respondents to the nurse/other clinical staff questionnaire at baseline and 126 respondents at 30 months.

Nurses and medical assistants comprised the majority of these respondents, with licensed practical nurses and other social workers, nutritionists, and case managers accounting for the remainder. In all, 129 respondents at baseline and 100 at 30 months completed the questionnaire for clerical and administrative staff. These included office managers/ administrators, financial assistants, receptionists, appointment clerks, and other staff. Among these categories, other clerical/administrative staff and receptionists accounted for the majority of respondents. As might be expected with staff turnover and differential response rates, the percentage composition of each clerical and administrative subgroup varied somewhat over time.

Table 8.1. Positions in Practice of Clinicians and Practice Staff Responding to the Provider Survey at Baseline and 30 Months

	Quasi-Experimental Sites				Randomization Sites	
	Intervention		Control			
	Baseline	30 Months	Baseline	30 Months	Baseline	30 Months
Physicians/Nurse Practitioners	N = 48	N =29	N =38	N = 30	N = 32	N = 40
Position in Practice	%	%	%	%	%	%
Physician	85.4	89.7	84.2	90.0	93.7	82.5
Nurse Practitioner	12.5	10.3	13.2	10.0	6.3	17.5
Physician's Assistant	2.1	0.0	2.6	0.0	0.0	0.0
Nurses and Other Clinical Staff	N =46	N = 31	N =41	N =33	N =52	N =62
Position in Practice	%	%	%	%	%	%
Nurse	37.0	48.4	19.5	21.2	32.7	19.4
Licensed Practical Nurse	17.4	16.1	9.8	18.2	9.6	16.1
Medical Assistant	32.6	25.8	39.0	42.4	48.1	46.8
Other	13.0	9.7	31.7	18.2	9.6	17.7
Clerical/Administrative Staff	N =42	N = 40	N = 49	N = 29	N = 38	N = 31
Position in Practice	%	%	%	%	%	%
Office Manager	14.3	15.0	18.4	17.2	18.4	12.9
Financial Assistant	16.7	10.0	8.2	0.0	2.6	6.5
Receptionist	23.8	30.0	34.7	24.1	36.8	25.8
Appointment Clerk	7.1	7.5	6.1	3.5	21.1	12.9
Other	38.1	37.5	32.6	55.2	21.1	41.9
HS Specialists	N = 18	N = 15	NA	NA	N = 14	N = 12

8.3.B. Participation in Healthy Steps Training Institutes

There were some differences in the extent to which clinicians, whether by choice or circumstance, had participated in formal HS Training Institutes in Boston. Overall, 65.6% of clinicians at QE intervention sites participated in one or more of the training institutes; 13.8% did not attend the training but would have liked to have been trained. At RND sites 32.5% of clinicians were formally trained in Boston but 40% would have liked to have attended the training.

Percentage of Clinicians participating in Healthy Steps Training Institutes

	QE Intervention Clinicians N = 29	Randomization Clinicians N = 40
1st and 2nd Year	17.3	7.5
3rd Year Only	6.9	2.5
All 3 Years	41.4	22.5
No Training/ None Desired	20.7	27.5
No Training/ Training Desired	13.8	40.0

8.4. The Impact of Healthy Steps at 30 Months

Results regarding the analysis of effects are reported separately for QE and RND sites. At QE sites, intervention and control families are seen in separate practices. Therefore, it would be extremely unlikely that someone working in the intervention practice would encounter a family in the control group or that members of the comparison practice would come in contact with an intervention family. However, at RND sites, families in the intervention and control group were provided services at the same practice. Although HS program services were not offered to control families and the HS Specialist was prohibited from contacting them, other members of the practice were expected to interact with both intervention and control families during the course of their daily responsibilities. Consequently, where appropriate, clinicians and staff at RND sites responded to questions concerning services provided to and perceptions of care for both intervention and control families.

8.4.A. The Practice Environment: Perceptions of Barriers to Delivering High Quality Behavioral and Developmental Services

Clinicians were asked about several factors that affected their ability to deliver the best quality well child care to their patients. Specific items were combined to develop three composite measures. These concerns included limited staff to address the needs of parents about child development, problems with managed care organizations or Medicaid reimbursement, and lack of time to answer parents' questions, teach parents or follow-up children. In **Table 8.2**, the percentages of clinicians reporting these barriers at baseline and 30 months are presented. The results of regression analyses are reported in **Table 8.3**. Overall, at baseline, the percentage of clinicians noting problems with limited staff varied from 31.3% (QE-intervention) to 52.6% (QE-control). Similar percentages reported problems with managed care organization or Medicaid reimbursement; these percentages varied from 31.3% (QE-intervention) to 50% (RND). On average the percentages reporting not enough time were somewhat greater than those reporting the other barriers measured; these percentages varied from 43.8% (QE-intervention) to 53.1% (RND). At QE sites, the percentages of clinicians reporting these barriers did not change significantly over time and no statistically significant differences between intervention and control groups were found. At RND sites, where clinicians were asked only about barriers to providing quality care overall, there was a three

Table 8.2. Percentages of Clinicians at Baseline and 30 Months Reporting Practice Barriers, Topics Discussed with Parents, Time Spent in Well Child Care, and Satisfaction with Ability of Clinical Staff to Meet Family Needs

	Quasi-Experimental Sites				Randomization Sites			
	Intervention		Control		Intervention		Control	
	Base-line N = 48 %	30 Mos N = 29 %	Base-line N = 38 %	30 Mos N = 30 %	Base-line N = 32 %	30 Mos N = 40 %	Base-line N = 32 %	30 Mos N = 40 %
Practice Barriers								
Staff problems	31.3	13.8	52.6	56.7	50	60.5	NA	NA
Reimbursement Problems	31.3	42.9	39.5	53.3	50.0	59.0	NA	NA
Time Problems	43.8	62.1	42.1	60.0	**53.1**	**77.5***	NA	NA
Mean Time Spent in Well Child Visits (minutes)								
Total	25.1	25.0	21.6	17.8	22.4	18.6	22.4	19.4
Topics Discussed with Parents								
Importance of Routines [1]	87.8	100.0	81.1	93.3	81.3	77.1	81.3	89.2
3 or More Family Risk Factors[2]	47.6	44.4	59.5	57.1	52.0	34.3	52.0	29.7
Satisfaction with Ability of Clinical Staff to Meet Needs								
Very satisfied with ability of clinical support staff to meet children's developmental and behavioral needs[3]	**38.5**	**65.4***	**9.4**	**14.3***	**31.0**	**61.8***	31.0	17.7

*p <.05, differences over time within groups

NA (Not applicable). Clinicians at randomization sites provided services to families in both the intervention and control group. At baseline, they were asked about practice barriers overall.

[1] Unable to perform chi square for QE-INT due to lack of observations in selected cells.

[2] Risk factors include: mother's or father's substance abuse, maternal depression, domestic violence, or child abuse.

[3] Variable includes two items: meet the needs of parents concerning behavior; and meet the needs of parents concerning development.

Table 8.3. Changes in Physicians'/Nurse Practitioners' Perceptions between Baseline and 30 Months and Differences in Effects: Adjusted Odds Ratios and 95% Confidence Intervals [a]

	Quasi-Experimental Sites			Randomization Sites		
	Intervention	Control	Difference	Intervention	Control	Difference
Practice Barriers						
Staff problems [b]	0.43 (0.08,2.40)	1.29 (0.50,3.34)	0.34 (0.05,2.46)	1.69 (0.57,5.02)	NA	NA
Reimbursement Problems [c]	1.86 (0.76,4.53)	1.70 (0.62,4.67)	1.09 (0.28,4.25)	2.18 (0.58,8.20)	NA	NA
Time Problems [d]	1.87 (0.76,4.56)	2.46 (0.86,7.06)	0.76 (0.19,3.05)	**3.16*** **(1.05,9.51)**	NA	NA
Mean Time Spent in Well Child Visit						
Total	-0.17 (-1.88,1.54)	**-3.00*** **(-5.51,0.50)**	2.83 (-0.08,5.74)	**-2.60*** **(-4.25,0.96)**	**-2.12*** **(-4.06,0.18)**	-0.49 (-1.67,0.69)
Topics Discussed with Parents						
Importance of Routines	‡	3.81 (0.61, 23.94)	NA	0.65 (0.15, 2.82)	1.79 (0.41, 7.72)	**0.36*** **(0.17, 0.79)**
3 or More Family Risk Factors [e]	0.64 (0.33, 1.25)	0.69 (0.24, 2.02)	0.93 (0.26, 3.29)	0.49 (0.18, 1.34)	0.42 (0.15, 1.15)	1.17 (0.88, 1.55)
Satisfaction with Ability of Clinical Support Staff to Meet Needs						
Very satisfied with ability of clinical support staff to meet children's developmental and behavioral needs [f]	**4.05*** **(1.15,14.21)**	1.45 (0.34,6.24)	2.80 (0.40,19.74)	**4.69*** **(1.44,15.30)**	0.44 (0.14,1.40)	**10.67*** **(3.56,31.95)**

Shaded areas indicate significant HS effects at RND sites. Less discussion of routines and increased satisfaction with ability of the practice to meet needs of families suggest greater reliance on the HS Specialist in these areas.

* p <.05

‡ Model did not converge.

NA (Not applicable). Clinicians at randomization sites provide services to families in both the intervention and control group. At baseline, they were asked about practice barriers overall.

[a] Adjusted odds ratios and 95% confidence intervals are shown for practice barriers, topics discussed, and satisfaction. For time spent in well child visits, effect reported as difference of means between 30 months and baseline for INT and CON groups. Difference columns note difference of differences for the total time variable and ratio of odds ratios for other dichotomous variables.

[b] Variable includes shortage of support staff; limited staff to address parent's/child's needs

[c] Variable includes low Medicaid reimbursement rates; problems with reimbursement by managed care organizations

[d] Variable includes not enough time to answer parents' questions; to teach parents; to follow up families

[e] Variable includes: mother's or father's substance abuse, maternal depression, domestic violence, or child abuse.

[f] Variable includes two items: meet the needs of parents concerning behavior; and meet the needs of parents concerning development.

fold increase in the odds of clinicians reporting time problems but no significant changes in other barriers **(Table 8.3).**

8.4.B. Time Spent in Well Child Visits

At baseline, clinicians reported spending between 22.4 (RND sites) and 25.1 (QE-intervention) to 25.0 minutes (QE-control) on average in well child visits (**Table 8.2**). Changes in these percentages over time were not statistically significant (**Table 8.3**). The difference between intervention and control groups in the level of change also was not statistically significant (**Table 8.3**). In addition, no significant changes were found in the proportion of these visits that was spent on anticipatory guidance (*data not shown*).

8.4.C. Satisfaction with Ability of Clinical Staff to Meet Developmental/Behavioral Needs

Physicians/nurse practitioners, nurses/other clinical staff, and HS Specialists were asked questions about their satisfaction with the ability of clinical support staff to meet the needs of new parents in relation to their children's behavior and development. The measure included two questions (child's behavior and child's development) that were combined. Satisfaction was assessed on a four point Likert scale with 1 being *very dissatisfied* and 4 being *very satisfied.* The higher the score, the greater the satisfaction of the respondent.

Clinicians at QE-Intervention sites and RND sites held similar views regarding the ability of the nurses and other clinical staff (including the HS Specialists caring for intervention families) to meet the developmental/behavioral needs of children in the intervention group and experienced similar changes over time. They had a significantly higher odds of being *very satisfied* at 30 months than at baseline **(Table 8.3)**. Clinicians held less favorable perceptions of the ability of nurses/other clinical staff to meet the developmental and behavioral needs of children in the control group and no significant changes were noted between baseline and 30 months. Significant differences in effects between intervention and control groups were found at RND sites only where clinicians had a significantly higher odds of being *very satisfied* with clinical staff in the intervention group than in the control group (**Table 8.3**).[8.2]

[8.2] Of note, clinicians did not report differences in their perceptions over time or between intervention and control groups related to the ability of clinical support staff to meet the needs of parents regarding health and growth (*data not shown*).

8.4.D. Perceptions of Topics Discussed (Family Risk Factors and Importance of Routines)

Clinicians answered questions about the topics they discussed with parents. These included whether they raised issues of substance abuse, maternal depression, domestic violence, or child abuse. These individual items were combined to form one variable indicating whether the provider covered three or more of these family risk factors with parents. A second variable indicated whether they discussed the importance of routines with families.

No significant differences were found between groups at baseline or 30 months in the percentages of respondents who reported discussing the family risk topics (**Table 8.2**). There were no significant differences in effects between intervention and control groups (**Table 8.3**).

The majority of clinicians discussed the importance of routines with families (**Table 8.2**) and about half reported discussing family risk topics. There were no significant changes in these percentages from baseline to 30 months. However, between baseline and 30 months, the percentage discussing routines with intervention families at RND sites decreased while it increased with control families. Although these changes within each group over time were not statistically significant, the difference in these effects between groups was significant (**Table 8.3**) indicating that, over time, clinicians had a higher odds of discussing the importance of routines with control families than with intervention families. This suggests that clinicians serving intervention families may have been relying on the HS Specialists to provide this information to intervention families.

HS Specialists reported in large percentages that they discussed these topics from the time they started working at the practice (*data not shown*). At 30 months, 75% of HS Specialists at RND sites and 73.3% at QE sites reported discussing risk factors, and 100% at RND sites and 93.3% at QE sites discussed routines. The percentages of nurses and other clinical staff raising these issues were quite low (*not shown*). This was particularly true at RND sites, where at 30 months, 3.2% reported discussing risk factors and 24.2%, routines. There were no significant differences over time.

8.4.E. Perceptions of the Healthy Steps Specialist's Role

All respondents were provided with a series of statements describing the services HS Specialists provided to intervention families at their sites. The response to each item was rated on a 5-point Likert scale with a value of 1 being *strongly disagree* with the statement and a 5, *strongly agree.* This instrument was divided into 3 subscales based on the content of the item and the results of a factor analysis. The subscales were: talked to parents about their child's behavior and development; showed parents activities and gave them information about what to do with their child; and provided parents with support, helped with stress, and referred them for emotional problems.

Overall, the vast majority of respondents at QE-intervention sites and RND sites acknowledged the benefits of the HS Specialists. Approximately 30 months after start-up at QE sites 100% of clinicians, 100% of nurses/other clinical staff, 86.5% of clerical/administrative staff, and 100% of HS Specialists *agreed* or *strongly agreed* that HS Specialists at their practices talked to parents about their child's behavior and development, showed them activities and gave them information about what to do with their child, and provided them with emotional support**.**

100% of MDs/NPs at QE sites and 95% at RND sites agreed or strongly agreed that HS Specialists at their practices talked to parents about their child's behavior and development, showed them activities and gave them information about what to do with their child, and provided them with emotional support.

Because of the overall high level of general agreement among the various groups, changes over time in the proportion who *strongly agreed* were examined. **Table 8.4** shows the percentages of clinicians and staff who *strongly agreed* that HS Specialists at their practices provided these services to families. At 30 months, for example, 76% of clinicians, 47% of nurses/other clinical staff, 50% of clerical/administrative staff, and 83% of HS Specialists at RND sites *strongly agreed* that the HS Specialists talked to parents about their child's behavior and development.

Table 8.5 presents results of analyses for the three subscales. An additional variable measured providers' perceptions of whether the HS Specialists discussed temperament and/or sleep problems with families. Keeping in mind that all respondents indicated a keen appreciation for the services provided by the HS Specialist, for all four variables studied, the perceptions of the HS Specialists tended to be somewhat more positive than those of the clinicians. In turn, the perceptions of the nurses/clinical staff were generally less positive than either the HS Specialists or clinicians and the clerical/administrative staff least favorable of all. The perceptions of the clinicians regarding the HS Specialist's role improved significantly over time at both RND and QE sites as reflected in the results for all four variables. Only the increased odds that clinicians *strongly agreed* that HS Specialists provided emotional support was not statistically significant at RND sites.

There were fewer changes over time in the perceptions of other respondents. Nurses/other clinical staff at RND sites had a significantly higher odds of *strongly agreeing* that HS Specialists discussed temperament and/or sleep problems (**Table 8.5**). Clerical and administrative personnel at QE intervention sites had a higher odds of *strongly agreeing* that HS Specialists conducted three of the four sets of activities measured (**Table 8.5**). The exception was discussing temperament and/or sleep problems.

This finding illustrates the differences in perspectives among clinicians and non-clinicians with their differing responsibilities and involvement in the program. These differences may have influenced the implementation of the HS program.

Table 8.4. Percentage Strongly Agreeing About the HS Specialists' Activities/Role

	Quasi-Experimental Sites		Randomization Sites	
	Baseline	30 Mos	Baseline	30 Mos
Physicians/Nurse Practitioners	**N = 48**	**N = 29**	**N = 32**	**N = 40**
Talk to parents about child's behavior and development [a]	**51.2**	**85.2***	**51.9**	**76.3***
Show parents activities and gave information about what to do with child[b]	**40.0**	**74.1***	48.2	68.4
Provide parents with support, helped with stress and referred for emotional problems[c]	**36.6**	**74.1***	48.2	60.5
Discuss temperament, sleep problems, or both[d]	**63.4**	**89.3***	**58.6**	**82.5***
Nurses/Other Clinical	N =46	N = 31	N =52	N =62
Talk to parents about child's behavior and development[a]	45.5	62.1	41.3	47.4
Show parents activities and gave information about what to do with child[b]	38.6	50.0	30.4	32.7
Provide parents with support, helped with stress and referred for emotional problems[c]	34.1	40.0	34.8	31.6
Discuss temperament, sleep problems, or both[d]	53.5	74.2	**37.0**	**61.0***
Administrative/Clerical	N =42	N = 40	N =38	N =31
Talk to parents about child's behavior and development[a]	**39.0**	**62.2***	30.3	50.0
Show parents activities and gave information about what to do with child[b]	22.0	36.8	21.9	16.7
Provide parents with support, helped with stress and referred for emotional problems[c]	26.8	44.7	21.9	26.9
Discuss temperament, sleep problems, or both[d]	46.3	53.9	38.2	38.5
HS Specialist	N = 18	N = 15	N = 14	N = 12
Talk to parents about child's behavior and development[a]	88.9	93.3	61.5	83.3
Show parents activities and gave information about what to do with child[b]	72.2	80.0	53.9	58.3
Provide parents with support, helped with stress and referred for emotional problems[c]	88.2	80.0	53.9	72.7
Discuss temperament, sleep problems, or both[d]	100.0	100.0	100.0	91.7

* $p < .05$, differences over time within groups

[a] Variable includes 5 items: encouraged parents to talk about problems they or their young child were experiencing; listened carefully to what parents said about their child; gave parents advice about solving problems that they were having at home with their child; gave parents help understanding their child's growth and development; checked the progress of their child.

[b] Variable includes 4 items: showed parents activities that they could do with their child to help her/him grow and learn; told parents about the kinds of behaviors they could expect to see in their child in the next six months; helped parents organize the daily routines for their child; let parents consider options for themselves and their child that were best for both of them.

[c] Variable includes 2 items: provided emotional support; referred parents for help with their emotional problems.

[d] Variable includes 2 items: discussed temperament; discussed sleep problems (either or both).

Table 8.5. Changes in Perceptions of HS Specialist's Role Between Baseline and 30 Months: Adjusted Odds Ratios and 95% Confidence Intervals [a]

	Quasi-Experimental Sites	Randomization Sites
Physicians/Nurse Practitioners		
Talk to parents about child's behavior and development[b]	**7.58* (2.08,27.67)**	**5.03* (1.51,16.73)**
Show parents activities and gave information about what to do with child[c]	**5.85* (1.89,18.09)**	**3.78* (1.14,12.52)**
Provide parents with support, helped with stress and referred for emotional problems[d]	**5.84* (1.80,19.01)**	2.01 (0.82,4.94)
Discuss temperament, sleep problems, or both[e]	**5.64* (1.40,22.68)**	**3.51* (1.33,9.23)**
Nurses/Other Clinical		
Talk to parents about child's behavior and development[b]	2.07 (0.79,5.42)	1.47 (0.63,3.45)
Show parents activities and gave information about what to do with child[c]	1.80 (0.68,4.73)	1.21 (0.51,2.87)
Provide parents with support, helped with stress and referred for emotional problems[d]	1.49 (0.52,4.28)	0.94 (0.39,2.22)
Discuss temperament, sleep problems, or both[e]	2.39 (0.63,9.10)	**3.70* (1.59,8.64)**
Administrative/Clerical		
Talk to parents about child's behavior and development[b]	**4.21* (1.36,13.00)**	3.00 (0.90,9.98)
Show parents activities and gave information about what to do with child[c]	**4.92* (1.21,19.98)**	0.71 (0.17,2.99)
Provide parents with support, helped with stress and referred for emotional problems[d]	**5.28* (1.42,19.65)**	1.01 (0.26,3.87)
Discuss temperament, sleep problems, or both[e]	1.83 (0.69,4.86)	0.65 (0.17,2.54)

[a] Results for Specialists are not shown. Chi square analyses alone were used to compare differences between groups at baseline and 30 months. These results appear in Table 8.4.

[b] Variable includes 5 items: encouraged parents to talk about problems they or their young child were experiencing; listened carefully to what parents said about their child; gave parents advice about solving problems that they were having at home with their child; gave parents help understanding their child's growth and development; checked the progress of their child.

[c] Variable includes 4 items: showed parents activities that they could do with their child to help her/him grow and learn; told parents about the kinds of behaviors they could expect to see in their child in the next six months; helped parents organize the daily routines for their child; let parents consider options for themselves and their child that were best for both of them.

[d] Variable includes 2 items: provided emotional support; referred parents for help with their emotional problems. [e] Variable includes two items: discussed temperament; discussed sleep problems (either or both).

9. The Impact of Healthy Steps on Receipt of Services

The Impact of Healthy Steps on Receipt of Services

The Healthy Steps program was designed to enhance the capacity of pediatric practices to better meet the needs of families with young children, to support parents in their child rearing, and to promote the health and development of young children. In this section differences in service receipt between families in the intervention group and in the control group are compared.

Families in the intervention group, across the 15 sites, received the Healthy Steps services in far greater percentages than did families in the control groups.

- Within the infant's first 2-4 months, intervention families had 16.6 times the odds of receiving 4 or more services of the type offered by the Healthy Steps program than control families. They had almost 20 times the odds of receiving 4 or more of these services over the course of the evaluation.
- Within the infant's first 2-4 months, intervention families had 10.2 times the odds of receiving a home visit than control mothers. They also had over 10 times the odds of receiving a home visit after their child was 6 months of age.
- Within the infant's first 2-4 months, intervention families had 2.4 times the odds of discussing 5 age-appropriate topics with someone in the practice than control families. They had more than 10 times the odds of discussing 6 or more age-appropriate topics over the course of the evaluation.
- Intervention families had 8 times the odds of receiving a developmental assessment over the course of the evaluation than control families.
- Intervention families had over 4 times the odds of receiving information on community resources over the course of the evaluation than control families.
- Intervention families had 29.1 times the odds of receiving books to read to their child from someone in the practice over the course of the evaluation than control families.

Guide to Interpreting Figures in Chapters 9 and 10.

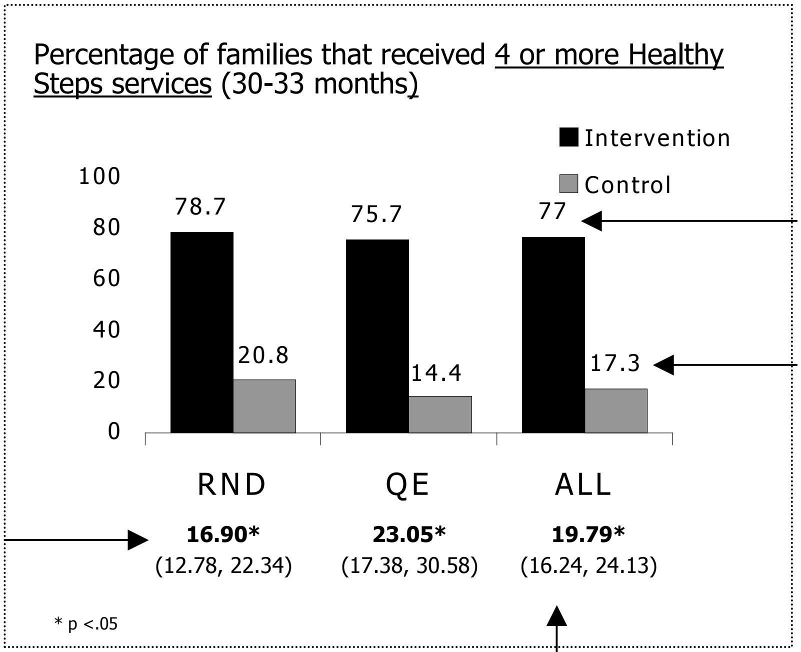
Results in Chapters 9 and 10 are described in the text and displayed in figures found in the margins. The annotated figures below are representative of these figures and provide guidance in how to interpret them.

Bar Graphs. Bar graphs in the margins display pooled results for randomization (RND), quasi-experimental (QE), and all sites combined. These graphs also show the results of an analysis of the effects of Healthy Steps (HS).

Analyses of HS effects were adjusted for differences in baseline characteristics of families. The analyses also were adjusted for the fact that families within each site tend to be more similar to each other than they are to families at other sites. Results of these adjusted analyses are reported as odds ratios at the bottom of each bar graph. An example of a bar graph for the effect of HS on receipt of four or more HS services is presented and explained here.

Regression results for dichotomous outcomes, adjusting for family baseline characteristics and site, are reported in terms of odds ratios. An odds ratio of *greater* than 1 indicates that subjects in the intervention group were *more* likely to report a given characteristic than were subjects in the control group; an odds ratio of *less* than 1 indicates that subjects in the intervention group were *less* likely to report a given characteristic than were subjects in the control group. An odds ratio of 1 indicates that there was no difference between intervention and control groups.

In this figure, intervention families at RND sites had 16.9 times the odds of receiving 4 or more HS services than control families. The corresponding figures were 23.05 times the odds at QE sites and 19.79 times the odds overall.



Percentage of intervention families who received 4 or more HS services.

Percentage of control families who received 4 or more HS services.

Ninety-five percent confidence intervals are estimated; when this interval does not include 1, it indicates a statistically significant difference between

Guide to Interpreting Figures in Chapters 9 and 10.

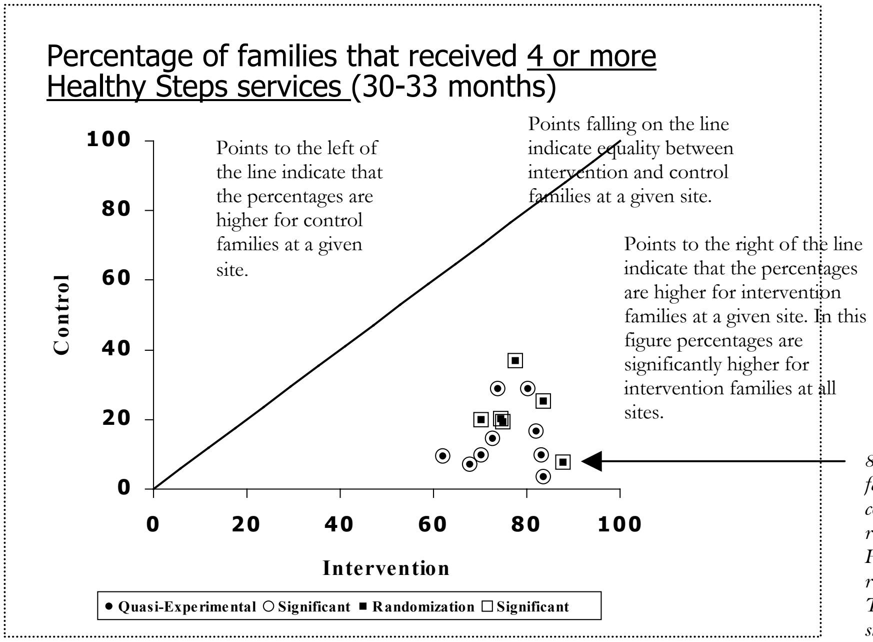
Scatterplots. Each bar graph is accompanied by a scatterplot showing the paired comparisons of intervention and control families by site for the same outcome.

On the horizontal axis, the percentages for the intervention families are displayed, while the percentages for the control families are depicted on the vertical axis.

Each point in the scatterplot represents the pairing of percentages for a particular site. The solid line serves as a reference to indicate equality between the intervention and control families at each site. The points to the right of this line indicate that the percentages are higher for the intervention families while the points to the left of the line indicate that the percentages are higher for the control families.

An outlined point indicates that there is a significant difference (at the 0.05 level) between control and intervention families at this site. The square points indicate RND sites and the round points, QE sites.

The example for 4 or more HS services is shown here for the scatterplot by site.



Percentage of families that received 4 or more Healthy Steps services (30-33 months)

Points to the left of the line indicate that the percentages are higher for control families at a given site.

Points falling on the line indicate equality between intervention and control families at a given site.

Points to the right of the line indicate that the percentages are higher for intervention families at a given site. In this figure percentages are significantly higher for intervention families at all sites.

88% of intervention families vs. 8% of control families received 4 or more HS services at this randomization site. This difference was statistically significant.

9. RECEIPT OF SERVICES

9.1. Introduction

The Healthy Steps (HS) program sought to enhance developmental services provided to families through their child's pediatric practice. While we hypothesized that intervention families were more likely to receive these services than control families, the evaluation practices may have offered one or more components before HS began. Moreover, control sites, responding to changes in community practice standards, may have started providing some of the services to families before the evaluation period ended. In this chapter, differences in receipt of developmental services between families in the intervention and control groups are compared. These comparisons address question 3 of the evaluation.

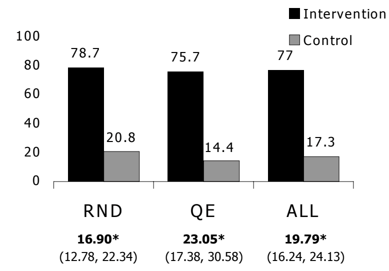
3. To what degree did children and families at Healthy Steps program sites receive Healthy Steps services (compared with children and families not in the program)?

Families in the intervention group, across the 15 sites, received HS services in far greater percentages than did families in the control group. The results of the analysis of the impact of HS on receipt of services are summarized in **Table 9.1.** Results for all sites combined as well as site level differences are described in the text. Results for randomization (RND) and quasi-experimental (QE) sites are noted where the significance or direction of the effect differs.

9.2. Four or More Services [9.1]

Among HS services offered to families were office visits addressing developmental issues and taking care of the child, a telephone number to discuss the child's development, a letter before office visits, written materials about development, a special health booklet (the Child Health and Development Record for intervention families), and parent groups. A much greater percentage of intervention families than control families, whether surveyed at 2-4 months or 30-33 months, reported receiving four or more of these services.

Percentage of families who received 4 or more Healthy Steps services (30-33 months)



* p <.05

[9.1] Unless otherwise noted, "mothers" refers to all respondents. Only 5 (0.1%) at 2-4 months and 42 (1.1%) of the respondents were fathers or other primary caregivers.

Healthy Steps Intervention Families:
■ Significantly More Likely than Control
◆ Significantly Less Likely than Control
□ Significant Effect Not Noted

Table 9.1. Receipt of Developmental Services: Adjusted Odds Ratios and 95% Confidence Intervals[a]

	2-4 Months			30-33-Months		
	Randomization	Quasi-Experimental	Pooled	Randomization	Quasi-Experimental	Pooled
RECEIPT OF SERVICES (Intervention Families More Likely to Receive Enhanced Developmental Services)						
Received 4 or More HS Services from Practice [b] *(Excluding Home Visiting)*	■ 11.68 (9.28, 14.71)	■ 22.35 (17.87, 27.96)	■ 16.62 (14.17, 19.50)	■ 16.90 (12.78, 22.34)	■ 23.05 (17.38, 30.58)	■ 19.79 (16.24, 24.13)
Someone Visited Parent or Child in Their Home Since Birth (2-4 Months) and Since 6 Months (30-33 Months)	■ 16.14 (12.23, 21.30)	■ 8.03 (6.65, 9.71)	■ 10.23 (8.76, 11.96)	■ 13.36 (10.18, 17.54)	■ 18.44 (14.33, 23.73)	■ 15.97 (13.27, 19.22)
Someone in the Practice Talked with Parent or Gave them Information About 5 Topics @ 2-4 Months and More than 6 Topics @ 30-33 Months [c]	■ 1.91 (1.57, 2.33)	■ 2.92 (2.43, 3.51)	■ 2.41 (2.10, 2.75)	■ 8.56 (6.47, 11.32)	■ 12.31 (9.35, 16.19)	■ 10.36 (8.51, 12.6)
Given Developmental Assessment by Someone in Practice				■ 7.11 (5.47, 9.26)	■ 8.81 (6.91, 11.23)	■ 8.00 (6.69, 9.56)
Received Books to Read to Their Child from Practice				■ 29.02 (21.48, 39.21)	■ 29.12 (21.60, 39.26)	■ 29.07 (23.52, 35.94)
Received Information About Community Resources From Someone in Practice				■ 3.50 (2.72, 4.50)	■ 4.95 (3.91, 6.28)	■ 4.23 (3.56, 5.02)
Child Diagnosed or Referred for Problem with Walking, Talking, Hearing, or Using His/Her Hands				□ 0.95 (0.68, 1.34)	■ 1.60 (1.14, 2.24)	□ 1.25 (0.98, 1.58)
Non-Medical Referral Noted in Child's Medical Record [d]				□ 1.28 (0.99, 1.65)	■ 1.62 (1.26, 2.09)	■ 1.44 (1.21, 1.73)

[a] Analyses account for the fact that subjects within sites tend to be more similar to one another than they are to families at other sites. The adjusted analyses further control for site of enrollment (hospital or office), age of the child at interview, and potential differences in the baseline characteristics of the mother (age, education, race/ethnicity, employment), father (employment), family (marital status, father in household, number of siblings, owned own home) and baby (low birth weight, source of payment for care). Results for dichotomous outcomes are reported in terms of odds ratios. An odds ratio of *greater* than 1 indicates that subjects in the intervention group were *more* likely to report a given characteristic than were subjects in the control group; an odds ratio of *less* than 1 indicates that subjects in the intervention group were *less* likely to report a given characteristic than were subjects in the control group. An odds ratio of 1 indicates that there was no difference between intervention and control groups. Ninety-five percent confidence intervals are estimated; when this interval does not include 1, it indicates a statistically significant difference between the intervention and control group.

[b] HS services: parent support groups; office visits about baby's development; office visits about taking care of the baby; telephone number to discuss baby's development; letter to prepare for office visits; brochures about baby's development; special health booklet.

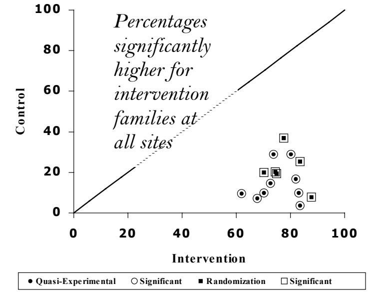
[c] Topics discussed at 2-4 Months included: calming baby; sleep position; routines; solid foods; and car seat. Topics discussed at 30-33 Months included: importance of regular routines for young children; sleep problems; discipline; language development; toilet training; sibling rivalry; home safety; child's development; child's temperament; ways of helping child learn.

[d] These included referrals for behavior, development (including developmental delay, motor delay, cognitive delay or evaluation for these causes), speech/language, hearing, maternal depression and mental health, child abuse or neglect, early intervention, marital or family issues not including domestic violence, and other social or environmental issues or agency referrals. Data on non-medical referrals come from the medical record abstractions completed by evaluation staff.

At 2-4 months, 74.0% of intervention vs. 17.6% of control families received four or more of these services *(data not shown)*. These differences between intervention and control families persisted in the site level comparisons, where there were significant differences at all sites.

At 30-33 months, 77% of intervention families vs. 17.3% of control families received four or more of these services. Again, these differences were significant for all sites.

Percentage of families who received 4 or more Healthy Steps services (30-33 months)

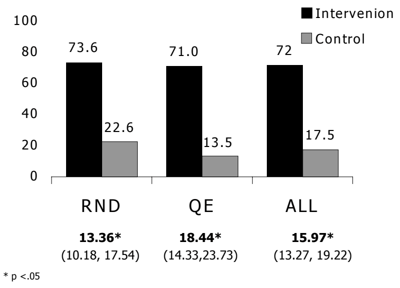


> *Within the infant's first 2-4 months, intervention families had 16.6 times the odds of receiving 4 or more services of the type offered by the Healthy Steps program than control families. They had almost 20 times the odds of having received 4 or more of these services over the course of the evaluation (measured at 30-33 months of age).*

9.3. Home Visits

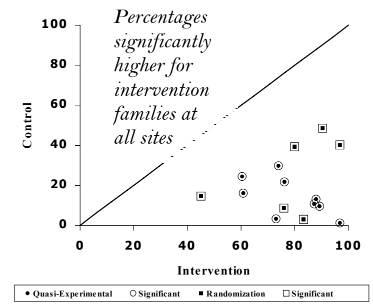
The HS program offered six home visits during the first three years. These home visits provided opportunities for "teachable moments" and for learning about the child's home environment. They focused on age-appropriate topics including newborn concerns such as nutrition and breast-feeding, sleep position and safety issues, and toddler concerns like early learning, eating, and toilet training. Families in the control group may have received home visits as well from the hospital of birth, from their child's practice, or from other agencies.

Percentage of mothers who reported someone made a home visit since child was 6 months of age (30-33 months)



Significantly greater percentages of intervention families (76.3%) than control families (33.8%) received at least one home visit from any source within two to four months postpartum (*data not shown*). All home visits were included in the analysis, regardless of whether they were by someone in the practice, because it was not clear that mothers could differentiate individuals from the practice and other health agencies, especially early in the program. At 12 sites, a significantly greater percentage of intervention than control families received one or more of these early visits.

Percentage of mothers who reported someone made a home visit since child was 6 months of age (30-33 months)



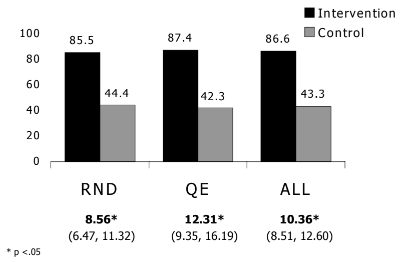
At 30-33 months, mothers reported receipt of home visits for themselves or their child since the child was 6 months of age. Again, significantly greater percentages of intervention mothers (72%) than control mothers (17.5%) reported receiving home visits since their child was six months of age. Differences between intervention and control families were significant at all 15 sites.

> *Within the infant's first 2-4 months, intervention mothers had 10.2 times the odds of receiving a home visit than control mothers. Intervention mothers had 16 times the odds of receiving a home visit after the child was 6 months of age (measured at 30-33 months of age).*

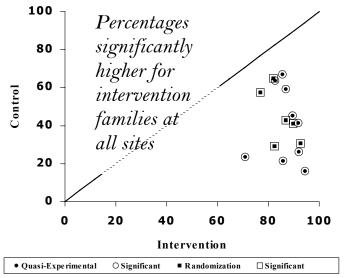
9.4. Age-Appropriate Topics

Through "teachable moments" at enhanced well child visits and home visits, the HS program provided opportunities for parents to discuss developmental and behavioral concerns as well as other issues of concern to the family. As a result, it was expected that clinicians would be more attentive to these topics in their interactions with HS intervention families and that these families would have more opportunities to discuss them.

Percentage of mothers who reported someone in the practice talked with them or gave them information on more than 6 topics (30-33 months)



Percentage of mothers who reported someone in the practice talked with them or gave them information on more than 6 topics (30-33 months)



At 2-4 months, a greater percentage of intervention mothers (43.5%) than control mothers (24.1%) reported discussing five topics about care of their newborn with someone at the baby's doctor's (*data not shown*). These were calming the baby, sleep position, routines, solid foods, and car seat use. Topics reported at 30-33 months included the importance of regular routines for young children, sleep problems, discipline, language development, toilet training, sibling rivalry, home safety, child's development, child's temperament, and ways of helping the child learn. Overall, 86.6% of intervention families compared with 43.3% of control families discussed six or more of these topics with someone in the practice. This was the case at each of the 15 sites, with significantly greater percentages of intervention than control families discussing six or more topics with someone in the practice.

> *Within the infant's first 2-4 months, intervention families had 2.4 times the odds of discussing 5 age-appropriate topics with someone in the practice. They had over 10 times the odds of discussing 6 or more age-appropriate topics over the course of the evaluation (measured at 30-33 months of age).*

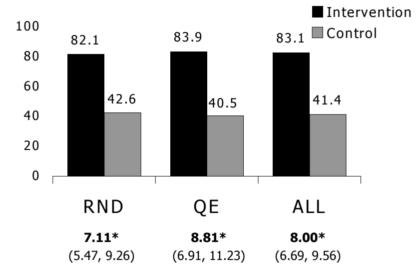
9.5. Developmental Assessments

As part of the HS program, the HS Specialist assessed each child's development every six months, using the Denver II Developmental Screening Tool (DDST) or the MacArthur

Communicative Development Inventories,[9.2] in addition to developmental assessments routinely provided by the clinician. The assessments detect early signs of developmental delay or behavioral problems and provide "teachable moments" to discuss developmental concerns, the child's learning and problem-solving styles, and responses to stress (Zuckerman et al., 1997) Children in the control group may have received developmental assessments, as well; these were generally DDST assessments or informal assessments by the clinician.

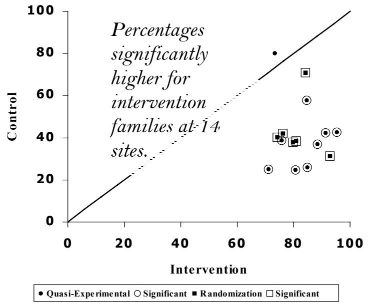
Similar to the pattern seen for other services offered by the program, greater percentages of intervention families received developmental assessments than did control families. Overall, 83.1% of intervention children compared with 41.4% of control children received one or more developmental assessments during the time they obtained their care at the practice. At 14 of the 15 sites, a significantly greater percentage of children in the intervention group than children in the control group received a developmental assessment.

Percentage of children given a developmental assessment by someone in practice) (30-33 months)



* p <.05

Percentage of children given developmental assessment by someone in practice) (30-33 months)

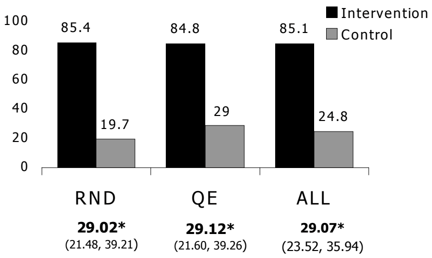


Intervention families had 8 times the odds of receiving a developmental assessment than control families (measured at 30-33 months of age).

9.6. Books to Read

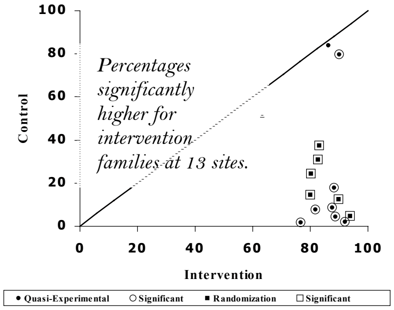
Reach Out and Read (ROAR) was a key element of the enhanced strategies provided through the HS program. In the ROAR program, the pediatric clinician gives the child a book at each well child visit, starting at six months of age, comments on the child's response to the book, and relates the book to the child's cognitive development; for example, demonstrating how the child can turn the pages (Zuckerman et al., 1997). At least one comparison practice began offering books to families through the ROAR Program before the evaluation ended and families may have received books at other comparison practices. Control families at RND sites did not participate in the book sharing program but may have received books informally.

Percentage of families who received books from the practice to read to the child (30-33 months)



* p <.05

Percentage of families who received books from the practice to read to the child (30-33 months)



Intervention mothers had 29 times the odds of receiving books to read to their child from someone in the practice over the course of the evaluation (measured at 30-33 months of age).

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Significantly greater percentages of intervention mothers (85.1%) received books to read to their child than did control mothers (24.8%). Differences between intervention and control groups were significant at 13 sites.

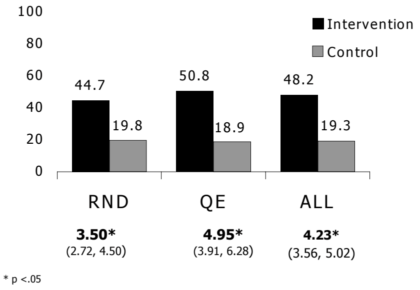
9.7. Information on Community Resources

Each HS practice was expected to develop a binder on community resources and to set up a bulletin board for intervention parents to communicate information on childcare and provide information on other community resources. Further, HS Specialists referred families in need to early intervention, educational, or other community resources, as appropriate.

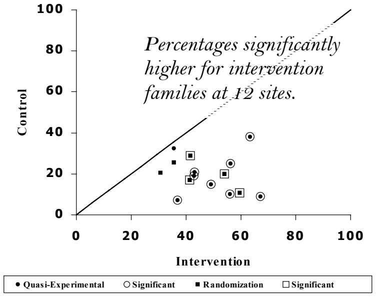
As with other services, greater percentages of intervention families (48.2%) than control families (19.3%) received information about community resources from the practice. Site level differences were significant at 12 sites.

> *Intervention mothers had slightly more than 4 times the odds of receiving information on community resources than control mothers (measured at 30-33 months of age).*

Percentage of families who <u>received information about community resources</u> from someone at the practice (30-33 months)



Percentage of families who <u>received information about community resources</u> from someone at the practice (30-33 months)

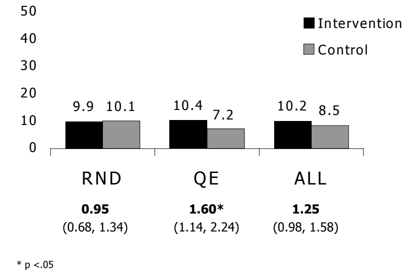


9.8. Referrals for Developmental and Behavioral Concerns

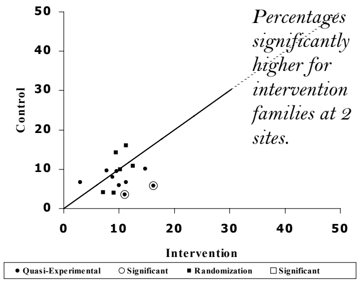
Through "teachable moments" at home visits, parent groups, and office visits, parents were given multiple opportunities to raise concerns about their children's behavior or development. HS Specialists and clinicians alike could refer families for services related to recognized problems. The number of mothers who reported referrals for their children in their 30-33 month interviews was generally too small to analyze. Only 56 mothers (1.5%) reported their child was diagnosed or referred for further testing because of a <u>behavioral</u> concern. More mothers reported referrals for developmental concerns.

Overall, 9.4% of mothers reported that their child had been diagnosed or referred for further testing related to his/her <u>developmental</u> progress. Differences in the percentages of intervention vs. control children referred at RND sites (9.9% vs. 10.1%) and overall (10.2% vs. 8.5%) were not significant. However, at the QE sites, significantly greater percentages of intervention than control children were referred for services (10.4% vs. 7.2%). Although the scatterplot shows several sites

Percentage of children <u>diagnosed or referred for further testing related to their developmental progress</u> with walking, talking, hearing, or using hands (30-33 months)



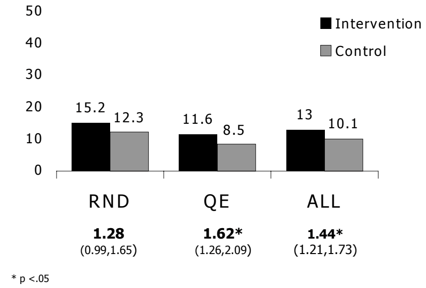
Percentage of children <u>diagnosed or referred for further testing related to his/her developmental progress</u> with walking, talking, hearing, or using hands (30-33 months)



with greater percentages of intervention than control children diagnosed or referred for a development problem, these differences were statistically significant at only two QE sites. It is possible that the results at QE sites are due to unobserved differences in the percentage of intervention children with developmental problems at the QE sites. They may also be due to real differences related to the program that did not appear at RND sites because physicians were more mindful of developmental problems for <u>all</u> families.

Approximately 12% of children had a non-medical referral noted in their medical record during the time they were at the practice (up to 32 months). These included referrals for behavior, development (including developmental delay, motor delay, cognitive delay or evaluation for these causes), speech/language, hearing, maternal depression and mental health, child abuse or neglect, early intervention, marital or family issues not including domestic violence, and other social or environmental issues or agency referrals. Intervention families had a significantly greater odds of referral at QE sites and overall. The results for RND sites were in the same direction but did not reach significance. See **Table 9.2**. for the distribution of specific types of referrals.

Percentage of children with <u>one or more non-medical referrals noted in their medical chart</u> during the time they were at the practice (up to 32 months)



Intervention children had 1.4 times the odds of having one or more non-medical referrals noted in their medical chart during the time they were at the practice (up to 32 months) than control children. These included referrals for behavior, development, speech or language, hearing, maternal depression and mental health, child abuse or neglect, early intervention, marital or family issues, and other social or environmental issues or agency referrals.

Table 9.2. Non-Medical Referrals for Children at Randomization and Quasi-Experimental Sites as Noted in Their Medical Chart during the Time They Were at the Practice (up to 32 months)

	Randomization Sites						Quasi-Experimental Sites						TOTAL					
	Intervention		Control		Total		Intervention		Control		Total		Intervention		Control		Total	
	N=1103		N=1066		N=2169		N=1748		N=1434		N= 3182		N=2851		N=2500		N=5351	
	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N
Receipt of ONE OR MORE Non-Medical Referrals (TOTAL)																		
	15.2	168	12.4	132	13.8	300	11.6	203	8.6	123	10.3	326[a]	13.0	371	10.2	255	11.7	626[a]
NUMBER of Non-Medical Referrals Received																		
None	84.8	935	87.6	934	86.2	1869	88.4	1545	91.4	1311	89.8	2856	87.0	2480	89.8	2245	88.3	4725
1	3.2	35	1.9	20	2.5	55	2.2	38	1.6	23	1.9	61	2.6	73	1.7	43	2.2	116
2	0.8	9	0.7	7	0.7	16	0.6	11	0.6	9	0.6	20	0.7	20	0.6	16	0.7	36
3 or more	11.2	124	9.9	105	10.6	229	8.8	154	6.4	91	7.7	245	9.8	278	7.8	196	8.9	474
Receipt of ONE OR MORE Non-Medical Referrals by Type of Referral																		
Behavior Referrals	1.0	11	1.1	12	1.1	23	1.2	21	0.5	7	0.9	28[a]	1.1	32	0.8	19	1.0	51
Developmental Delay Referrals	5.8	64	5.4	57	5.6	121	3.3	57	2.0	28	2.7	85[a]	4.2	121	3.4	85	3.9	206
Speech Referrals	5.8	64	4.0	43	4.9	107	5.4	95	2.2	32	4.0	127[c]	5.6	159	3.0	75	4.4	234[c]
Hearing Referrals	3.6	40	4.4	47	4.0	87	3.8	67	2.7	38	3.3	105	3.8	107	3.4	85	3.6	192
Maternal Depression Referrals	1.3	14	0.8	8	1.0	22	1.3	22	0.1	2	0.8	24[c]	1.3	36	0.4	10	0.9	46[c]
Child Abuse Referrals	2.5	28	1.6	17	2.1	45	1.7	29	1.1	15	1.4	44	2.0	57	1.3	32	1.7	89[a]
Early Intervention Referrals	2.3	25	2.1	22	2.2	47	0.3	5	0.8	11	0.5	16	1.1	30	1.3	33	1.2	63
Family Problem Referrals	0.9	10	0.6	6	0.7	16	0.3	5	0.1	2	0.2	7	0.5	15	0.3	8	0.4	23
Agency Referrals	5.1	56	3.1	33	4.1	89[a]	1.8	32	3.8	54	2.7	86[c]	3.1	88	3.5	87	3.3	175

[a] p#0.05; [b] p#0.01; [c] p#0.001

10. The Effect of Healthy Steps on Outcomes

The Effect of Healthy Steps on Parent and Child Outcomes

Families in the Healthy Steps program received significantly more developmental services than their counterparts in the control group. These services were expected to promote the health and development of the children who participated in the program either directly or through changing how their parents interacted with them. How the services affected these children and their parents is the focus of this chapter.

Healthy Steps had significant effects on the receipt of preventive services, satisfaction with care and other outcomes specifically related to the effective delivery and utilization of pediatric care. The evidence suggests that Healthy Steps successfully strengthened relationships between families and their pediatric practice, providing them with an additional source of support from Healthy Steps Specialists, clinicians, and practice staff. Intervention mothers were significantly more likely to rely on someone at the practice for developmental advice and to be satisfied with the care they received. Their children were significantly more likely to receive their well child care and immunizations on time. They also were more likely to receive care at the practice for a longer period of time.

Healthy Steps helped establish a firm foundation for the children's healthy growth and development, setting parents on a trajectory of good parenting practices. Intervention mothers were more likely to play and to share books with their infants every day than were control mothers. They were less likely to place their infants on their stomachs to sleep, reducing their risk of infant death syndrome (SIDS). They were also less likely to give water to their newborns. (Water is not recommended in early infancy because of the infant's need for calories and the risk of water intoxication.) They were less likely to use harsh approaches to discipline when their children were toddlers, particularly severe physical discipline. They were more likely to report sleep problems and aggressive behaviors, perhaps reflecting greater alertness to or comfort in talking about behavior issues.

Fewer effects were found for reading, routines, and other parent-child activities related to toddlers. Although intervention children were less likely to make emergency department visits for injuries, there were no other differential reductions in factors such as hospitalizations that would have large cost offsets.

10. PARENT AND CHILD OUTCOMES

10.1. Introduction

Previous sections detailed the ways in which Healthy Steps (HS) was effective in producing systematic changes in pediatric primary care in a variety of settings to better meet the needs of families with young children. This chapter describes effects of the HS program on parents' knowledge, skills and confidence in their childrearing abilities, and on the health and development of their young children. It addresses evaluation questions 4, 5, and 6.

> *4. To what extent did the Healthy Steps program affect parents' knowledge, beliefs and practices regarding their understanding of early child development and parenting practices?*
>
> *5. To what degree did the Healthy Steps program affect parents' utilization of health care services, adoption of health and safety promotion practices, and satisfaction with pediatric care for their young children?*
>
> *6. To what degree did the Healthy Steps program affect children's health and development?*

Healthy Steps had significant effects on the receipt of preventive services, satisfaction with care and other outcomes specifically related to the effective delivery and utilization of pediatric care. Fewer effects were found in parents' self-reported competence in parenting, psychological well-being, and behaviors. These effects were found for parents' responses to their child's misbehaviors, perceptions of their child's behavior, and discussion of their own psychological well-being with their child's pediatric clinician or someone else at the practice.

The results of analyses of parent and child outcomes are summarized in **Table 10.1.** Results for all sites combined as well as site level differences are described in the text. Results for randomization (RND) and quasi-experimental (QE) sites are noted where the significance or direction of the effect differs. The guide to reading the results at the beginning of Chapter 9 also applies to Chapter 10.

Results are described in relation to the general components of the conceptual framework (*see Chapter 4*). They are presented first for mothers' satisfaction with care, perceived competence in parenting, and feelings of chronic stress and depression. These results are followed by a description of the comparisons for

Intervention families were more satisfied with care, would use their pediatric practice more for developmental advice, were less likely to place the infant to sleep in the incorrect position and to use severe discipline strategies and harsh forms of punishment. In general, they were more likely to report some problem behaviors, were more likely to receive age-appropriate well child care and immunizations, and were more likely to receive care at the practice through 20 months of age than control families.

Healthy Steps Intervention Families:
■ Significantly More Likely than Control
◆ Significantly Less Likely than Control
□ Significant Effect Not Noted

Table 10.1. Healthy Steps Program Effects: Adjusted Odds Ratios and 95% Confidence Intervals[a,b,c,d]

	2-4 Months			30-33-Months		
	Randomization	Quasi-Experimental	Pooled	Randomization	Quasi-Experimental	Pooled
PARENT KNOWLEDGE, BELIEFS, PSYCHOLOGICAL HEALTH: SATISFACTION WITH CARE **(Intervention Families More Likely to Be Satisfied with Care)**						
Someone Went Out of Way to Help	■ 2.23 (1.84, 2.70)	■ 2.14 (1.83, 2.51)	■ 2.18 (1.92, 2.46)	■ 2.06 (1.64, 2.58)	■ 2.11 (1.72, 2.59)	■ 2.09 (1.80, 2.43)
Dissatisfied with Help from MD/NP[e]	◆ 0.58 (0.40, 0.86)	◆ 0.34 (0.25, 0.47)	◆ 0.43 (0.33, 0.55)			
Dissatisfied with Help from Staff[e]	◆ 0.65 (0.44, 0.95)	◆ 0.32 (0.23, 0.44)	◆ 0.42 (0.33, 0.54)			
Dissatisfied with Listening of MD/NP[f]	□ 0.86 (0.57, 1.30)	◆ 0.60 (0.43, 0.83)	◆ 0.69 (0.53, 0.89)			
Dissatisfied with Listening of Staff[f]	◆ 0.07 (0.03, 0.22)	■ 0.61 (0.45, 0.84)	◆ 0.71 (0.56, 0.90)			
Disagree that MDs and NPs Provided "Support" to Parent[h]				◆ 0.44 (0.31, 0.63)	◆ 0.32 (0.24, 0.43)	◆ 0.37 (0.29, 0.46)
Disagree that MDs and NPs "Listened" to Parent[g]				◆ 0.68 (0.47, 0.98)	◆ 0.66 (0.49, 0.89)	◆ 0.67 (0.53, 0.84)
Disagree that MDs and NPs Respected Parent's Knowledge, Knew What Was Going On with the Child, and Made Them Feel Like Thy Were Doing a Good Job[i]				□ 1.02 (0.72, 1.45)	◆ 0.66 (0.49, 0.89)	◆ 0.79 (0.63, 1.00)
Overall Perception of Care at Practice (good/excellent)				□ 1.18 (0.80, 1.76)	□ 1.21 (0.86, 1.71)	□ 1.20 (0.93, 1.55)
Overall perception that Doctors and Nurses at the Practice Are Easy to Reach by Telephone				□ 1.02 (0.78, 1.34)	□ 0.82 (0.63, 1.06)	□ 0.91 (0.76, 1.10)
Willing to pay more than $100 for Healthy Steps Services[j]				■ 2.78 (2.19, 3.53)	■ 2.52 (2.03, 3.13)	■ 2.63 (2.24, 3.09)
PARENT KNOWLEDGE, BELIEFS, PSYCHOLOGICAL HEALTH: SENSE OF COMPETENCE, DAILY HASSLES, AND DEPRESSION						
Percentage of Mothers with Depressive Symptoms (Score of ≥11 on Modified CES-D)	□1.04 (0.82,1.32)	□1.26 (1.03,1.56)	□1.16 (0.99,1.36)	□ 1.18 (0.88, 1.57)	□ 1.02 (0.79, 1.33)	□ 1.09 (0.90, 1.33)
Parenting Sense of Competence (mean)	*□-0.01* *(-0.04,0.02)*	*□-0.01* *(-0.03, 0.004)*	*□-0.01* *(-0.03, 0.004)*	*◆ -0.03* *(-0.06,-0.005)*	*□-0.002* *(-0.03, 0.02)*	*□ -0.02* *(-0.03, 0.002)*
Hassles Scale (Mean)	*□ 0.001* *(-0.04,0.04)*	*◆-0.04* *(-0.07,-0.004)*	*□-0.021* *(-0.05, 0.005)*	*□ 0.01* *(-0.03,0.06)*	*□-0.03* *(-0.07,0.01)*	*□ -0.01* *(-0.04, 0.02)*

Healthy Steps Intervention Families:
■ Significantly More Likely than Control
◆ Significantly Less Likely than Control
☐ Significant Effect Not Noted

Table 10.1. Healthy Steps Program Effects: Adjusted Odds Ratios and 95% Confidence Intervals [1,10,11,12]

	2-4 Months			30-33-Months		
	Randomization	Quasi-Experimental	Pooled	Randomization	Quasi-Experimental	Pooled
PARENT KNOWLEDGE, BELIEFS, AND PSYCHOLOGICAL HEALTH: SENSE OF COMPETENCE, DAILY HASSLES, AND DEPRESSION (Mothers Significantly More Likely to Discuss Sadness with Someone in Practice at QE Sites.) *(Reported for Women with CES_D >11, said they needed help with sadness or depression since child was born, or cut down or limited their activity in the amount of work they did or other daily activities for one week or longer because of feeling anxious or depressed.)*						
Mothers Who Made a Mental Health Visit Since Child Was Born				☐ 0.87 (0.53, 1.40)	■ 1.72 (1.07, 2.70)	☐ 1.23 (0.88,1.72)
Mothers Who Take Medication for Depression				◆ 0.55 (0.33, 0.92)	☐ 1.30 (0.81, 2.08)	☐ 0.88 (0.62, 1.23)
Mothers Who Needed Help With Sadness Since Child Was Born				☐ 0.65 (0.41, 1.02)	☐ 1.01 (0.67, 1.53)	☐ 0.83 (0.61, 1.12)
Mothers Who Discussed Sadness with Someone in the Practice				☐ 0.95 (0.56, 1.63)	■ 2.83 (1.57, 5.11)	■ 1.60 (1.09, 2.36)
Respondents Overall Perception of Their Health (excellent/very good)				☐ 1.38 (0.88, 2.15)	☐ 0.72 (0.48, 1.09)	☐ 0.97 (0.72, 1.31)
PARENT KNOWLEDGE, BELIEFS, PSYCHOLOGICAL HEALTH: NURTURING AND EXPECTATIONS (No Significant Differences Between Intervention and Control Groups)						
(Modified) Parent Behavior Checklist: % More Nurturing (≥ 63)				☐ 1.12 (0.87, 1.44)	☐ 1.09 (0.87, 1.35)	☐ 1.10 (0.93, 1.3)
(Modified) Parent Behavior Checklist: % Less Nurturing (≤ 44)				☐ 1.00 (0.66, 1.50)	☐ 0.85 (0.58, 1.23)	☐ 0.91 (0.69, 1.2)
(Modified) Parent Behavior Checklist: Higher Expectations (>1 SD above mean)				☐ 0.97 (0.74,1.27)	☐ 0.98 (0.76,1.26)	☐ 0.98 (0.81, 1.17)
(Modified) Parent Behavior Checklist: Lower Expectations (> 1 SD below mean)				☐ 0.95 (0.70,1.29)	☐ 1.22 (0.92,1.62)	☐ 1.09 (0.88, 1.34)
PARENT PRACTICES: DISCIPLINE (Intervention mothers significantly less likely than control mothers to have ever slapped their child in the face or spanked child with an object, less likely to use harsher discipline strategies, and more likely to ignore child's misbehavior or negotiate.)						
(Modified): Parent Response to Misbehavior: Severe Physical Discipline: % ever slapped child in face or spanked with object				☐ 0.82 (0.54,1.26)	◆ 0.67 (0.46,0.97)	◆ 0.73 (0.55, 0.97)
(Modified): Parent Response to Misbehavior: Discipline: % Using Harsher Discipline (threaten, yell, slap on hand, spank with hand) (≥6)				☐ 0.76 (0.53, 1.09)	☐ 0.80 (0.59, 1.10)	◆ 0.78 (0.62, 0.99)
(Modified): Parent Response to Misbehavior: Discipline: % Using More Reasoning (≥9)				☐ 1.16 (0.89, 1.51)	☐ 1.09 (0.87, 1.37)	☐ 1.12 (0.95, 1.33)
(Modified): Parent Response to Misbehavior: Explain the rules or consequences				0.97 (0.62, 1.52)	0.83 (0.55, 1.25)	0.89 (0.66, 1.21)
(Modified): Parent Response to Misbehavior: Show child more acceptable activity				1.08 (0.74, 1.56)	1.01 (0.72, 1.40)	1.04 (0.81, 1.33)
(Modified): Parent Response to Misbehavior: Negotiate				1.18 (0.96, 1.45)	1.15 (0.95, 1.39)	■1.16 (1.01, 1.34)
(Modified): Parent Response to Misbehavior: Give timeout				0.95 (0.77, 1.18)	1.03 (0.85, 1.24)	0.99 (0.86, 1.14)
(Modified): Parent Response to Misbehavior: Withdraw privileges				0.99 (0.80, 1.23)	1.03 (0.85, 1.25)	1.01 (0.87, 1.17)
(Modified): Parent Response to Misbehavior: Ignore misbehavior				1.20 (0.84, 1.71)	■1.52 (1.13, 2.04)	■1.38 (1.10, 1.73)

Healthy Steps Intervention Families:
■ Significantly More Likely than Control
◆ Significantly Less Likely than Control
□ Significant Effect Not Noted

Table 10.1. Healthy Steps Program Effects: Adjusted Odds Ratios and 95% Confidence Intervals [1,10,11,12]

	2-4 Months			30-33-Months		
	Randomization	Quasi-Experimental	Pooled	Randomization	Quasi-Experimental	Pooled
PARENT PRACTICES: SAFETY, PARENT-CHILD ACTIVITIES, USE OF ROUTINES, FEEDING, PARENT HEALTH ACTIVITIES (Intervention Families More Likely to Report Use of Some Good Safety Practices)						
Mother Used Wrong Position at Bedtime and Naptime	◆ 0.74 (0.56, 0.97)	◆ 0.78 (0.62, 0.99)	◆ 0.76 (0.64, 0.91)			
Mother Placed Car Seat in Back Seat	□ 1.05 (0.77, 1.42)	□ 0.86 (0.65, 1.14)	□ 0.94 (0.76, 1.16)			
Mother Showed Picture Books Every Day or More Often	□ 1.07 (0.87, 1.31)	■ 1.35 (1.13, 1.61)	■ 1.22 (1.07, 1.40)	□ 0.94 (0.75, 1.18)	□ 0.98 (0.80, 1.21)	□ 0.96 (0.82, 1.12)
Mother Played With Baby Once a Day or More	□ 1.03 (0.72, 1.47)	■ 1.38 (1.05, 1.81)	■ 1.24 (1.00, 1.54)	□ 0.99 (0.72, 1.35)	□ 0.85 (0.64, 1.13)	□ 0.91 (0.74, 1.12)
Family Followed 2 or More Routines at Bedtime, Naptime, or Mealtime at 2-4 Months; Family Followed at Least 3 Routines at 30-33 Months	□ 1.11 (0.91, 1.35)	□ 0.93 (0.79, 1.10)	□ 1.00 (0.88,1.13)	□ 0.96 (0.76, 1.21)	□ 1.09 (0.89, 1.34)	□ 1.03 (0.88, 1.20)
Mother and Father Equally or Father Usually Take Child to Well Child Visits				□ 1.15 (0.88, 1.48)	□ 1.05 (0.82, 1.34)	□ 1.09 (0.92, 1.31)
Family Lowered Temperature on Water Heater	□ 0.92 (0.76, 1.13)	□ 0.95 (0.80, 1.14)	□ 0.94 (0.82, 1.07)	■ 1.31 (1.05, 1.65)	□ 0.84 (0.68, 1.04)	□ 1.03 (0.89, 1.2)
Family Uses Covers on Electric Outlets				□ 1.41 (0.98, 2.03)	□ 1.02 (0.74, 1.39)	□ 1.17 (0.92, 1.48)
Family Has Safety Latches on Cabinets				□ 1.11 (0.90, 1.38)	□ 0.98 (0.80, 1.20)	□ 1.04 (0.90, 1.2)
Mother Knows a Number to Call if Concerned Child May have Swallowed Something Harmful				□ 1.36 (0.93, 1.98)	□ 0.94 (0.69, 1.29)	□ 1.09 (0.86, 1.39)
Mother Continuing to Breastfeed at 2-4 Months, Proportional Hazards Model at 30-33 Months	□ 1.13 (0.90, 1.43)	□ 1.16 (0.96, 1.39)	□ 1.15 (0.99, 1.33)	*□ - 0.02* *(-0.13,0.09)*	*□ 0.014* *(-0.07,0.10)*	*□ 0.002* *(-0.07,0.07)*
Baby Given Cereal by2-4 Months	□ 0.87 (0.70, 1.07)	◆ 0.81 (0.68, 0.98)	◆ 0.84 (0.73, 0.96)			
Baby Given Water by 2-4 Months	□ 0.81 (0.66, 1.00)	◆ 0.76 (0.64, 0.90)	◆ 0.78 (0.69, 0.89)			
Mother Resumed Smoking After Baby's Birth (2-4 Months)	□ 1.20 (0.77,1.87)	□ 0.73 (0.48,1.12)	□ 0.93 (0.68, 1.26)			
Current Smokers in Household Who Smoke Outside				□ 1.07 (0.70, 1.66)	□ 1.28 (0.82, 1.99)	□ 1.17 (0.86, 1.59)
Mother Smokes Outside				□1.49 (0.84, 2.64)	□1.03 (0.56, 1.88)	□1.25 (0.82, 1.89)
Mother's Last Check Up or Physical Exam Within Past year				1.18 (0.88, 1.58)	1.13 (0.87, 1.46)	1.15 (0.94, 1.39)
CHILD OUTCOMES: HEALTH AND DEVELOPMENT (With Few Exceptions, No Significant Differences Between Intervention and Control Groups in Parent Report of Health and Development)						
Age Child Spoke Two-Word Sentences (did not speak 2-word sentences before 24 months of age)				□ 0.88 (0.68, 1.15)	□ 1.04 (0.83, 1.29)	□ 0.97 (0.82, 1.15)
Age Child First Walked without Holding On (walked before 12 months of age)				■ 1.25 (1.01, 1.54)	□ 0.85 (0.70, 1.02)	□ 1.01 (0.87, 1.16)

Healthy Steps Intervention Families:
■ Significantly More Likely than Control
◆ Significantly Less Likely than Control
□ Significant Effect Not Noted

Table 10.1. Healthy Steps Program Effects: Adjusted Odds Ratios and 95% Confidence Intervals [1,10,11,12]

	2-4 Months			30-33-Months		
	Randomization	Quasi-Experimental	Pooled	Randomization	Quasi-Experimental	Pooled
CHILD OUTCOMES: HEALTH AND DEVELOPMENT **(With Few Exceptions, No Significant Differences Between Intervention and Control Groups in Parent Report of Health and Development)**						
Mother Very Satisfied with Child's Eating Habits				□ 0.90 (0.73, 1.11)	□ 0.83 (0.69, 1.01)	◆ 0.86 (0.75, 0.99)
Mother Very Satisfied with Child's Sleeping Habits				□ 0.85 (0.68, 1.06)	□ 0.85 (0.69, 1.03)	◆ 0.85 (0.73, 0.98)
Mother Very Satisfied with Child's Bowel Habits				□ 0.86 (0.68, 1.10)	□ 0.97 (0.79, 1.20)	□ 0.92 (0.79, 1.08)
Mother Very Satisfied with Progress Walking and Talking				□ 1.29 (0.93, 1.81)	□ 0.79 (0.60, 1.05)	□ 0.97 (0.78, 1.20)
Mother Very Satisfied with How Well Child Understands What Respondent Says				□ 1.26 (0.86, 1.82)	◆ 0.69 (0.49, 0.96)	□ 0.90 (0.70, 1.15)
CHILD OUTCOMES: CHILD'S PROBLEM BEHAVIOR **(as measured by the Child Behavior Checklist) (Intervention Group More Likely to Report Some Types of Problem Behaviors)**						
CBCL: Aggressive Behavior (mean)				*□ 0.23* *(-0.29,0.75)*	*■ 0.54* *(0.08,1.00)*	*■ 0.40* *(0.06,0.75)*
CBCL: Anxious or Depressed (mean)				*□ 0.13* *(-0.16,0.41)*	*□ 0.24* *(-0.02,0.50)*	*□ 0.19* *(0.004,0.38)*
CBCL: Problems Sleeping (mean)				*□ 0.12* *(-0.13,0.36)*	*■ 0.26* *(0.38,0.49)*	*■ 0.20* *(0.03,0.36)*
CBCL: % More Aggressive (≥14)				□ 1.20 (0.89, 1.61)	■ 1.40 (1.06, 1.84)	■ 1.30 (1.07, 1.59)
CBCL: % More Anxious or Depressed (≥ 9)				□ 1.35 (0.93, 1.95)	□ 1.20 (0.87, 1.66)	□ 1.26 (0.99, 1.61)
CBCL: % More Problems Sleeping (≥ 6)				■ 1.37 (1.01, 1.86)	□ 1.21 (0.92, 1.60)	■ 1.28 (1.04,1.57)
CHILD OUTCOMES: CHILD HEALTH STATUS **(With Few Exceptions, No Significant Differences Between Intervention and Control Groups in Parent Report of Health and Development)**						
Child Is Very Healthy				□ 1.18 (0.91, 1.54)	□ 1.19 (0.93, 1.51)	□ 1.19 (0.99, 1.42)
Child's Health Is Excellent				□ 0.90 (0.91, 1.12)	□ 1.03 (0.84, 1.25)	□ 0.97 (0.83, 1.12)
Since Child Came Home from Hospital S/He Had Been Seriously Ill				□ 0.82 (0.61, 1.10)	□ 0.96 (0.72, 1.29)	□ 0.89 (0.72, 1.1)
CHILD OUTCOMES: INJURIES AND USE OF ACUTE HEALTH CARE **(No Significant Differences Found in Emergency Department Use, Hospitalizations, or Injuries)**						
Injured Badly Enough to See a Doctor				□ 1.04 (0.77, 1.41)	□ 0.95 (0.73, 1.25)	□ 0.99 (0.81, 1.21)
Number of Emergency Room Visits in Past Year (1 or more)				□ 1.21 (0.96, 1.52)	□ 0.92 (0.75, 1.12)	□ 1.03 (0.89, 1.20)
One or More Emergency Room Visit for Injury-Related Causes in Past Year				□ 0.94 (0.65, 1.34)	◆ 0.67 (0.49, 0.90)	◆ 0.77 (0.61, 0.97)
Number of Hospitalizations (1 or More Times Since Birth @ 2-4 Months; 1 or More Times in Past Year @ 30-33 Months)	□ 0.71 (0.49, 1.03)	□ 1.00 (0.72, 1.39)	□ 0.86 (0.68, 1.10)	□ 1.30 (0.85, 1.98)	□ 0.99 (0.64, 1.53)	□ 1.14 (0.84, 1.54)

Healthy Steps Intervention Families:
■ Significantly More Likely than Control
◆ Significantly Less Likely than Control
☐ Significant Effect Not Noted

Table 10.1. Healthy Steps Program Effects: Adjusted Odds Ratios and 95% Confidence Intervals [1,10,11,12]

	2-4 Months			30-33-Months		
	Randomization	Quasi-Experimental	Pooled	Randomization	Quasi-Experimental	Pooled
CHILD OUTCOMES: AGE-APPROPRIATE WELL CHILD CARE [k] (Intervention Children More Likely to Receive Age-Appropriate Care)						
1 Month Well Child Visit (*Visit within 41 days of birth*)				■1.85 (1.17, 2.94)	■2.99 (1.87, 4.78)	■2.36 (1.70, 3.28)
2 Month Well Child Visit (*Visit between 42 days (1.5 months) and 92 days (3 months), inclusive*)				■1.73 (1.32, 2.26)	■1.77 (1.43, 2.19)	■1.75 (1.48, 2.07)
4 Month Well Child Visit (*Visit between 93 days (3 months) and 151 days (5 months), inclusive*)				■1.35 (1.06, 1.72)	■1.65 (1.34, 2.03)	■1.51 (1.29, 1.77)
6 Month Well Child Visit (*Visit between 152 days (5 months) and 213 days (7 months), inclusive*)				■1.55 (1.22, 1.97)	■1.45 (1.19, 1.76)	■1.49 (1.28, 1.73)
9 Month Well Child Visit (*Visit between 244 days (8 months) and 305 days (10 months), inclusive)*				☐1.20 (0.95, 1.53)	■1.92 (1.62, 2.27)	■1.64 (1.43, 1.89)
12 Month Well Child Visit *(Visit between 336 days (11 months) and 397 days (14 months), inclusive)*				■1.69 (1.28, 2.24)	■1.70 (1.37, 2.12)	■1.70 (1.43, 2.02)
15 Month Well Child Visit *(Visit between 427 days (14 months) and 488 days (17 months, inclusive)*				☐1.26 (0.99, 1.60)	■2.01 (1.67, 2.43)	■1.69 (1.46, 1.95)
18 Month Well Child *(Visit between 519 days (17 months) and 580 days (20 months), inclusive*)				■2.01 (1.60, 2.54)	■3.14 (2.57, 3.82)	■2.61 (2.25, 3.03)
24 Month Well Child Visit *(Visit between 701 days (23 months) and 762 days (28 months)*				■2.25 (1.70, 2.97)	■1.35 (1.07, 1.72)	■1.68 (1.40, 2.01)
CHILD OUTCOMES: AGE-APPROPRIATE VACCINATIONS [k] (Intervention Children More Likely to Receive Age-Appropriate Vaccinations)						
DTP1				**■1.50 (1.11, 2.02)**	■1.67 (1.31, 2.13)	■1.60 (1.32, 1.93)
DTP3				■1.37 (1.09, 1.72)	■1.56 (1.31, 1.86)	■1.49 (1.29, 1.71)
MMR1				■1.38 (1.03, 1.85)	■1.42 (1.12, 1.81)	■1.40 (1.17, 1.69)
CHILD OUTCOMES: CHILD UP-TO-DATE ON VACCINATIONS [l] (Intervention Children More Likely to Receive Up-to-Date Vaccinations)						
Up-to-Date at 24 Months (4 DTP, 3 OPV/IPV, 1 MMR)				■1.51 (1.14, 1.98)	■1.33 (1.02, 1.73)	■1.41 (1.17, 1.71)
CHILD OUTCOMES: UTILIZATION OF THE PRACTICE (Intervention Children More Likely to Utilize Practice for Longer Period))						
Child made one or more office visits after 20 months of age				■1.87 (1.55, 2.25)	■ 1.53 (1.31,1.78)	■ 1.66 (1.47, 1.87)

[a] Analyses account for the fact that subjects within sites tend to be more similar to one another than they are to families at other sites. The adjusted analyses further control for site of enrollment (hospital or office), age of the child at interview, and potential differences in the baseline characteristics of the mother (age, education, race/ethnicity, employment), father (employment), family (marital status, father in household, number of siblings, owned own home) and baby (low birth weight, source of payment for care). Results for dichotomous outcomes are reported in terms of odds ratios. An odds ratio of *greater* than 1 indicates that subjects in the intervention group were *more* likely to report a given characteristic than were subjects in the control group; an odds ratio of *less* than 1 indicates that subjects in the intervention group were *less* likely to report a given characteristic than were subjects in the control group. An odds ratio of 1 indicates that there was no difference between intervention and control groups. Ninety-five percent confidence intervals are estimated; when this interval does not include 1, it indicates a statistically significant difference between the intervention and control group. Results for continuous outcomes are reported as the difference between means. For these few outcomes, the variable results are *italicized.* A positive (negative) difference indicates that subjects in the intervention (control) group tend to have higher values of the outcome as compared to subjects in the control (intervention) group.

[b] Language Development between 23 and 26 months of age was measured using the MacArthur CDI/WS. Results are reported for (for Randomization Sites only). No significant differences were found.

Vocabulary Production	*☐ -1.13*	*(-4.33,2.08)*
Mean Length of Sentence	*☐ 0.31*	*(-1.42,0.81)*
Sentence Complexity	*☐ 0.24*	*(-1.60,1.12)*
Combined Words	☐ 1.23	(0.78,1.92)

[c] A measure of the family's relationship to the practice based on responses to the 6-month and 12- month parent forms was also assessed. Results indicated that parents were more likely to seek advice about baby's speech from practice *(Physician, HS Specialist, and Nurse)* vs. other source).

[d] Sample Numbers:

	Randomization		Quasi-Experimental		Total
	Intervention	Control	Intervention	Control	
Parent Interview at 2-4 Months	1021	966	1610	1299	4896
MacArthur CDI-WS at 23-26 Months	532	397	NA	NA	929 (Randomization Sites Only
Parent Interview at 30-33 Months	832	761	1189	955	3737
Medical Record Reviews through 32 Months	1103	1066	1748	1434	5351

[e] Help from MD/NP includes: points out what parents do well; acts like parents understand information; makes parents feel like they are doing a good job; suggests things to do with baby in daily life; understands that parents know their baby best; helps parents get needed information; gives parents advice to use at home; gives parents new ideas to do with baby.

[f] MD/NP listens includes: having time to answer questions; understanding main reason for visit; not having other things on their minds; giving parents a chance to ask questions; thinking carefully about questions; not being in a rush; encouraging questions.

[g] Disagree that MDs and NPs provided "support" to parent: suggested things that I could do for child that fit into my family's daily life; helped me get all the information I need about child's growth and development; helped me get services for child from other agencies about programs; gave me advice on how to solve problems at home with child; gave me new ideas about things to do with child; pointed out what I did well as a parent.

[h] Disagree that MDs and NPs "listened" to parent: always had time to answer my questions about child; seemed to have other things on their minds when I talked with them; acted like I couldn't understand information about child's growth and development; seemed to think carefully about my questions about child's development; were always in a rush when they saw child; encouraged me to ask questions about child's growth and development; did not really give me a chance to ask questions about child.

[I] Disagree that MDs and NPs respected parent's knowledge, knew what was going on with the child, and made them feel like they were doing a good job: understood that I know child better than anyone else does; made me feel like I was doing a good job caring for child; seemed to know what was going on with child.

[j] Parent was asked how much they would be willing to pay one time to receive the following HS services for one year: well child visits with a developmental specialist, a telephone information line about child development, parent groups, brochures on child health and development, letters before well child visits about what to expect at the next visit, and a book designed to keep information about your child's healthcare and development.

[k] Age-Appropriate Variables: Denominator for analysis varies. Eligible children = all children who made a visit during or after previous age-appropriate well child visit interval.

[l] Up-to-date Vaccination Variables: Denominator for analysis varies. Eligible children for UTD-24 = all children who made a visit after 20 months of age.

intervention and control families on parent behaviors that promote their child's health and development. Among these behaviors are nurturing, developmental expectations, discipline practices, safety practices, and others. Results for mothers' perceptions of their child's health, development, and behavior are then described, followed by child outcomes related to injuries and health care utilization.

10.2. Data Sources

The assessment of parent and child outcomes relied on several evaluation measures. The 30-33 month parent interviews provided the majority of data for the results presented here. Data sources for other outcomes were: 1) parent satisfaction and practices (2-4 month parent interviews); breast-feeding (parent self-reports at 2-4 months, 6-months, 12-months, 18-months, and 30-33 months); use of the practice for developmental advice (6- and 12-month parent self-reports); language development (self-administered MacArthur CDI-WS at 23-26 months of age); and well child visits, broken appointments, and immunization status (medical record reviews through 32 months of age).

Because data were collected at specific points during the child's three years and there was attrition over time, each data set also represents a different sample of children (*See Chapter 5 for detailed description of sample characteristic*s). The medical record data capture the full visit and vaccination histories of the children through their last visit to the practice for 97% of children enrolled in the evaluation. However, even here, the results for each visit and vaccine variable are based on different samples.

10.3. Parents' Knowledge, Beliefs, Psychological Health

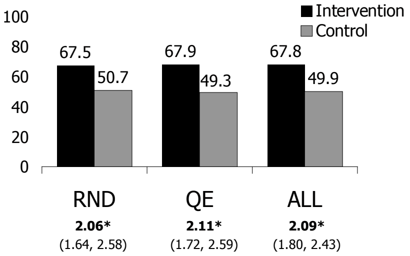
10.3.A. Satisfaction with Care

10.3.A.1. Perceived Satisfaction and Dissatisfaction with Health Care from Pediatric Practice

The HS program significantly improved parent satisfaction with care. Despite high levels of satisfaction with care overall, mothers in HS were more likely than mothers in the control group to be highly satisfied with their child's care. They also were significantly less dissatisfied with the care they received from the pediatric clinicians.

When their infants were only 2-4 months of age, greater percentages of intervention mothers than control mothers at

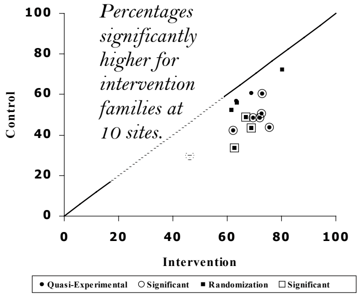
Percentage of mothers reporting that someone in practice went out of the way for them (30-33 months)



* p <.05

RND and QE sites alike reported that someone in the practice went out of the way for them. Intervention mothers continued to report higher levels of satisfaction over time. Again, at 30-33 months, significantly greater percentages of intervention mothers (67.8%) than control mothers (49.9%) reported that someone in the practice went out of the way for them. The scatterplot shows significantly higher levels of satisfaction among intervention mothers at 10 sites.

Percentage of mothers reporting that someone in practice went out of the way for them (30-33 months)



At 30-33 months, 40.3% of intervention mothers pointed to the HS Specialist as the person who had made the extra effort. This percentage is comparable to that found when children were infants and had been in the program but a few months.

Intervention mothers had twice the odds of reporting that someone at the practice had gone out of the way for them at both 2-4 months (odds ratio of 2.2) and 30-33 months (odds ratio of 2.1).

Several additional measures of parent's satisfaction and dissatisfaction with care were evaluated at 2-4 months and again at 30-33 months. Although dissatisfaction measures at 2-4 months and 30-33 months differed somewhat, the findings at 2-4 months generally carried through to 30-33 months. We used measures of dissatisfaction with care because of the high percentage of mothers who were satisfied with their child's care.

At 30-33 months, three scales measured dissatisfaction related to the care provided by doctors and nurse practitioners at the sites. A greater percentage of control families at both design sites (RND and QE) disagreed that doctors and nurse practitioners, and other site staff "supported"[10.1] them and "listened"[10.2] to them **(Figure 10.1**). For a third variable measuring disagreement that physicians and nurse practitioners "respected the mother's

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[10.1] Disagree that MDs and NPs provided "support" to mother: suggested things that I could do for child that fit into my family's daily life; helped me get all the information I need about child's growth and development; helped me get services for child from other agencies; gave me advice on how to solve problems at home with child; gave me new ideas about things to do with child; pointed out what I did well as a parent.

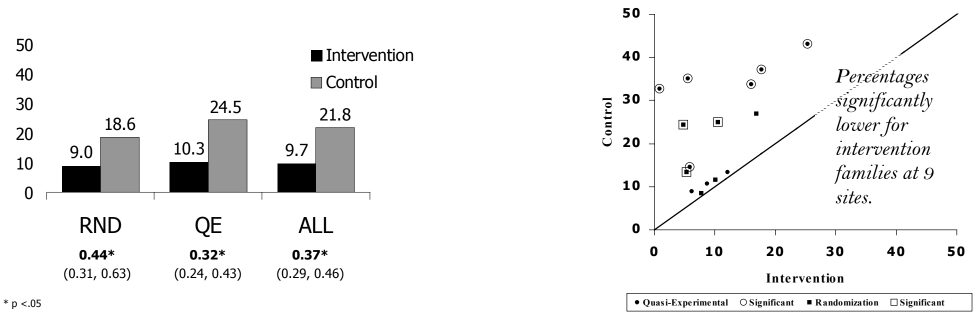
[10.2] Disagree that MDs and NPs "listened" to mother: always had time to answer my questions about child; seemed to have other things on their minds when I talked with them; acted like I couldn't understand information about child's growth and development; seemed to think carefully about my questions about child's development; were always in a rush when they saw child; encouraged me to ask questions about child's growth and development; did not really give me a chance to ask questions about child..

Dissatisfaction with Care Among Mothers in the Intervention and Control Groups at Randomization and Quasi-Experimental Sites

Figure 10.1. Percentage of families in the intervention and control groups at Randomization and Quasi-Experimental Sites who reported dissatisfaction with care. Bar graphs show comparisons between intervention and control groups with adjusted odds ratios and 95% confidence intervals. Scatterplots compare the percentages of families in the intervention and control groups at each site.

Percentage mothers who disagreed that MDs and NPs provided "support" to them (30-33 months)

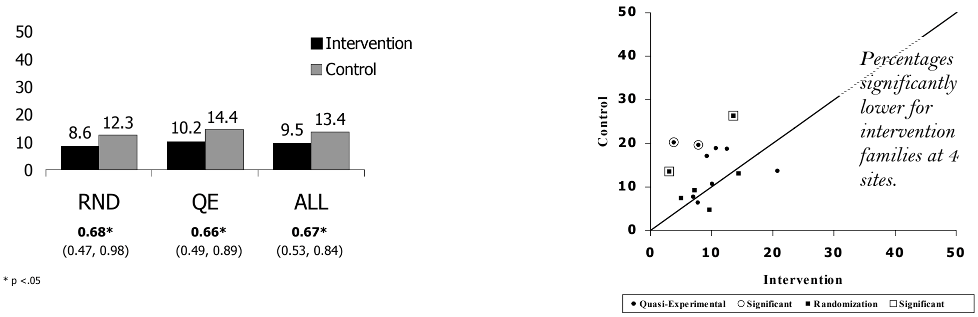
Percentage of mothers who disagreed that MDs and NPs provided "support" to them (30-33 months)



Percentages significantly lower for intervention families at 9 sites.

Percentage of mothers who disagreed that MDs and NPs "listened" to them (30-33 months)

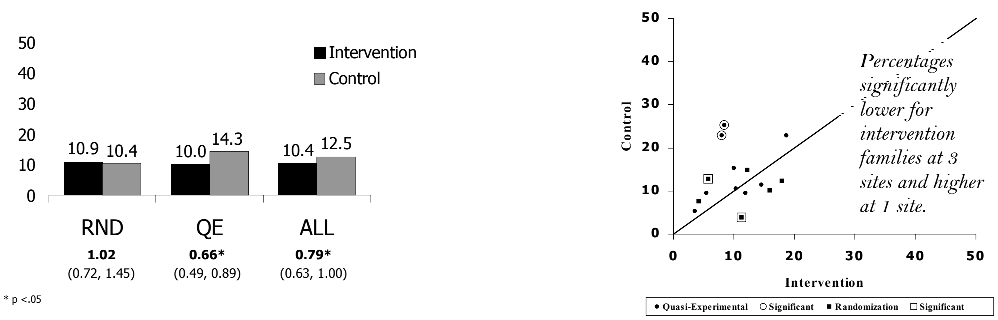
Percentage of mothers who disagreed that MDs and NPs "listened" to them (30-33 months)



Percentages significantly lower for intervention families at 4 sites.

Percentage of mothers who disagreed that MDs and NPs "respected their knowledge" (30-33 months)

Percentage of mothers who disagreed that MDs and NPs "respected their knowledge" (30-33 months)



Percentages significantly lower for intervention families at 3 sites and higher at 1 site.

<u>Disagree that MDs and NPs</u> <u>provided "support" to mother</u>: suggested things that I could do for child that fit into my family's daily life; helped me get all the information I need about child's growth and development; helped me get services for child from other agencies about programs; gave me advice on how to solve problems at home with child; gave me new ideas about things to do with child; pointed out what I did well as a parent.

<u>Disagree that MDs and NPs</u> <u>"listened" to mother</u>: always had time to answer my questions about child; seemed to have other things on their minds when I talked with them; acted like I couldn't understand information about child's growth and development; seemed to think carefully about my questions about child's development; were always in a rush when they saw child; encouraged me to ask questions about child's growth and development; did not really give me a chance to ask questions about child.

<u>Disagree that MDs and NPs</u> <u>respected mother's knowledge</u>, knew what was going on with the child, and made them feel like they were doing a good job: understood that I know child better than anyone else does; made me feel like I was doing a good job caring for child; seemed to know what was going on with child.

knowledge,"[10.3] significant differences were not found at RND sites. The differences by site generally were in the same direction for the first two dissatisfaction subscales (**Figure 10.1**). Significantly greater percentages of control mothers than intervention mothers were dissatisfied with "support" from physicians and nurse practitioners at nine sites and "listening" at four sites. The scatterplot for the third subscale (**Figure 10.1**) shows that at three sites, significantly greater percentages of control mothers were dissatisfied with the extent to which physicians and nurse practitioners "respected their knowledge." At one site, results were in the opposite direction.

Intervention mothers were significantly less likely to be dissatisfied with care from their child's physician or nurse practitioner than were control mothers on three measures of dissatisfaction (evaluated at 30-33 months of age).

Mothers also were asked to rate [on a scale from 1 (excellent) to 4 (poor)] two other measures of satisfaction: (1) their perception of the overall quality of the practice in terms of providing good health care and advice on how to care for the child; and (2) easily reaching the doctors and nurses at the practice by phone. At 30-33 months, mothers, on the whole, appeared to be pleased with their child's practice. No significant differences between intervention and control groups were found for either variable (**Table 10.1**).

10.3.A.2. Reliance on the Practice for Developmental Advice *(data not shown)*

One indication of increased satisfaction and strengthened relationships between intervention families and their pediatric practice is the extent to which intervention mothers would preferentially rely on someone in the practice for developmental advice. When their children were 6 and 12 months of age, intervention mothers had a 60% higher odds of reporting that they would seek advice about their child's speech from someone at the practice rather than a relative, book, or some other source, as compared to control mothers.

[10.3] Disagree that MDs and NPs respected mother's knowledge, knew what was going on with the child, and made them feel like they were doing a good job: understood that I know child better than anyone else does, made me feel like I was doing a good job caring for child, seemed to know what was going on with child.

10.3.B. Sense of Competence, Daily Stress, and Depression

10.3.B.1. Parenting Sense of Competence (*data not shown*)

The Parenting Sense of Competence (PSOC) scale (Gribaud-Watson and Wandersman, 1978; Johnston and Mash, 1989) and its subscales were compared for intervention and control families. This scale, designed to assess parenting self-esteem, includes 17 items scored on a 6-point scale from *strongly agree* (1) to *strongly disagree* (6). The order of these values was reversed in the analysis so that higher scores indicate a greater sense of parenting competence. The two subscales, one measuring perceived efficacy as a parent and the other satisfaction with parenting, contribute to the total scale.

The mean PSOC score was 2.9 at both 2-4 and 30-33 months, indicating that mothers, in general, felt only moderately competent about parenting, and their sense of competence did not change with time. There was a statistical difference between intervention and control groups only at RND sites (**Table 10.1**). However, this difference was not meaningful in practical terms. The site level comparisons showed similar findings with little variability across sites.

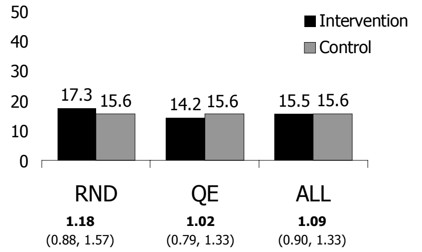
10.3.B.2. Daily Hassles (*data not shown*)

Scores on a modified, shortened version of the Hassles Scale (Curry et al, 1994) a measure of daily stresses since the child was born, were also compared. As with parenting sense of competence, mother's scores appeared stable over time (3.4 at 2-4 months and 3.3 at 30-33 months). No significant differences by HS status were found at either time point.

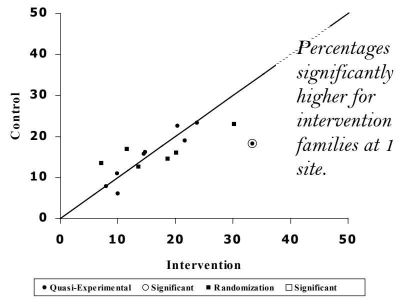
10.3.B.3. Maternal Depression

Depressive symptoms were measured using a modified 14-item version of the 20-item Epidemiologic Studies of Depression (CES-D) Scale (Radloff, 1977). At 2-4 months, 17.8% of mothers had scores on the modified scale of 11 or greater; at 30-33 months, the percentage was 15.6% (*2-4 month results not shown*). There were no significant differences between intervention and control groups on CES-D scores (**Table 10.1**). At both 2-4 and 30-33 months, with one exception, the findings for the percentage with high scores showed no differences by site.

Percentage of mothers reporting <u>depressive symptoms on modified CES-D depression scale</u> (30-33 months)



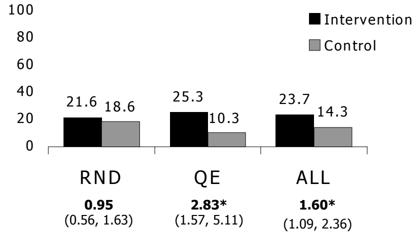
Percentage of mothers reporting <u>depressive symptoms on CES-D depression scale</u> (30-33 months)



At 30-33 months, in addition to measuring depressive symptoms on the modified CES-D scale, we asked two related questions. These were whether the mother had cut down or limited the amount of work she did or other daily activities for one week or longer in the last six months because of feeling anxious or depressed and whether she needed help with sadness since her child was born. Slightly more than one quarter (25.9%) of the mothers scored 11 or higher on the modified CES-D scale, and/or answered yes to either of these two questions. We then compared these intervention and control mothers on their responses to several questions related to their mental health.

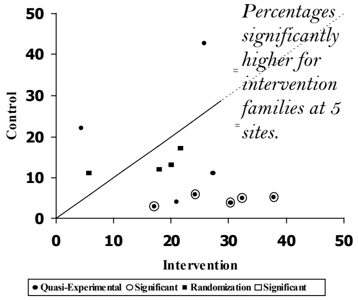
More than half (57.3%) of mothers who reported sadness or depression on any of the three measures perceived their overall health as being very good to excellent and 26.8% had made a visit to a mental health specialist since their child's birth. Approximately half (51%) reported that they had needed help with sadness or depression; of these mothers, 19.4% said they had discussed their sadness with someone at the pediatric practice, and 33.1% of those who did had been referred to a mental health specialist. No significant intervention-control differences were found in the mothers' overall perception of their health or in the percentage who had made a mental health visit, took medication for depression, or felt that they needed help with sadness (**Table 10.1**). However, greater percentages of intervention (23.7%) than control (14.3%) mothers who reported needing help had discussed their sadness with someone in the practice. These differences, however, were not significant at RND sites – due to higher levels of mothers in the control groups at these sites who discussed their sadness with their child's pediatric clinician or someone else at the practice. The scatterplot shows significant differences at five QE sites.

Percentage of mothers with depressive symptoms on composite measure who discussed sadness with someone in the practice (30-33 months subset)



* p <.05

Percentage of mothers with depressive symptoms on composite measure who discussed sadness with someone in the practice (30-33 months subset)



Intervention mothers with depressive symptoms, who needed help with sadness, or who restricted their activity because of feeling anxious or depressed had 1.6 times the odds of having discussed their sadness with someone at their child's practice than their control counterparts (evaluated at 30-33 months of age). This relation was significant in the combined sample and at QE sites only.

10.3.C. Nurturing and Expectations

10.3.C.1. Parent Nurturing (*data not shown*)

At 30-33 months, mothers rated, from 1 (*always/almost always*) to 4 (*never/almost never*), a series of statements from the Parent Behavior Checklist (PBC) (Fox, 1994) about how parents raise young children. The order of these values was reversed in the analysis so that higher scores indicated more frequent use of the nurturing behavior. The series of statements included 18 of 20 items in the PBC nurturing subscale. This subscale measures specific parent behaviors that promote a child's psychological growth (e.g., "I read to my child at bedtime"). The score on the modified nurturing subscale divided by the number of items in the scale was 3.1, indicating that mothers, on average, reported frequent use of the nurturing practices. No significant differences between intervention and control mothers in these reports of nurturing behaviors were found (**Table 10.1**).

10.3.C.2. Developmental Expectations (*data not shown*)

Mothers' responses at 2-4 months to 30 items specifically related to infant development taken from the Knowledge of Infant Development Inventory (KIDI) (MacPhee, 1981), indicated that most appeared to have a fairly good understanding of child development. Thirteen of the items represented general principles of child development or parenting, and included items such as "Some normal babies do not enjoy being cuddled" and "Babies do some things just to make trouble for their parents, like crying or soiling their diapers." The remaining 17 statements specifically identified developmental milestones and an age at which a "typical" child would be capable of the identified activity. Examples of these statements include "An infant of three months often will smile when he or she sees an adult face" and "Most infants are ready to be toilet-trained by one year of age."

Almost 70% of mothers answered more than one-half of the general child development questions correctly. Very few mothers either consistently underestimated or overestimated development when presented with items specifying developmental milestones and assessing knowledge of the typical ages when those milestones are achieved. There were no significant differences in these measures between intervention and control groups.

Twenty-five of 50 items from the Parent Behavior Checklist expectations subscale, which mothers rated from 1 (*disagree*) to 4 (*strongly agree*), measured mothers' expectations for their child's development at 30-33 months. The expectations subscale assesses parent's developmental expectations of their child (e.g., "My child should use the toilet without help"). Mothers who scored significantly above the mean on this subscale may benefit from advice to lower their expectations to a more reasonable level. In contrast, mothers who scored significantly below the mean may need encouragement to increase their expectations. On average mothers scored 2.8 on the modified expectations subscale (range 1-4), indicating that their child should be able to do the stated task. Overall, 13.8% of mothers scored more than one standard deviation below the mean (below 2.5) and 18.9% more than one standard deviation above the mean (above 3). The odds of having higher or lower than average expectations, however, did not differ significantly between intervention and control groups (**Table 10.1**).

10.4. Parent Practices

10.4.A. Discipline Practices

At 30-33 months, mothers were asked about their discipline practices using an instrument called the Parent Response to Child Misbehavior (PRCM) (Holden and Zamarano, 1992). The PRCM was designed to determine techniques used by parents in response to their children's misbehaviors and to assess the frequency with which parents use each of twelve different responses to misbehavior over the course of an average week during the past month. Parents rate each phrase on a seven-point Likert scale ranging from *never* to *9 or more times per week.* In the HS evaluation, the scale was condensed to four response categories ranging from 0 (*never*) to 3 (*almost always*) to be used in the telephone interview.

Mothers reported using multiple approaches to discipline (seldom, often, or almost always) in an average week. Virtually all mothers responded to their child's misbehavior by explaining the rules or consequences (99.1%) and showing their child a more acceptable behavior (98.9%). Somewhat smaller percentages used non-physical strategies that

Percentage of mothers in an average week using (seldom, often, or almost always) 12 discipline strategies from Parent Response to Misbehavior (30-33 Months)

	Intervention %	Control %	Total %
Randomization	**N = 832**	**N = 761**	**N = 1593**
Explain the rules or consequences	99.2	99.3	99.2
Show more acceptable activity	99.2	99.1	99.1
Negotiate	87.1	83.8	85.5
Give timeout	88.7	89.8	89.2
Withdraw privileges	78.5	77.0	77.7
Ignore *	49.1	42.8	46.1
Yell in anger *	72.8	67.6	70.3
Threaten	47.7	44.5	46.2
Spank with hand	56.1	57.9	57.0
Slap on the hand	50.7	52.9	51.7
Spank with object	5.0	5.7	5.3
Slap in the face	1.7	1.5	1.6
Quasi-Experimental	**N = 1189**	**N = 955**	**N = 2144**
Explain the rules or consequences	99.1	98.8	99.0
Show more acceptable activity	98.8	98.8	98.8
Negotiate	88.9	86.2	87.7
Give timeout	85.9	84.8	85.4
Withdraw privileges	76.0	77.8	76.8
Ignore *	53.3	44.6	49.4
Yell in anger	73.0	71.8	72.4
Threaten	50.9	52.0	51.4
Spank with hand *	51.4	57.1	53.0
Slap on the hand *	41.7	55.6	47.9
Spank with object *	5.1	7.7	6.2
Slap in the face	1.0	1.3	1.1
All	**N = 2021**	**N = 1716**	**N = 3737**
Explain the rules or consequences	99.1	99.1	99.1
Show more acceptable activity	99.0	98.9	98.9
Negotiate *	88.1	85.1	86.7
Give timeout	87.0	87.0	87.0
Withdraw privileges	77.0	77.4	77.2
Ignore *	51.5	43.8	48.0
Yell in anger *	72.9	69.9	71.5
Threaten	49.6	48.7	49.2
Spank with hand *	53.4	57.5	55.3
Slap on the hand *	45.4	54.4	49.5
Spank with object *	5.0	6.8	5.9
Slap in the face	1.3	1.4	1.3

* $p < .05$; up to 1% of data may be missing for these variables

involved negotiating with their child (86.7%), giving their child time out (87.0%), withdrawing privileges (77.2%), and ignoring their child's misbehavior (48.0%). Nearly three-quarters yelled in anger (71.5%) and almost half (49.2%) threatened their child. In an average week, more than half of mothers (55.3%) spanked their child with their hand, half (49.5%) slapped their child on his/her hand, and 5.9% spanked him/her with an object. Few (1.3%) slapped their child in the face.

Several variables were constructed based on this instrument. First, selected responses were combined from the list of strategies into three scales. The first scale included harsh responses to misbehavior (threatening, yelling in anger, slapping their child's hands, and spanking with their hand). Non-physical strategies (negotiating, explaining the rules or consequences, showing their child a more acceptable activity, giving a time-out, withdrawing privileges, and ignoring the misbehavior) comprised the second scale. A third variable was created to indicate whether the mother had ever slapped her child in the face or hit him/her with an object.

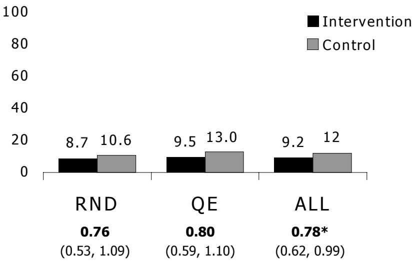
10.4.A.1. Harsh Punishment

At 30-33 months, mothers, on average, scored very low in their use of harsh strategies (0.71), indicating that they seldom to never used harsh discipline strategies during an average week.

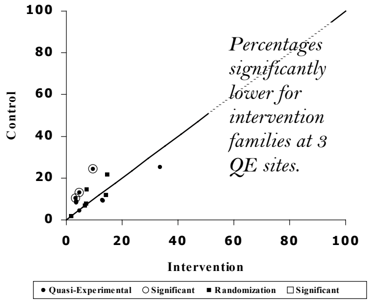
A dichotomous variable created from the harsh discipline scale compared higher levels of use (1.5 or higher on the 0 to 3 scale). Overall, 10.5% of mothers reported that they employed harsh discipline, i.e., used some form of harsh discipline seldom to often during any given week. On this measure, smaller percentages of intervention mothers (than control) overall reported that they used harsh discipline seldom to often (9.2% of intervention mothers vs. 12% of control mothers). Although the trends were similar for mothers at RND and QE sites, the differences were not significant at this level. The site level comparisons showed significantly smaller percentages of mothers at three QE sites reported that they used harsher discipline seldom to often.

Overall, 6.9% of mothers reported using severe physical discipline in an average week. Severe discipline strategies were defined as slapping in the face or spanking with an object. Intervention mothers were less likely to use these more severe forms of punishment (5.9% vs. 7.8%)—although this difference did not reach significance at the RND sites. The scatterplot

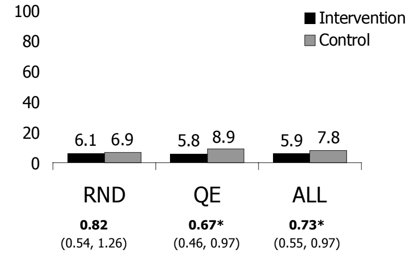
Percentage of mothers <u>using harsh discipline</u> (30-33 months)



Percentage of mothers <u>using harsh discipline</u> (30-33 months)

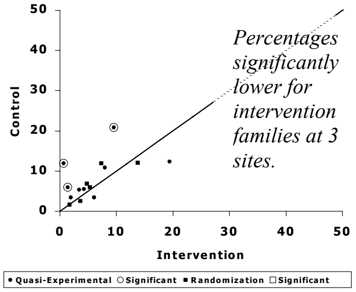


Percentage of mothers <u>ever slapping their child in the face or spanking him/her with an object</u> in an average week (30-33 months)



* p <.05

Percentage of mothers <u>ever slapping their child in the face or spanking him/her with an object</u> in an average week (30-33 months)



for this variable shows significantly smaller percentages of intervention mothers using severe discipline at three QE sites.

Mothers in the intervention group had a 22% lower odds of relying on harsh punishment (yelling, threatening, slapping their child's hands, or spanking their child with their hand) than mothers in the control group. They had a 27% lower odds of using severe physical discipline with their child. Severe discipline strategies were defined as slapping their child in the face or spanking their child with an object such as a belt.

10.4.A.2. Non-Physical Discipline Strategies *(data not shown)*

Mothers, overall, scored 1.72 (between seldom and often) in their use of non-physical strategies. A dichotomous variable was created from this scale to indicate the percentage of mothers who reported using non-physical or "reasoning" strategies. Overall, 78.6% of mothers reported that they used these non-physical approaches. No significant intervention-control differences were found in mothers' reports of use of non-physical strategies (**Table 10.1**).

Because the internal consistency of the composite "reasoning" variable was poor, we assessed the extent to which mothers had *often or almost always* used each of the non-physical discipline strategies independently. Mothers reported employing multiple strategies including often or almost always explaining the rules or consequences (94.1%), showing child a more acceptable activity (91.0%), negotiating (57.1%), giving a time out (55.7%), withdrawing privileges (36.7%) and *often or almost always* ignoring the behavior (11.1%).

With respect to their non-physical responses to misbehavior, intervention and control mothers differed only in whether they ignored the misbehavior or used negotiation. Greater percentages of intervention than control mothers overall ignored their child's misbehavior (51.1% vs. 43.8%) or used negotiation (88.1% vs. 85.1%).

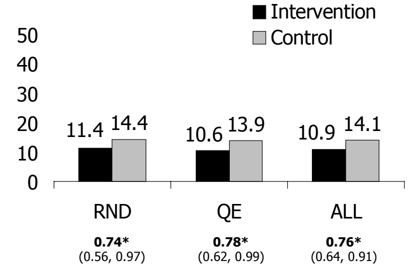
Mothers in the intervention group had a 38% higher odds than control mothers of ignoring their child's behavior and a 16% higher odds of using negotiation. However, significant differences in this first strategy were not found at randomization sites and significant differences in the use of negotiation were found only in the combined sample, where their significance was borderline.

10.4.B. Safety Practices and Sleep Position

"Teachable moments" in the home and at the office provided opportunities to emphasize safety and injury prevention. Safety practices were compared at 2-4 months and 30-33 months.

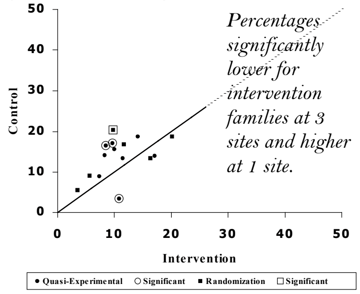
At 2-4 months, the specific practices evaluated were sleep position of the baby at naptime and bedtime, where the baby's car seat was placed in the car, whether or not the family had tested the water temperature in the home, and whether the family had lowered the water temperature. The only one of these practices for which there were significant differences between intervention and control families was placing the baby on the stomach to sleep, a position that has been shown to place vulnerable infants at risk for sudden infant death syndrome (SIDS). Approximately 12% of mothers were consistent in reporting use of the incorrect sleep position at *both* bedtime and naptime. There was considerable variability across sites in terms of the percentage of babies that were placed on their stomachs (wrong position) at bedtime and for naps. At 11 sites this percentage was greater among control families, but it was significant only for 3 sites. At one other site, a greater percentage of mothers at the intervention site than at the control site used the wrong sleep position for their infant.

Percentage of mothers who reported putting their baby to bed on the stomach (wrong position) at naptime and bedtime (2-4 months)



* p <.05

Percentage of mothers who reported putting their baby to bed on the stomach (wrong position) at naptime and bedtime (2-4 months)



At 30-33 months, mother's use of safety practices for their toddlers was fairly high overall: 98.3% placed the car seat in the back seat; 95.1% of mothers who took their child in a car or taxi always or almost always used a car seat; 90.2% used covers on their electric outlets; 97.3% had working smoke detectors in their homes; and 90.3% knew a number to call if they were concerned that their child had swallowed something harmful. Families were less likely to employ other age-appropriate safety measures: 62.6% used safety latches on their cabinets; 31.7% had placed stickers on their bottles of poisonous liquids; and 32.4% of families living in homes with stairs had a stair gate in use Significant differences in the use of these toddler safety practices were not found for intervention and control families.

The high baseline levels of safety practice use among mothers, attentiveness of virtually all physicians and nurse practitioners to

Mothers in the Healthy Steps program practiced better infant sleep position practices than control mothers. Intervention mothers had a 24% lower odds of placing their newborns on their stomachs to sleep, reducing the risk of sudden infant death syndrome (SIDS), than their counterparts in the control group (evaluated at 2-4 months of age).

Father's Engagement in Activities

The Healthy Steps program emphasizes the whole family---mothers, fathers, and children. However, the assessment of program effects is limited largely to mothers and children. Mothers were the primary subjects of the two interviews that provide the majority of data on program effects. Nonetheless, some data on fathers' engagement in activities with their child was collected from mothers during these interviews.

At the time of the 30-33 month interviews, 76% of children were living with their biological or adoptive father. The sample for the analysis of Healthy Steps effects on fathers consisted of 2792 families. It included 23 fathers who completed the telephone interview at 30-33 months and 2769 mothers who completed the interview and were living with the child's biological or adoptive father.

Mothers (and the 23 fathers) were asked how often the child's father (they) read to their child, played with their child, and helped with three routines (bedtime, mealtime, and bathing). Forty-three percent of fathers read to their child and 76.7% played with their child every day or more often. Fathers also helped with child care: 89% helped with mealtime at least once a day or whenever they were home; 85.9% helped with bedtime at least twice a week or whenever they were home; and 54.4% helped with bathing at least twice a week or whenever they were home. When differences in baseline demographic factors and site were taken into account, no significant program effects were found on father's participation in these activities.

safety in their standard anticipatory guidance, and the relatively infrequent contact of HS Specialists and practice clinicians with families of toddlers (compared with early education or child care programs) may explain the lack of effects of HS on safety practices.

10.4.C. Play, Sharing Books, and Other Parent-Child Activities (*data not shown*)

The next group of parent practices related to promoting development included showing books to the baby and playing with the baby. These were readiness to read and language development activities promoted by the HS program through "teachable moments" and the Reach Out and Read Program (which began at the 6-month well child visit).

At 2-4 months, about two-thirds of mothers had begun showing picture books to their baby and 27.1% were doing so every day or more often. The majority played with their baby at least once a day (91.1%). Greater percentages of intervention mothers showed books to their babies than control mothers; 29.2% vs. 24.5% of mothers overall showed picture books to their child at least once a day (*data not shown*).

At 30-33 months, 68.1% of mothers read to their child at least once a day and 86.8% played with their child once a day or more often. However, significant differences between intervention and control groups in these activities were not found (**Table 10.1**).

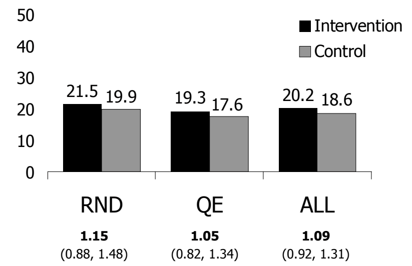
> *Intervention mothers had a 22% higher odds than control mothers of showing picture books to their infants every day. Intervention mothers also had a 24% higher odds of playing with their infant every day. No significant differences were noted in playing or showing books at RND sites, however.*

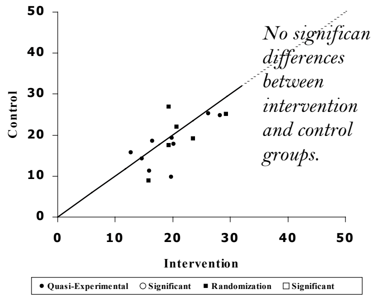
10.4.D. Use of Routines (*data not shown*)

At 2-4 months, all families followed at least one routine (same mealtime, same naptime, same bedtime every day) with their baby and almost 60% followed all three routines. At 30-33 months, all mothers were using at least one routine and 63.9% used all three. Overall, 76.8% of children had the same bedtime every day; 71.8% of children who napped used the same naptime; and 81.5% of children ate dinner at the same time every day. We found no significant differences between groups in the use of these routines at either time point (**Table 10.1**).

10.4.E. Father's Participation in Well Child Visits

Anecdotal observations at some HS sites suggested that fathers were more likely to attend well child visits. Almost one-fifth (19.5%) of fathers participated in well child visits on a regular basis. However, there were no significant intervention-control group differences in father's attendance at these visits.


Percentage of families in which the mother and father equally or father usually took child to well child visits (30-33 months)


Percentage of families in which the mother and father equally or father usually took child to well child visits (30-33 months)

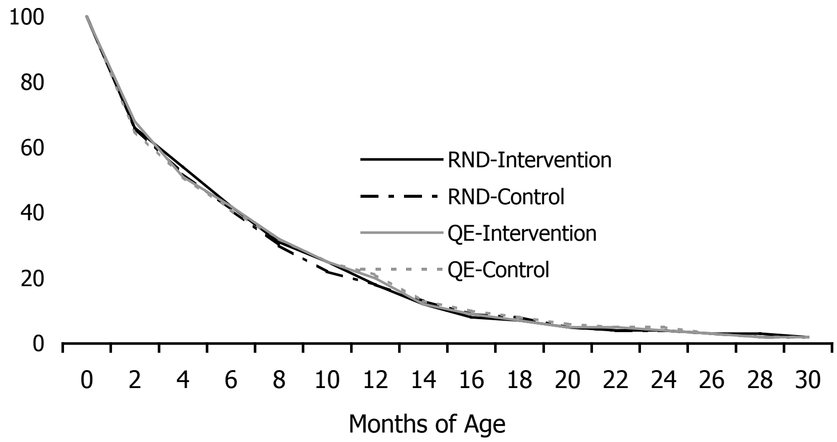
No significant differences between intervention and control groups.

10.4.F. Feeding Practices

A number of practices by parents which may enhance their baby's health or development were also investigated. These practices included breastfeeding and infant nutrition promoted by the HS Specialist and clinicians in their early contacts with mothers.

At entry into the evaluation, 67% of mothers had initiated breastfeeding and about half (54.7%) of mothers who initiated breastfeeding were still breastfeeding 2-4 months post-partum. These levels are comparable to those seen nationally. No differences between intervention and control groups were found in the length of breastfeeding (**Figure 10.1**). It may be that the HS specialists' contacts with families came too late to influence the mothers' decisions regarding continuation of breast-feeding.

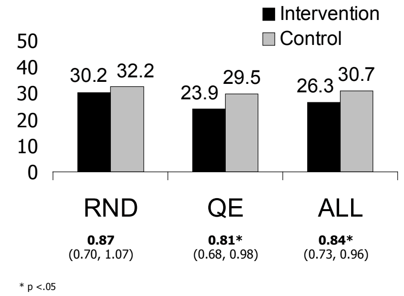
Figure 10.1 Percentage of Breastfeeding Mothers Continuing to Breast-Feed Their Child through 30 Months of Age



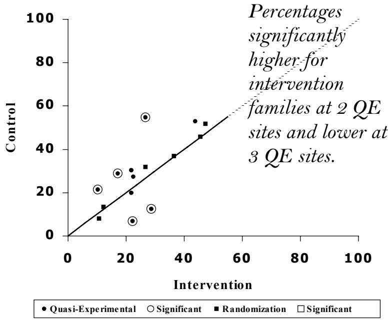
Mothers also were asked if their infant had started taking cereal or water. By 2-4 months, 28.3% had introduced cereal into their infant's diet. Over 40% reported giving water to their baby. Water is not recommended in early infancy due to the need for caloric intake as well as the risk to infants of water intoxication. Intervention mothers were less likely to have given their child water and cereal than control mothers, although these results were not significant at RND sites. Overall, 26.3% of intervention mothers compared with 30.7% of control mothers had introduced cereal and 38% of intervention families vs. 46.4% of control families had given their baby water. The scatterplots present a mixed picture, showing statistically significant results in favor of intervention and control groups alike.

> *Intervention mothers had a 22% lower odds of giving their newborns water than control mothers. (Water is not recommended in early infancy due to the need for caloric intake as well as the risk to infants of water intoxication.) Further, intervention mothers had a 16% lower odds of introducing cereal by 2-4 months of age—although this result was not statistically significant at RND sites.*

Percentage of mothers who introduced cereal 2-4 months)

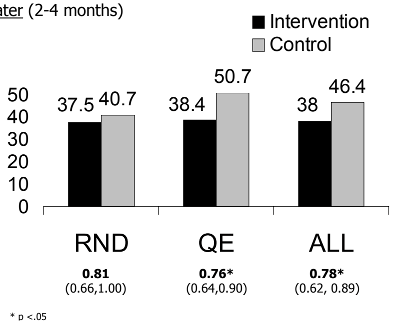


Percentage of mothers who introduced cereal before 2-4 months of age (2-4 months)

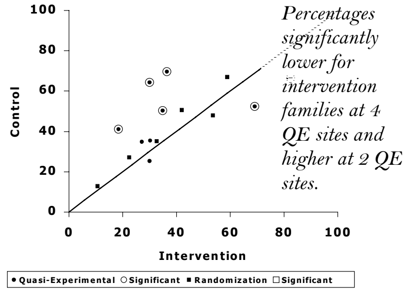


Percentages significantly higher for intervention families at 2 QE sites and lower at 3 QE sites.

Percentage of mothers who reported giving their baby water (2-4 months)



Percentage of mothers who gave water to their child before 2-4 months of age (2-4 months)



Percentages significantly lower for intervention families at 4 QE sites and higher at 2 QE sites.

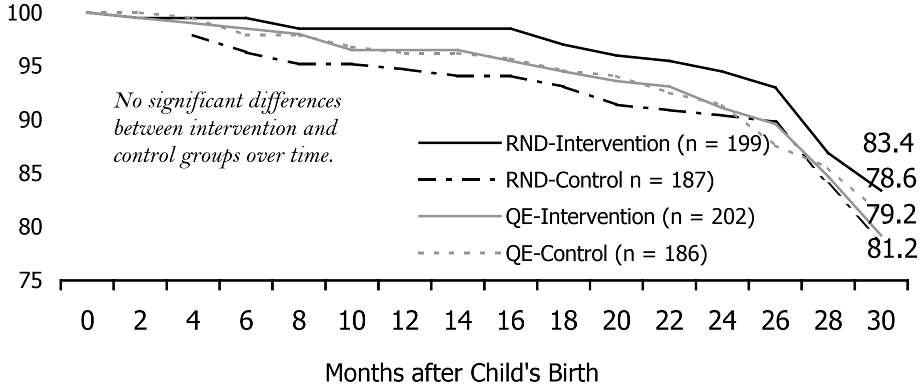
10.4.G. Parent Health Behaviors

We assessed program effects on behaviors of parents that may affect the child as well as the parents (smoking) and behaviors of the mother that may affect her health (postpartum and preventive health visits).

Among mothers interviewed at 2-4 months, more than 10% reported smoking at the time they entered the evaluation. More than twice as many fathers as mothers were reported to smoke (25.9% vs. 10.6%). The figures for the fathers are consistent with national data, while those for mothers are lower, even for pregnant women who are less likely to smoke than nonpregnant women. The percentage of mothers who smoked was similar between intervention and control families.

Among 1230 women smokers who had not smoked during pregnancy, 25% had resumed smoking since giving birth; 15% of 602 women who smoked during pregnancy had not smoked since their baby was born. There were no significant differences between intervention and control groups for either variable. At the site level, there were significant differences between intervention and control groups at three of the QE sites in the percentage of mothers who had resumed smoking and at two RND sites in the percentage of mothers who had continued to smoke. For both variables, at the sites with significant differences, mothers in the control groups were significantly more likely than mothers in the intervention groups to have resumed smoking or continued to smoke since the child's birth.

Percentage of Mothers Completing 30-33 Month Interviews who Continued to Smoke from Their Child's Birth to 30-33 Months



More than one in five mothers (20.7%) who completed the 30-33 month interview reported smoking since the birth of their child. This percentage is consistent with national data. Of these 794 mothers, 174 (21.9%) had stopped smoking by 30 months post partum. There were no significant differences in the percentage of mothers who stopped smoking over time.

At 30-33 months, we also assessed whether mothers who smoked did so in the same room, an adjacent room or outside. Of mothers who were currently smoking, the majority smoked outside (62.3%) while 11.8% smoked in the same room and another 25.6% smoked in an adjacent room. No significant differences were found between intervention and control groups in where mothers smoked (**Table 10.1**). We also found no difference in whether any smoker in the household smoked in an adjacent room or outside (**Table 10.1**).

By 2-4 months postpartum almost 90% of mothers had had a postpartum check-up. At 30-33 months, the majority (83.2%) of mothers interviewed reported having had a check up or physical exam within the past 6 months. There were no differences between intervention and control groups for either variable (**Table 10.1**).

10.5. Child Outcomes

10.5.A. Child Development (*data not shown*)

The primary focus of HS was on parents and any effects on children were expected to occur primarily through changes in the knowledge, beliefs, and behaviors of their parents. Because the intensity of program services was modest compared to other early intervention programs that have been evaluated (Campbell and Ramey, McCarton et al., 1997), HS was expected to have only marginal or limited effects on child development. With this understanding, the appraisal of child development was restricted to outcomes that were most likely to be related to parent effects and could be measured easily. It would have been prohibitively expensive to conduct a direct observation study of all children involved.

At 30-33 months, mothers, on the whole, seemed to be satisfied with their child's developmental progress: 91.4% were *very satisfied* with how well the child understands what they say; 54.3% with their child's eating habits, 67.2% with their child's sleeping habits, and 74.3% with their child's bowel habits. Small, although significant, differences were found between intervention and control groups only in satisfaction with the child's eating habits and sleeping habits. In both cases, lower levels of satisfaction were found for intervention mothers (52.4% of intervention mothers vs. 56.5% of control mothers were *very satisfied* with their child's eating habits and 65.5% of intervention mothers vs. 69.2% of control mothers were *very satisfied* with their child's sleeping habits). Significant differences between groups were found only in the combined sample (**Table 10.1**). The only other significant difference noted was at QE sites, where smaller percentages of intervention than control mothers were *very satisfied* with how well the child understood what they said.

When their child was between 30-33 months of age, mothers were asked about the age their children reached several important developmental milestones related to language and motor development. These milestones included the age the child spoke a real word for the first time and used two-word sentences, and the age the child first walked by himself without holding on to something. Overall, only 5.2% of children spoke a real word for the first time after 19 months of age; 24.6% of children were not yet speaking in two word sentences by 24 months of age; and 47.9% were walking unaided by 11 months of age. There were no significant differences between intervention and control groups in the distribution of these variables except for age of walking. At RND sites only, children in the intervention group were slightly more likely to walk before 12 months of age than were control children (**Table 10.1**).

The MacArthur Communicative Development Inventories /Words and Sentences (CDI-WS),[10.4] measured program effects on language development when children were 23 through 26 months of age. Results are reported for RND sites only.[10.5]

Table 10.2 compares mean values for intervention and control groups by month of age for three CDI-WS variables: mean length of longest sentence; sentence complexity; and vocabulary production. A fourth variable, the percentage of children combining words, also is shown. Results are consistent with observed differences between boys and girls at these ages. The absolute scores for these children tended to be comparable or higher than those for children in CDI normative samples. Children at RND sites were more diverse and their mothers better educated than the normative samples. After adjusting for child's age and gender (girls tend to do better than boys at a given age and children's development progresses over time), site,

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[10.5] Of 5,565 children enrolled in the evaluation, CDI-WS forms were completed for 1975 (35.5%) children only. Because the sample excluded so many families and families completing forms at the QE intervention sites differed in significant ways from those at QE control sites that may affect the results, results are reported for RND sites only. Of 2235 children enrolled in the evaluation at RND sites, 929 (41.6%) were included in the MacArthur CDI-WS sample for analysis (532 intervention, 397 control) Of these, 910 (98.0%) completed the English language version and 19 (2%) the Spanish Language version.

Table 10.2. MacArthur Communicative Development Inventories (CDI-Words and Sentences) Scores [a]

	Age in Months				
	23	24	25	26[b]	ALL
Mean sentence length [c]	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Intervention	5.5 (8.3)	4.6 (4.7)	4.7 (1.7)	5.8 (2.7)	4.8 (5.3)
Control	5.7 (9.2)	5.6 (8.3)	6.3 (9.7)	4.4 (1.3)	5.7 (8.5)
Sentence complexity [d]	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Intervention	9.3 (8.7)	9.7 (9.1)	13.7 (11.1)	18.8 (12.7)	10.3 (9.5)
Control	10.0 (10.2)	10.3 (10.2)	13.9 (12.7)	12.7 (10.8)	10.9 (10.7)
Vocabulary Production (0-100) [e]	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Intervention	50.7 (23.7)	51.5 (23.8)	58.3 (23.2)	71.4 (24.8)	52.7 (24.0)
Control	53.0 (23.1)	51.9 (24.1)	60.1 (25.9)	64.2 (21.7)	54.1 (24.2)
Combining Words [f]	%	%	%	%	%
Intervention	86	88	93	94.1	88.3
Control	90	85	88	90.0	86.7

[a] Fenson L et al (1994). The MacArthur Communicative Development Inventories: User's guide and technical manual. San Diego, CA: Singular Publishing Group, p 43.

[b] Mean values are shown for the 26-month groups although sample sizes are very small. Sample sizes for each measure are found below.

[c] Mean Length of the Longest Sentence: In this section parents were asked to list the three longest sentences they have heard their child speak. The number of morphemes in each sentence was counted following instructions in the training manual. A morpheme is a linguistic unit that contains no smaller meaningful parts, e.g. birthday or doggie. For forms completed in Spanish, words were counted rather than morphemes. We then calculated the mean of the three longest sentences or if fewer than three sentences were listed, the mean length of utterance was based on the sentence(s) recorded. Sample size: BOYS: Intervention: N = 35 at 23 months, 109 at 24 months, 18 at 25 months, and 6 at 26 months; Control: N= 21 at 23 months, 87 at 24 months, 26 at 25 months, and 7 at 26 months. GIRLS: Intervention: N = 33 at 23 months, 158 at 24 months, 15 at 25 months, and 7 at 26 months; Control: N = 36 at 23 months, 76 at 24 months, 22 at 25 months, and 6 at 26 months.

[d] Sentence Complexity: In the sentence complexity section of the CDI-WS, parents were asked to choose from each of 37 pairs of more or less complex phrases. They could select either phrase or neither one. For each of the 37 items, we assigned a score of zero if the parent checked the less complex phrase or left that item blank, and a score of one if the parent checked the more complex alternative. Sample size: BOYS: Intervention: N = 44 at 23 months, 155 at 24 months, 23 at 25 months, and 6 at 26 months. Control: N= 29 at 23 months, 110 at 24 months, 33 at 25 months, and 8 at 26 months; GIRLS: Intervention: N = 39 at 23 months, 188 at 24 months, 20 at 25 months, and 11 at 26 months; Control: N = 44 at 23 months, 100 at 24 months, 22 at 25 months, and 12 at 26 months.

[e] Mean Vocabulary Score (English-Language version only): One hundred words comprise the CDI-WS Short Form A vocabulary checklist, which is intended to measure vocabulary production. Numbers in sample: BOYS: Intervention: N = 48 at 23 months, 171 at 24 months, 25 at 25 months, and 5 at 26 months; control: N= 31 at 23 months, 118 at 24 months, 34 at 25 months, and 9 at 26 months. GIRLS: Intervention: N = 40 at 23 months, 187 at 24 months, 22 at 25 months, and 13 at 26 months. Control: N = 49 at 23 months, 104 at 24 months, 25 at 25 months, and 13 at 26 months.

[f] Combining Words: Parents were asked whether their child had begun to combine words *not yet, sometimes, or often.* The two latter categories were combined to indicate that the child had begun to combine words. Numbers in sample: BOYS: Intervention: N = 46 at 23 months, 163at 24 months, 24 at 25 months, and 6 at 26 months; Control: N= 31 at 23 months, 117 at 24 months, 35 at 25 months, and 8 at 26 months. GIRLS: Intervention: N = 40 at 23 months, 192 at 24 months, 20 at 25 months, and 11 at 26 month; Control: N = 47 at 23 months, 102 at 24 months, 24 at 25 months, and 12 at 26 months

and baseline demographic characteristics, no significant differences were found between intervention and control groups in the four variables evaluated. (**Table 10.1, footnote 10**)

10.5.B. Parent Report of Behavioral Problems

Through "teachable moments," clinicians and HS Specialists helped further parents' understanding of their child's behavior, temperament, and the "goodness of fit" in the parent-child relationship (Zuckerman et al, 1997). It is possible that these exchanges would lead parents to become more alert to their children's behaviors, including their misbehaviors, and to be more comfortable talking about them.

Mean Scale Raw Scores on Anxious/Depressed, Sleep Problems, and Aggressive Behavior Subscales of the Child Behavior Checklist for Healthy Steps Intervention and Control Groups (30-33 Months)

	I Mean (SD)	C Mean (SD	Total Mean (SD
Randomization Sites			
Anxious/Depressed	4.8 (2.9)	4.7 (2.8)	4.7 (2.8)
Sleep Problems	2.9 (2.5)	2.8 (2.4)	2.9 (2.4)
Aggressive Behavior	8.7 (5.1)	8.4 (5.0)	8.6 (5.1)
Quasi-Experimental Sites			
Anxious/Depressed	4.7 (2.9)	4.6 (3.0)	4.6 (2.8)
Sleep Problems	2.9 (2.5)	2.7 (2.3)	2.8 (2.4)
Aggressive Behavior	8.5 (5.0)	8.2 (4.9)	8.4 (5.0)
All Sites			
Anxious/Depressed	4.7 (2.9)	4.6 (2.9)	4.7 (2.9)
Sleep Problems	2.9 (2.4)	2.8 (2.4)	2.9 (2.4)
Aggressive Behavior	8.6 (5.1)	8.3 (4.9)	8.5 (5.0)

Mean scale raw scores for nonreferred children as reported in Achenbach TM. (1992) Manual for the Child Behavior Checlist/2-3 & 1992 profile. Burlington, VT: University of Vermont Department of Psychiatry: Anxious/Depressed: 4.5 (3.0); Sleep Problems: 3.2 (2.8); Aggressive Behavior: 8.6 (5.7)

The Child Behavior Checklist (CBCL) (Achenbach, 1992) was used to measure parents' perceptions of their children's emotional and behavioral problems. The CBCL/2-3 consists of 99 items describing behavioral/ emotional problems, plus an open-ended item for additional problems. Parents rate their child for how true each item is now or was within the past 6 months using the scale "often true", "sometimes true" or "never true". The CBCL/2-3 provides raw scores, T scores and percentiles for 6 syndromes representing Internalizing, Externalizing and Total Problems. These syndromes are Social Withdrawal, Anxious/Depressed, Sleep Problems, Somatic Problems, Aggressive, and Destructive. In the HS evaluation, the Aggressive Behavior, Anxious/Depressed, and Sleep Problems subscales were used.

The mean raw scores for mothers' responses on the three scales--Anxious/Depressed, 4.7 (2.9); Sleep Problems, 2.9 (2.4); and Aggressive Behavior, 8.5 (5.0)--were comparable to the mean scale raw scores for nonreferred children reported by Achenbach. After differences in baseline family characteristics and site correlations were taken into account, intervention mothers, on average, were significantly more likely than control mothers, to report sleep problems and aggressive behaviors in their child (**Table 10.1**).

A set of dichotomous variables was created from the three subscales. As evaluation families did not represent a high-risk group, the cutoff points established for all three variables were well below clinical levels: scores of 14 or higher on the aggressive

<u>Aggressive Behaviors (15 items)</u>
Defiant
Demands must be met immediately
Disobedient
Easily frustrated
Easily jealous
Gets into many fights
Hits others
Angry moods
Punishment doesn't change his/her behavior
Screams a lot
Selfish or won't share
Sudden changes in mood or feelings
Temper tantrums or hot temper
Unusually loud
Whining

<u>Anxious/Depressed (11 items)</u>
Clings to adults or too dependent
Feelings are easily hurt
Gets too upset when separated from parents
Looks unhappy without good reason
Nervous, high-strung, or tense
Overtired
Self-conscious or easily embarrassed
Shy or timid
Too fearful or anxious
Unhappy, sad, or depressed
Wants a lot of attention

<u>Sleep Problems (7 items)</u>
Doesn't want to sleep alone
Has trouble getting to sleep
Nightmares
Resists going to bed at night
Sleeps less than most children during day and/or night
Talks or cries out in sleep
Wakes up often at night

behaviors subscale (clinical cutoff = 22); 9 or higher on the anxious/depressed subscale (clinical cutoff = 12); and 6 or higher on the Sleep Problems subscale (clinical cutoff = 10). For all three variables, a score above the cutoff indicated that the mother observed more or more frequent behaviors in her child. The odds of reporting these behaviors was significantly higher for intervention than for control mothers with respect to reporting aggressive behaviors at QE sites and sleep problems at RND sites. In the combined RND/QE sample, intervention mothers were more likely to report both sleep problems and aggressive behaviors. Significant differences were not found in reporting of anxious/depressed behaviors (Figure 10.2).

Mothers in the intervention group were more likely to report problem behaviors in their child as assessed using subscales of the Child Behavior Checklist (CBCL). This could have happened because Healthy Steps children actually had more behavioral/emotional problems than children in the control group. However, it is more likely that HS affected how mothers perceived their child's behavior (and misbehavior) and possibly increased their level of comfort in discussing their child's behavior with others.

10.5.C. Child's Health Status

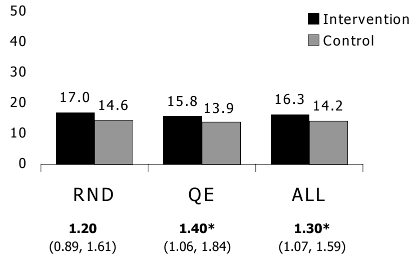
The majority of children in the evaluation were in excellent health, as judged by their mother's perceptions. Nearly all mothers (96.8%) *strongly agreed* or *agreed* that their child's health was excellent although some children had been seriously ill (12.3%) after coming home from the hospital after their birth.

From their ratings of several statements describing a child's general health, a scale was created to indicate whether the mother perceived her child's general health as *very healthy*. These statements, which mothers rated from 1 (*strongly disagree*) to 4 (*strongly agree*), included whether at this time, their child's health was excellent, and whether he or she seemed to resist illness very well, seemed (not) to be less healthy than other children, (did not) usually catch an illness that was going around, and had (not) been seriously ill after coming home from the hospital after birth. Approximately one-fifth of mothers (19.2%) scored 11 or higher on the scale indicating that they tended to give strongly positive responses about their child's health. There were no significant differences between intervention and control groups in the percentage of mothers who reported their child as "very healthy." (**Table 10.1**)

Behavioral Problems as Reported on the Child Behavior Checklist (CBCL) by Mothers in the Intervention and Control Groups at Randomization and Quasi-Experimental Sites

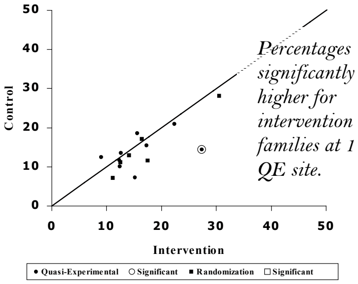
Figure 10.2. Percentage of families in the intervention and control groups at Randomization and Quasi-Experimental Sites who reported behavior problems. Bar graphs show comparisons between intervention and control groups with adjusted odds ratios and 95% confidence intervals. Scatterplots compare the percentages of families in the intervention and control groups at each site.

Percentage of children more aggressive (30-33 months)



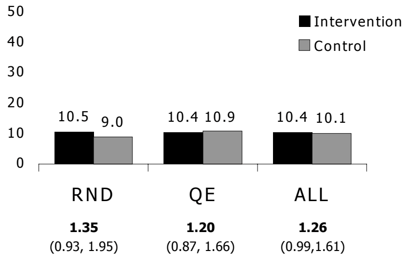
* p <.05

Percentage of children more aggressive (30-33 months)

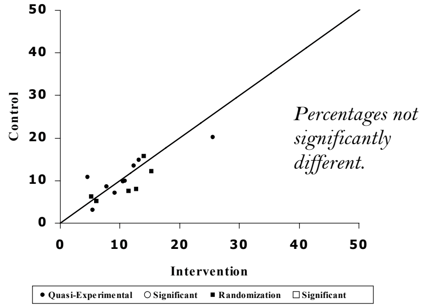


Percentages significantly higher for intervention families at 1 QE site.

Percentage of children more anxious or depressed (30-33 months)

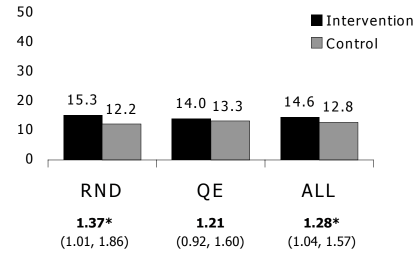


Percentage of children more anxious or depressed (30-33 months)



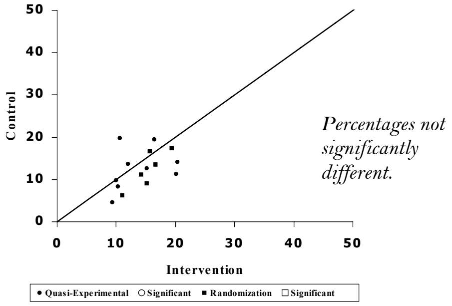
Percentages not significantly different.

Percentage of children with more problems sleeping (30-33 months)



* p <.05

Percentage of children with more problems sleeping (30-33 months)

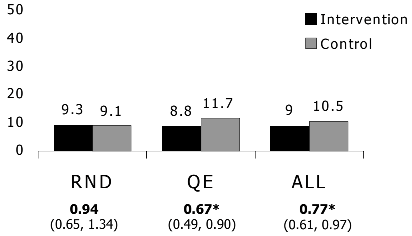


Percentages not significantly different.

10.5.D. Injuries and Use of Acute Health Care

According to mothers' reports at 30-33 months, 14.1% of children had been injured badly enough within the last year to require treatment; 5.9% had been hospitalized in the past year, 37.2% received emergency department treatment, and 9.7% visited an emergency department for injury-related causes.

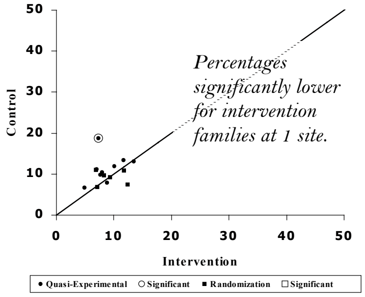
Percentage of children with <u>one or more emergency department visits for injury-related causes</u> in past year (30-33 months)



* p <.05

Except for injury-related emergency department visits, no significant differences were found between intervention and control families in the acute care measures mentioned above. In the combined sample, smaller percentages of intervention children made injury-related emergency department visits than control children (9.0% vs. 10.5%). Significant differences were found at QE sites (8.8% of children at intervention sites vs. 11.7% at control sites made an injury-related visit) but not at RND sites. The scatterplot shows that the difference at QE sites was largely driven by one site. This finding may represent less severe injuries, or more likely, differences in how the practices approached injury care.

Percentage of children with <u>one or more emergency department visits for injury-related causes</u> in past year (30-33 months)



> *Children in Healthy Steps had a 23% lower odds than children in the control group of having made one or more emergency department visits in the past year for injury-related causes. This finding may represent less severe injuries, or more likely, differences in how the practices approached injury care. No differences were found in injuries per se or in emergency department use overall.*

10.5.E. Preventive Health Care and Vaccinations

Despite high baseline levels of well child care utilization and immunization among children overall, intervention children were significantly more likely to attend age-appropriate well child visits and to be immunized on time. (*See Chapter 4 for specific variable definitions.*)

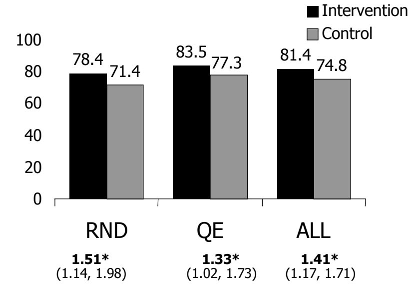
10.5.E.1. Age-Appropriate Well Child Care

Age-appropriate attendance at well child visits was remarkably high across sites. Almost all children (96.6%) received a well child visit before one and a half months of age. Receipt of age-appropriate visits declined somewhat over time and was lowest at the 9-, 15-, and 18-month visits with 65.1%, 64.2%, and 67.0% of children receiving these visits at the appropriate age, respectively. At RND sites, significantly greater percentages of intervention than control children received age-appropriate well child care at all but the 9- and 15-month visits; at QE sites, significantly greater percentages of intervention than control children received each one of these visits (**Table 10.3**). The scatterplots show considerable variability among sites with significant differences at from five to six sites, depending on the age of the visit, but all in favor of the intervention (**Figures 10.3**).

10.5.E.2. Timely Vaccination

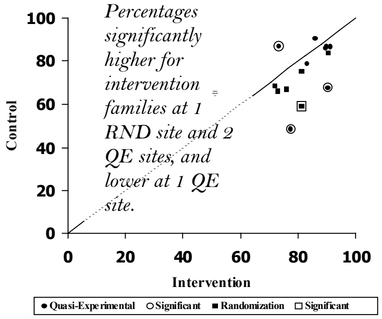
Levels of age-appropriate vaccination were similarly high with 89.9% of children receiving their first diphtheria, tetanus, pertussis (DTP) vaccination on time (**Table 10.3**). As with well child visits, the percentage of children receiving age-appropriate vaccinations tended to decline over time. For the majority of vaccines and doses, significantly greater percentages of intervention than control children received age-appropriate vaccination. **Figure 10.4** shows results for selected age-appropriate vaccinations. The scatterplots show considerable variability among sites with significant differences at about half of the sites, both RND and QE, in favor of the intervention.

Percentage of <u>children who were up -to-date by 24 months of age for 4 DTP, 3 polio, and 1 MMR</u>



* p <.05

Percentage of <u>children who were up-to-date by 24 months of age for 4 DTP, 3 polio, and 1 MMR</u>


Percentages significantly higher for intervention families at 1 RND site and 2 QE sites, and lower at 1 QE site.

Overall 78.7% of children who made a visit after 20 months of age were up-to-date on their DTP, polio, and measles, mumps, rubella (MMR) vaccinations by 24 months of age. This percentage is similar to levels nationally.[10.6] As was found for age-appropriate vaccinations, levels of up-to-date vaccination were significantly higher among intervention children with 81.4% of intervention vs. 74.8% of control children up-to-date. From 49% to 91% of children were up-to-date on their vaccinations at each site with significantly greater percentages for intervention than control children at three sites.

Intervention children had up to 2.4 times the odds of receiving a well child visit on time (depending on the particular visit) and up to 1.6 times the odds of receiving their routine vaccinations on time (depending on the vaccine measure) than control children.

[10.6] Direct comparisons with national data cannot be made because of the provider-based nature of the sample and differences in definitions that may exist between measures.

Table 10.3. Age Appropriate Well Child Visits and Age-Appropriate and Up-to-Date Vaccination of Children at Randomization and Quasi-Experimental Sites

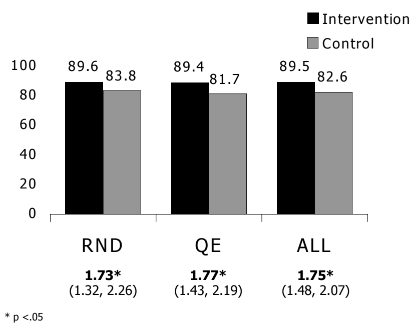
	Randomization Sites						Quasi-Experimental Sites						TOTAL					
	Intervention		Control		Total		Intervention		Control		Total		Intervention		Control		Total	
	N=	1103	N=	1066	N=	2169	N=	1748	N=	1434	N=	3182	N=	2851	N=	2500	N=	5351
	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N
Age-Appropriate Well Child Visits (denominator = all children who made a visit during or after previous age-appropriate well child visit interval)																		
1-month (before 1.5 months)	97.2	1072	95.1	1014	96.2	2086[a]	98.5	1721	95.2	1365	97.0	3086[c]	98.0	2793	95.2	2379	96.6	5172[c]
2-month (1.5 – 3 months)	89.6	988	83.8	893	86.7	1881[c]	89.4	1563	81.7	1171	85.9	2734[c]	89.5	2551	82.6	2064	86.2	4615[c]
4-month (3 – 5 months)	84.3	894	80.6	804	82.6	1698[a]	87.4	1472	79.6	1064	84.0	2536[c]	86.2	2366	80.1	1868	83.4	4234[c]
6-month (5 – 7 months)	83.9	859	77.9	736	81.0	1595[c]	83.8	1369	76.4	975	80.5	2344[c]	83.8	2228	77.0	1711	80.7	3939[c]
9-month (8 – 10 months)	63.6	629	60.8	547	62.3	1176	73.8	1149	58.4	709	67.0	1858[c]	69.84	1778	59.4	1256	65.1	3034[c]
12-month (11 – 14 months)	88.1	832	82.4	694	85.4	1526[c]	86.7	1253	78.6	890	83.2	2143[c]	87.3	2085	80.2	1584	84.1	3669[c]
15-month (14 – 17 months)	60.1	546	56.5	452	58.4	998	74.8	1032	60.0	644	68.3	1676[c]	68.9	1578	58.5	1096	64.2	2674[c]
18-month (17 - 20 months)	74.0	613	60.9	428	68.0	1041[c]	76.8	983	52.4	500	66.4	1483[c]	75.7	1596	56.0	928	67.0	2524[c]
24-month (23 – 28 months)	85.4	661	73.8	474	80.2	1135[c]	82.4	990	77.6	639	80.5	1629[b]	83.6	1651	76.0	1113	80.3	2764[c]
DTP Age-Appropriate Vaccination (denominator = all children who made a visit during or after previous age-appropriate well child visit interval)																		
DTP1 (2 months)	91.6	1010	88.2	940	89.9	1950[b]	92.3	1613	86.8	1245	89.8	2858[c]	92.0	2623	87.4	2185	89.9	4808[c]
DTP2 (4 months)	83.5	885	79.8	796	81.7	1681[a]	86.1	1450	77.8	1040	82.4	2490[c]	85.1	2335	78.7	1836	82.1	4171[c]
DTP3 (6 months)	77.7	796	72.6	686	75.3	1482[b]	77.7	1269	67.7	865	73.3	2134[c]	77.7	2065	69.8	1551	74.1	3616[c]
DTP4 (15-18 months)	74.7	679	68.8	558	72.4	1237[a]	76.6	1057	65.7	706	71.8	1763[c]	75.8	1736	67.5	1264	72.1	3000[c]
OPV/IPV Age-Appropriate Vaccination (denominator = all children who made a visit during or after previous age-appropriate well child visit interval)																		
OPV/IPV1 (2 months)	91.8	1013	88.3	941	90.1	1954[b]	92.1	1610	86.4	1239	89.5	2849[c]	92.0	2623	87.2	2180	89.8	4803[c]
OPV/IPV1 (4 months)	83.9	889	79.7	795	81.9	1684[a]	85.9	1448	77.7	1037	82.3	2485[c]	85.1	2337	78.5	1832	82.1	4169[c]
OPV/IPV1 (6-18 months)	79.6	815	76.3	721	78.0	1536	71.5	1169	69.8	891	70.8	2060	74.6	1984	72.6	1612	73.7	3596
MMR Age-Appropriate Vaccination (denominator = all children who made a visit during or after previous age-appropriate well child visit interval)																		
MMR (12-15 months)	89.0	840	85.8	722	87.5	1562[a]	88.7	1281	84.3	954	86.7	2235[b]	88.8	2121	84.9	1676	87.0	3797[c]
Up-to-Date Vaccination at 24 Months (denominator = all children who made a visit after 20 months of age)																		
DTP 1-4, OPV/IPV 1-3, MMR 1	78.4	538	71.4	369	75.4	907[b]	83.5	862	77.3	540	81.0	1402 [b]	81.4	1400	74.8	909	78.7	2309[c]

[a] p#0.05; [b] p#0.01; [c]p#0.001

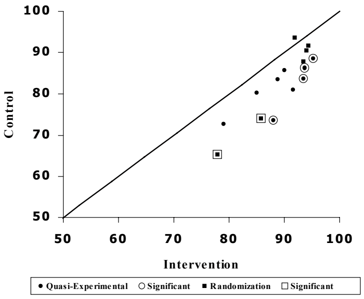
Age-Appropriate Well Child Visits by Children in the Intervention and Control Groups at Randomization and Quasi-Experimental Sites

Figure 10.3. Percentage of children in the intervention and control groups at Randomization and Quasi-Experimental Sites who made 2-month and 6-month age-appropriate well child visits. Bar graphs show comparisons between intervention and control groups with adjusted odds ratios and 95% confidence intervals. Scatterplots compare the percentages of families in the intervention and control groups at each site.

Percentage of <u>children who made 2-month age-appropriate well child visit</u>

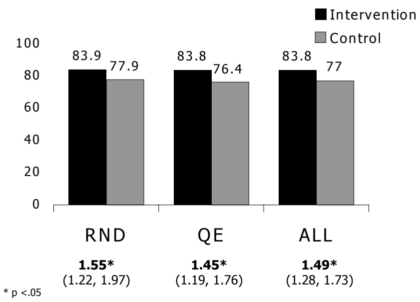


Percentage of <u>children who made 2-month age-appropriate well child visit</u>

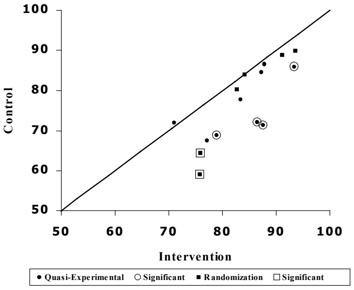


Percentages significantly higher for intervention families at 4 QE sites and 2 RND sites.

Percentage of <u>children who made 6-month age-appropriate well child visit</u>



Percentage of <u>children who made 6-month age-appropriate well child visit</u>

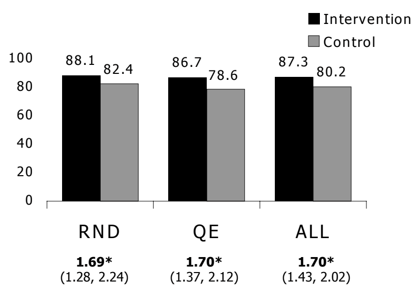


Percentages significantly higher for intervention families at 4 QE sites and 2 RND sites.

Age-Appropriate Well Child Visits by Children in the Intervention and Control Groups at Randomization and Quasi-Experimental Sites

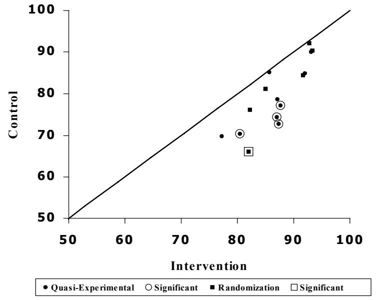
Figure 10.3. (Continued) Percentage of children in the intervention and control groups at Randomization and Quasi-Experimental Sites who made 12-month and 24-month age-appropriate well child visits. Bar graphs show comparisons between intervention and control groups with adjusted odds ratios and 95% confidence intervals. Scatterplots compare the percentages of families in the intervention and control groups at each site.

Percentage of <u>children who made 12-month age-appropriate well child visit</u>



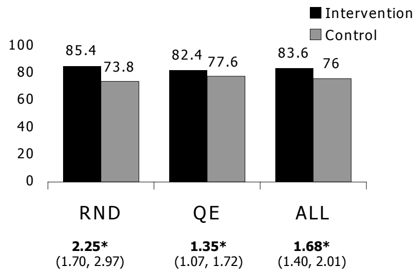
* p <.05

Percentage of <u>children who made 12-month age-appropriate well child visit</u>



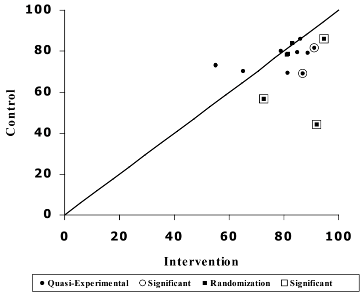
Percentages significantly higher for intervention families at 4 QE sites and 1 RND site.

Percentage of <u>children who made 24-month age-appropriate well child visit</u>



* p <.05

Percentage of <u>children who made 24-month age-appropriate well child visit</u>

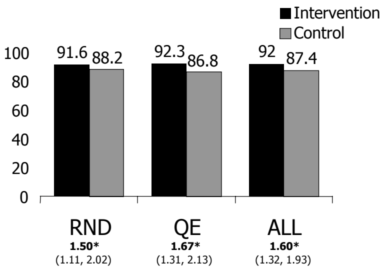


Percentages significantly higher for intervention families at 2 QE sites and 3 RND sites.

Age-Appropriate Vaccinations of Children in the Intervention and Control Groups at Randomization and Quasi-Experimental Sites

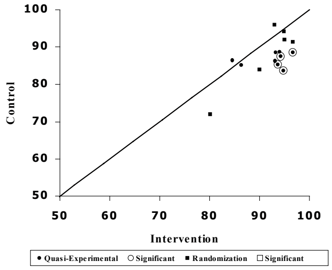
Figure 10.4. Percentage of children in the intervention and control groups at Randomization and Quasi-Experimental Sites who received selected age-appropriate vaccinations. Bar graphs show comparisons between intervention and control groups with adjusted odds ratios and 95% confidence intervals. Scatterplots compare the percentages of families in the intervention and control groups at each site.

Percentage of children who received age-appropriate vaccinations (DTP1)



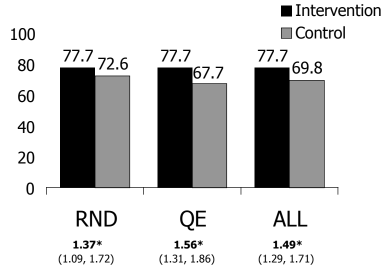
* p <.05

Percentage of children who received age-appropriate vaccinations (DTP1)



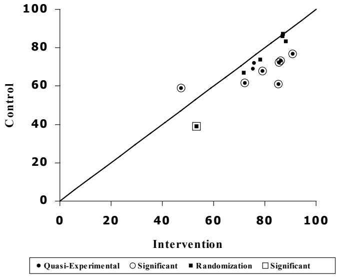
Percentages significantly higher for intervention families at 4 QE sites.

Percentage of children who received age-appropriate vaccinations (DTP3)



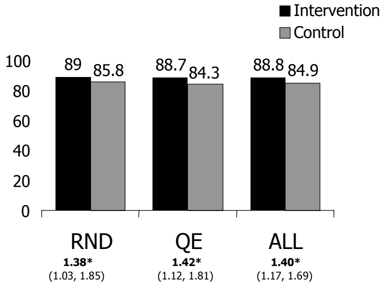
* p <.05

Percentage of children who received age-appropriate vaccinations (DTP3)



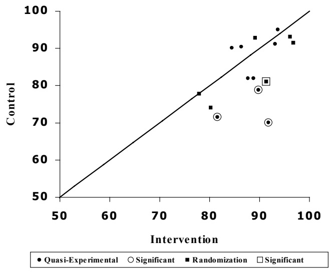
Percentages significantly higher for intervention families at 6 QE sites and 1 RND site, and lower at 1 QE site.

Percentage of children who received age-appropriate vaccinations (MMR1)



* p <.05

Percentage of children who received age-appropriate vaccinations (MMR1)

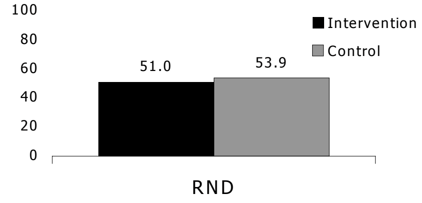


Percentages significantly higher for intervention families at 3 QE sites and 1 RND site.

10.5.E.2. Missed Appointments

Missed appointments comprise another measure of utilization. These are occasions on which a child is expected to make a visit but neither shows up for the appointment nor cancels it. Information on missed visits comes from the child's medical record. At RND sites, although more than half of children missed one or more scheduled appointments with their child's clinician, no significant difference was noted between intervention and control groups. Data at QE sites could not be analyzed because of variation in documentation among intervention and control practices.

Percentage of children who did not keep scheduled appointments as documented in their medical record (RND sites only)



0.85
(0.70, 1.04)

10.5.F. Retention in Practice

As might be expected, for a variety of reasons including insurance changes and family moves, a substantial number of families stopped using the practice for their child's care during the three year program and stopped being eligible for services from the practice at that time. As an outcome and as a denominator in the evaluation of other outcomes, retention in practice is an important variable.

10.5.F.1. The Practice as Medical Home

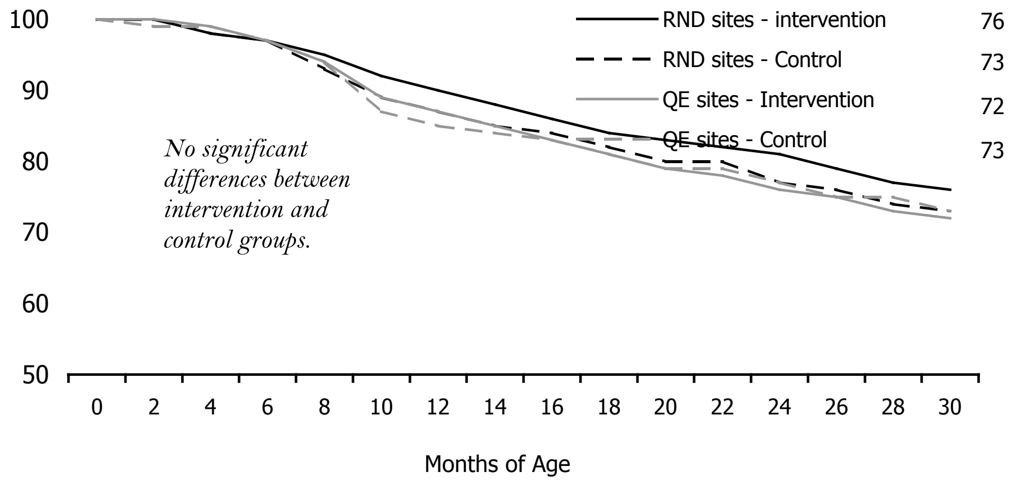
The American Academy of Pediatrics has supported the concept of the *medical home* as a place at which children receive primary care by physicians with whom families develop partnerships of mutual responsibility and trust (Medical Home Initiatives for Children with Special Needs Project Advisory Committee, 2002). Care provided through medical homes is expected to be accessible, family centered, continuous, comprehensive, coordinated, compassionate, and culturally effective. In the HS evaluation, identification of a medical home was operationalized as the regular place where the child obtained health care.

At the 30-33 month interview, mothers were asked if their family was still using the practice and if not, the date of withdrawal. Of the 68% of families who responded to the 30-33 month interview, 79% reported still using the practice, 19% reported leaving the practice and provided a date of withdrawal, and 2% reported leaving the practice but provided no date of withdrawal. Based on the interview data alone, the evaluation is missing complete time in practice (through 32 months) information on three types of families: (a) those who did not respond to the 30-33 month; (b) families who reported having left the practice at time of interview but provided no date of withdrawal; and (c) families who reported remaining in the practice at time of interview but time of interview occurred prior to 32 months. The evaluation, however, abstracted information on all office visits on these families through 32 months. Thus, detailed information is available on the nature, timing, and frequency of office visits, which provide highly useful information, including a lower bound on time in practice.

To address the issue of missing time in practice information, we used a multi-stage imputation approach. First, an interview date was imputed for respondents with missing interview data based on the distribution of interview times for respondents at the same practice. Next, for subjects with missing responses to the "still in practice" question, we imputed the response based on a logistic regression prediction model, which incorporated information on the known or imputed interview data, number of visits, time since last visit at interview, and additional demographic factors. After these imputations, each family then either had complete time in practice information through 32 months or did not. We then categorized those families who were still missing this information into two groups. For the first group, time in practice was between the time of last office visit and the interview. For the second, time in practice was greater than the interview time. Based on these bounds and a statistical intensity model for the office visit process, which included demographic information, time in practice was imputed as the 95th percentile of the distribution of time of next visit if there was to have been one.

At 30 months, nearly three fourths of families identified the HS

Percentage of Mothers who Identified the Healthy Steps Practice as Their Child's Site of Care by Age of Child (Months)



No significant differences between intervention and control groups.

practice as their child's site of care, with no discernible difference between intervention and control families. The lack of difference may be attributable, in part, to overall high level of practice retention among all families, despite changes in insurance, family moves, and other factors which were known to contribute to disenrollment from the practice during the child's first three years of life. Moreover, the overall high level of care provided at both control and intervention families may have contributed to comparable percentages continuing to identify the practice as their child's medical home.

Mothers responding to the 30-33 month interview gave a variety of reasons for leaving the practice, whether involuntary or voluntary. Involuntary reasons, including insurance problems and family moves, accounted for approximately two-thirds of the reasons given and voluntary reasons such as dissatisfaction, expense, and convenience for the other third.

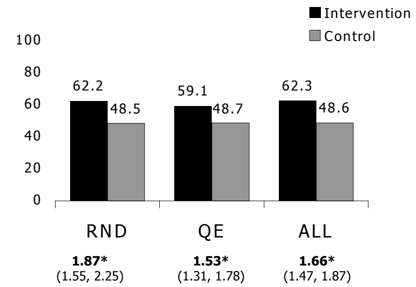
Table 10.4. Reasons for Leaving the Practice Reported by Mothers in the Intervention and Control Groups

	Intervention	**Control**	**All**
Involuntary	**N =243 (65.7%)** %	**N = 205 (60.7%)** %	**N =448 (63.3%)** %
Family moved out of state/moved	54.7	53.2	54.0
Insurance problems (lost insurance, practice did not accept new insurance, insurance changed, insurance wouldn't cover visits, practice did not accept Medicaid)	44.0	44.4	44.3
Other miscellaneous involuntary	1.3	2.4	1.7
Voluntary	**N =127 (34.3%)** %	**N = 133 (39.3%)** %	**N = 260 (36.7%)** %
Personality conflicts	15.0	25.6	20.4
Office was inconvenient distance	25.2	27.8	26.5
Too many changes in doctors and/or problems with HMO	10.2	9.0	9.6
Left because doctor left	16.5	3.0	9.6
Unhappy with care	7.9	8.3	8.1
Too expensive	3.9	1.5	2.7
Didn't like that office/treatment	2.4	2.3	2.3
Hard to get appointments	2.4	2.3	2.3
Other miscellaneous voluntary	16.5	20.2	2.3

10.5.F.2. Utilization of the Practice

Whether families used the HS practice differently, captured as date of the last visit, also was considered. This measure was examined regardless of whether the family continued to identify the practice as their medical home. Utilization was assessed by comparing the percentage of children who make an office visit after 20 months of age. These are the children for whom being up-to-date on their vaccinations by 24 months of age was measured. Significantly greater percentages of

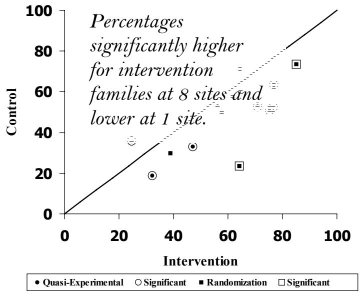
Percentage of children who made an office visit after 20 months of age



* p <.05

intervention than control children made one or more visits to the practice after 20 months of age.

The scatterplot for this variable shows eight sites with significantly greater percentages of intervention than control children visiting the practice through 20 months of age and one site with smaller percentages.


Percentage of children who made an office visit after 20 months of age

These visits were determined based on actual medical records data rather than parental recall. The visit results combined with reports of intervention families' enhanced satisfaction, increased ties to practice, and the views of practice as source of information suggest that even in the absence of increased perceptions of medical home, that, in actuality, practices served families in different ways among those who participated in HS.

The odds of intervention children having utilized the practice through 20 months of age were 1.8 times those of the control children.

Taken in context with the numerous findings supporting enhanced quality of care for families who participated in HS, the greater percentage of families having recent visits supports the notion that HS promoted *continuity* of care; Berwick (Berwick, 2002), in fact, suggests that "care based on continuous healing relationships" is fundamental for enhancing the effectiveness of care. It is likely that this increased continuity contributed to previously discussed treatment findings of increased receipt of appropriate well child care, increased timeliness of vaccinations, increased receipt of developmental assessments, and increased receipt of HS core services.

HEALTHY STEPS℠

11. Subgroup Effects

Subgroup Effects

The Healthy Steps program differs from many previous intervention programs in early childhood in that it was conceived as a "universal" program, rather than one targeted to specific families. This strategy came from the observations that all mothers and fathers need and seek support for raising their children.

In the national evaluation, in addition to determining the effects of Healthy Steps on receipt of services and program effects overall, we examined how the Healthy Steps program affected sub-groups of families. These subgroups included families with low, middle, and high incomes; families with teen, young adult, and older mothers; and families with first-time vs. more experienced mothers.

The evidence suggests that Healthy Steps supported families across the entire range of risk and need. Families in the intervention group, regardless of income or the age of the child's mother received the Healthy Steps services in far greater percentages than did families in the control groups. In other words, HS achieved its goal of universality.

Program services (such as home visits) tended to get to the higher income families and older mothers, who are not usually involved in supportive services and brought them from very low levels of service receipt to levels that were comparable to the lower income families and teenage mothers. Consequently, the higher the income and the older the mother, the greater the effect of Healthy Steps.

Contrary to expectations, few differences were found between first-time and second or greater-time mothers in receipt of services or parent and child outcomes.

11. SUB-GROUP EFFECTS

11.1. Introduction

Healthy Steps (HS) differs from many previous intervention programs in early childhood in that it was conceived as a "universal" program, rather than one targeted to specific families. This strategy came from the observations that all mothers and fathers in this current era need and seek support for raising their children.

Researchers often look for subgroup variation in evaluating universal programs, like HS, because intervention effects may be masked when effects are examined only in the evaluation sample as a whole.

Understanding how program effects vary among groups also can be important in policy and program development. A fundamental tension in early childhood interventions is whether or not program services should be available to everyone or be targeted to those most needy. Universal interventions are very expensive, and if publicly funded, may be politically open to attack due to limited public buy-in. An advantage of universal programs is that if the services appear helpful to less needy parents, they may decide to purchase them. More targeted programs can be stigmatizing, especially if they target families with little political clout or those considered to be at the margins of society.

In the national evaluation, in addition to determining the effects of HS on receipt of services and program effects overall, we examined how the HS program affected sub-groups of families: (1) low, middle, and high income tertiles; (2) teen, young adult, and older mothers; and (3) first-time and more experienced mothers.

These comparisons address questions 3, 4, 5, and 6 of the evaluation, but for subgroups of the sample.

> *3. To what degree did children and families at Healthy Steps program sites receive Healthy Steps services?*
>
> *4. To what extent did the Healthy Steps program affect parents' knowledge, beliefs and practices regarding their understanding of early child development and parenting practices?*
>
> *5. To what degree did the Healthy Steps program affect parents' utilization of health care services, adoption of health and safety*

promotion practices, and satisfaction with pediatric care for their young children?

6. To what degree did the Healthy Steps program affect children's health and development?

Families in the intervention group, regardless of income or the age of the baby's mother, received the HS services in far greater percentages than did families in the control groups. In other words, HS achieved its goal of universality. Program services (such as home visits) tended to get to the higher income families and older mothers, who are not usually involved in supportive services and brought them from very low levels of service receipt up to levels that were comparable to the lower income families and teenage mothers. Consequently, the higher the income and the older the mother, the greater the effect of HS. Contrary to expectations, few differences were found between first-time and second or greater-time mothers in receipt of services or parent and child outcomes.

For the three groups described above, we examined utilization of HS services, satisfaction with care, and other potential benefits of the HS program across sub-groups. We included the same co-variates in the analyses of sub-group effects as were included in the overall analyses with the following exceptions: Income was excluded from the income subgroup analysis; maternal age from the maternal age sub-group analysis; and birth order from the comparisons of first-time and second-time mothers

11.2. Income Subgroups

11.2.A. Overview

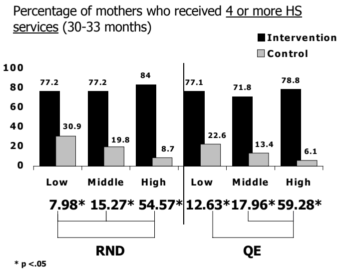
Low-income disadvantaged families are frequently the target of public supported programs (e.g., Medicaid, Early Head Start) because they are at risk for poor outcomes and are less able than other families to pay on their own for the kinds of services these programs offer; they are less likely to receive and to benefit from such services.

In the analyses comparing the effect of HS on receipt of services across income, tertiles (low, middle, high) were used to represent income groups. The tertiles reflect a natural split in the distribution of income for respondents. The tertiles are also correlated with variables such as the percentage of families with incomes below the poverty level (which includes family size as well as income) and the receipt of publicly-funded health insurance. Moreover, even though sites with highly skewed

Interpreting Odds Ratios

Regression results for dichotomous outcomes, adjusting for baseline family characteristics and site, are reported in terms of odds ratios. An odds ratio of *greater* than 1 indicates that subjects in the intervention group were *more* likely to report a given characteristic than were subjects in the control group; an odds ratio of *less* than 1 indicates that subjects in the intervention group were *less* likely to report a given characteristic than were subjects in the control group. An odds ratio of 1 indicates that there was no difference between intervention and control groups. Ninety-five percent confidence intervals are estimated; when this interval does not include 1, it indicates a statistically significant difference (at the 0.5 level) between the intervention and control group.

Interpreting Statistical Significance in the Figures



Lines between sub-groups signify statistically significant differences <u>in effects between sub-groups</u>

income distributions tend to be overly represented in the low or high income tertile, the tertiles provide a middle income group with adequate numbers represented at all sites. Thus, there is one income group for which income was not strongly confounded by site. Finally, as shown in **Table 11.1** comparing the percentage distribution of income among families with children under six years of age and families comprising the 2-4 month and 30-33 month samples, HS families are fairly representative of US families with respect to income.

Table 11.1. Number, Percentage,[a] and Cumulative Percentage Distribution of Income among Families with One or More Related Children under 6 Years Old[b] and Healthy Steps Families[c]

	U.S. Families with Children under 6 Years (N = 9,183,000) %	Healthy Steps Families National Evaluation (N = 4,896) %	Healthy Steps Families National Evaluation (N = 3737)[d] %
Tertile 1: Low Income			
Less than 4,999	5.0	5.9	4.9
5,000-7,499	3.3	3.7	3.0
7,500-9,999	3.2	6.6	5.9
10,000-14,999	6.4	7.7	7.3
15,000-19,999	7.0	9.1	8.2
Total	25.0	33.0	29.2
Tertile 2: Middle Income			
20,000-29,999	13.5	13.8	13.3
30,000-39,000	10.7	10.8	11.3
40,000-49,999	11.5	10.1	11.2
Total	35.6	34.8	35.8
Tertile 3: High Income			
50,000-74,999	20.9	17.3	18.9
75,000-99,999	9.0	8.0	8.7
100,000 or more	9.5	6.9	7.3
Total	39.4	32.2	34.9

[a] Due to rounding, percentages may not add to total.
[b] Source: Annual Demographic Survey, March Supplement, Bureau of Labor Statistics and Bureau of the Census.
[c] 2-4 Month Parent Interview Sample
[d] 30-33 Months Sample; 228 families did not report income at baseline.

11.2.B. Demographic Characteristics

When families in the three income groups are compared demographically, differences are apparent in home ownership, education, marital status, race and ethnicity (**Table 11.2**). The higher the income group, the more likely mothers were to have graduated from college and to be married, the more likely fathers were to be employed, and the more likely the family was to own their own home. The higher the income group, the smaller the percentage of children whose birth weight was low and whose mothers were black/African American or Hispanic. Differences in birth order and mother's employment were less noticeable.

Table 11.2. Percentage Distribution of Mother's Demographic Characteristics, Insurance Status, and Baby's Birth Weight for Families in Low, Middle, and High Income Subgroups at Randomization and Quasi-Experimental sites

	Randomization Sites			**Quasi-Experimental Sites**			**All Sites**
	HOUSEHOLD INCOME			HOUSEHOLD INCOME			
	Low (N = 545) %	Middle (N = 678) %	High (N = 772) %	Low (N =481) %	Middle (N =580) %	High (N = 453) %	TOTAL (N= 3509) %
Mother's Age							
19 or less years	22.6	8.4	1.8	28.3	10.0	2.9	11.4
30 or more years	18.7	36.0	63.9	15.2	31.9	63.4	39.4
Mother's Education							
11 years or less	40.6	7.4	1.6	26.8	10.2	2.2	13.7
College Graduate	4.2	22.8	58.5	4.4	25.2	63.9	31.5
Mother's Race							
Black/African American	34.3	25.1	13.1	48.2	14.5	4.6	22.7
Mother's Ethnic Origin							
Hispanic	33.9	15.0	10.1	17.1	21.7	9.3	17.5
Mother's Employment							
Employed 2-4 months postpartum	24.8	40.1	35.0	28.3	43.1	45.5	36.2
Mother's Marital Status							
Married/living with baby's father	80.2	87.3	96.2	78.2	89.5	97.6	88.6
Father's Employment Status							
Employed at child's birth	75.8	91.0	97.2	68.2	90.0	93.8	87.1
Economic Status							
Family owned their home	28.4	51.6	76.4	32.6	59.1	85.4	56.5
Live Birth Order							
First	44.2	47.1	50.6	53.4	46.8	48.8	48.5
Baby's Insurance							
Medicaid	77.2	30.8	9.7	76.6	28.1	7.1	36.6
Baby's Birth Weight							
Less than 2500 grams	6.6	5.8	5.2	10.0	6.2	5.1	6.3

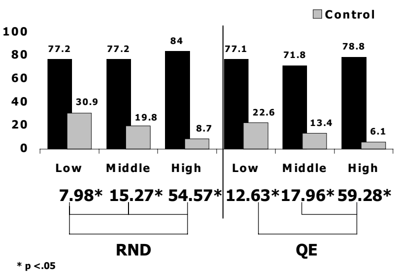
11.2.C. Receipt of Healthy Steps Services

Intervention families were significantly more likely to have received a variety of HS program services than control families within each income subgroup. Receipt of services tended to be similar across intervention families in all subgroups. However, receipt of services by control families varied across sub-groups; it generally declined as income increased. Consequently, differences in effects frequently were found between high and middle income groups, middle and low income groups, and/or high and low income groups, with the effects greater for the higher income groups.

11.2.C.1. Receipt of Four or More Healthy Steps Services

Regardless of income group, intervention families at RND and QE sites were significantly more likely to report receiving four or more HS services than were control families. There were differences among income groups in the effects of HS on receipt of services based on a t-test comparing the coefficients from the logistic regression. At RND sites, differences in effects were found between high and middle income groups, middle and low income groups, and high and low income groups, with the effects greater for the higher income groups. At QE sites, the effect was greater for high income than for both middle and low income families. These differences were due primarily to a greater baseline receipt of services among low income control families. Receipt of services was generally the same level for all three income groups among QE intervention families but higher for higher income intervention families at RND sites.

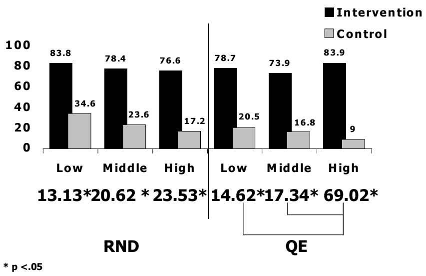
Percentage of mothers who received 4 or more HS services (30-33 months)



11.2.C.2. Home Visits

The analysis of the effect of HS on receipt of any home visit showed that significantly greater percentages of intervention than control families received a home visit in each income group. Within intervention families, all income groups, whether low, middle, or high income, received similar levels of home visits. At RND sites, no significant differences were found in the effect of HS on home visits across income groups. At QE sites, the effect was significantly greater for high income than for either low or middle income families. These differential effects for the receipt of a home visit among income groups occurred because the percentage of control families receiving a home visit declined as income increased.

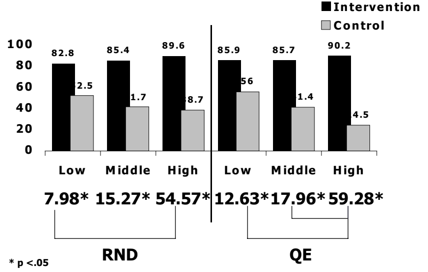
Percentage of mothers who reported that someone had made a home visit since child was 6 months of age (30-33 months)



11.2.C.3. Age-Appropriate Topics

As with the other services evaluated, intervention families regardless of income were significantly more likely to report having discussed six or more topics with someone in the practice. At RND and QE sites, effects were greater for high income families than for low income ones. At QE sites effects also were greater for high income than for middle income families. These differences in reports of having discussed 6 or more topics were due in part to lower levels among high income control families as well as high levels of receipt reported among high income intervention families.

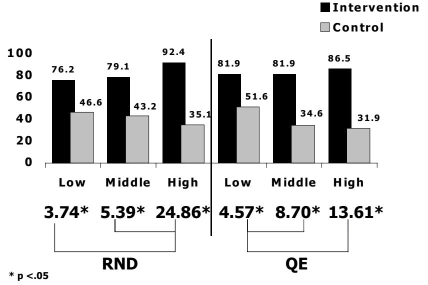
Percentage of mothers who reported that someone in practice talked with them or gave them information on <u>more than 6 topics</u> (30-33 months)



11.2.C.4. Developmental Assessments

Similar to the pattern seen for other program components, greater percentages of intervention children within each subgroup received developmental assessments than did control children. At RND sites, the odds were greater that intervention children in high income households had received a developmental assessment than those for middle or low income households. At QE sites, both the high and middle income groups had a greater odds of receiving a developmental assessment than did the low income group. Again these differences occurred because baseline levels decreased as income rose. The higher baseline levels of children receiving developmental assessments among low income children may result from their provision and coverage as part of EPSDT requirements under Medicaid.

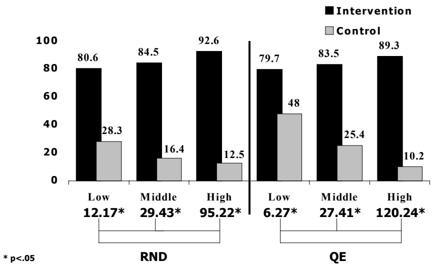
Percentage of children who received a developmental assessment (30-33 months)



11.2.C.5. Books to Read

Within all subgroups significantly higher percentages of intervention families received books to read to their children than did control families. The odds that a family received books from the practice were significantly greater for high income than low and middle income households and were greater for middle income households than for low income ones. Services received by control families is a measure of baseline services--- services that families would have received had they not participated in the HS program. Approximately 10% to 12% of families in high income control subgroups reported receiving books from the practice, compared with 29% to 48% of families in the low income control subgroups. This lower level of services among higher income families explains part of the difference in effects across sub-groups. High income families, nonetheless, reported greater receipt of

Percentage of families that <u>received books from the practice</u> to read to the child (30-33 months)

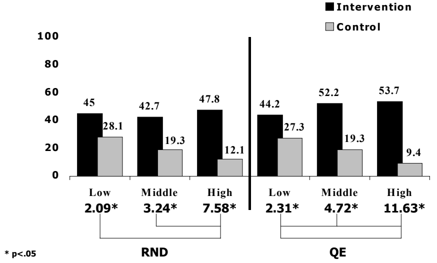


books than lower income families. Again, this finding may be due to their higher use of well child care.

11.2.C.6. Information on Community Resources

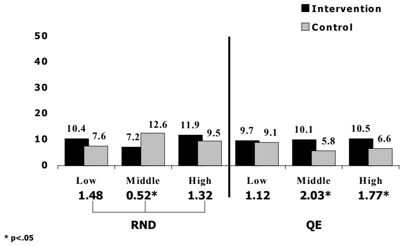
While percentages of intervention mothers who received information on community resources were smaller for each sub-group than for the other services, the pattern of significant differences within each subgroup persisted. Effects were greater for higher than lower income or middle income groups at both RND and QE sites; at QE sites effects for the middle income group were significantly greater than for the low income group, as well.

Percentage of mothers who received information about community resources from someone at the practice (30-33 months)



> *Regardless of income, intervention families were significantly more likely to have received a variety of Healthy Steps program services over time than control families and the percentages receiving services tended to be similar across intervention families in all subgroups. However, receipt of services by control families generally declined as income increased. Consequently, the higher the income group, the greater the effect.*

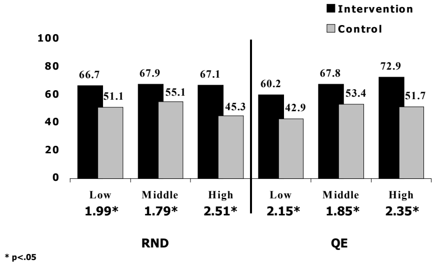
Percentage of children diagnosed or referred for further testing related to their developmental progress with walking, talking, hearing, or using their hands (30-33 months)



11.2.C.7. Child Diagnosed or Referred for Developmental Problem

Intervention children tended to be more likely than control children to have been diagnosed or referred for testing related to a developmental problem---although these differences were significant for middle and high income families at QE sites only. At RND sites, intervention children in the middle income group were significantly less likely than control families to have been diagnosed or referred.

Percentage reporting someone in practice went out of way to help (30-33 Months)

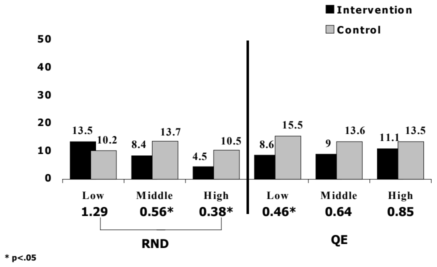


11.2.D. The Effect of Healthy Steps on Parent and Child Outcomes

11.2.D.1. Satisfaction with Their Child's Health Care

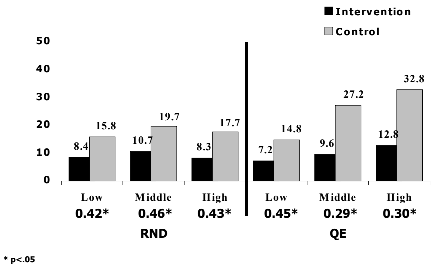
Whether in the high, middle, or low income subgroups, intervention families were more likely than control families to report that someone at their child's practice had gone out of the way for them. No significant differences were found in effects between income sub-groups. The effect of HS on dissatisfaction was somewhat different for each variable. For

Percentage who disagreed that doctors or nurses "listened" to parents (30-33 months)

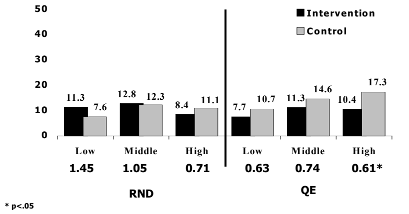


dissatisfaction with "support"[11.1] from practice clinicians, intervention mothers in each subgroup were less likely than control mothers to be dissatisfied. For dissatisfaction with "listening,"[11.2] high income intervention mothers at the RND sites had a lower odds of being dissatisfied than low income intervention mothers. At QE sites, only intervention mothers in the low income group were less likely to be dissatisfied with listening and there were no differences across subgroups. For dissatisfaction with "respect for the mother's knowledge,"[11.3] the only significant difference noted was for high income mothers at the QE sites and there were no differences in effects across subgroups.

Percentage who disagreed that doctors and nurses provided "support" to parents (30-33 months)



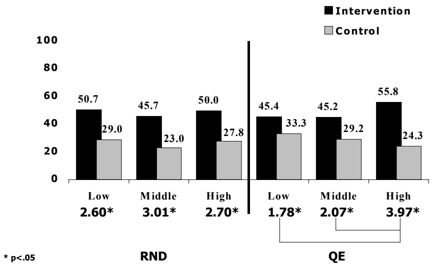
Percentage who disagreed that doctors or nurses "respected parent's knowledge" (30-33 months)



11.2.D.2. Mother's Willingness to Pay for Services

Mothers' willingness to pay for the HS services was also a measure of their satisfaction with them. Intervention mothers, having personally experienced the program, were significantly more likely to say they would pay $100 or more one time for the package of services offered through their child's doctor's office. The percentages of intervention mothers willing to pay $100 or more for the services were remarkably similar across income groups with the highest percentages noted for high income intervention families at QE sites. Between 45.2% and 55.8% of intervention families would be willing to pay in comparison to 23.9% to 33.3% of control families. At QE sites, higher income mothers had a greater odds of being willing to pay $100 or more than either middle income or low income mothers.

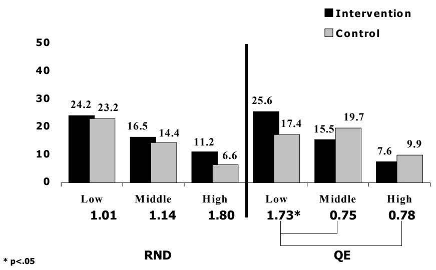
Percentage of willing to pay more than $100 for Healthy Steps Services (30-33 months)



11.2.D.3. Maternal Depression

The percentage of mothers reporting depressive symptoms on the 14-item Epidemiologic Studies of Depression (CES-D) scale decreased as income increased. Low income intervention

Percentage of mothers reporting depressive symptoms on CES-D depression scale (30-33 months)



[11.1] Disagree that MDs and NPs provided "support" to mother: suggested things that I could do for child that fit into my family's daily life; helped me get all the information I need about child's growth and development; helped me get services for child from other agencies about programs; gave me advice on how to solve problems at home with child; gave me new ideas about things to do with child; pointed out what I did well as a parent.

[11.2] Disagree that MDs and NPs "listened" to mother: always had time to answer my questions about child; seemed to have other things on their minds when I talked with them; acted like I couldn't understand information about child's growth and development; seemed to think carefully about my questions about child's development; were always in a rush when they saw child; encouraged me to ask questions about child's growth and development; did not really give me a chance to ask questions about child.

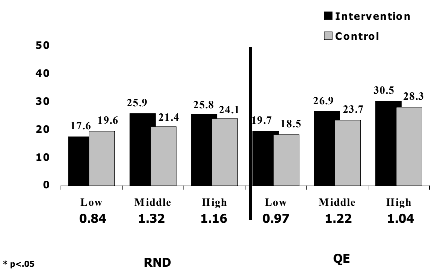
[11.3] Disagree that MDs and NPs respected mother's knowledge, knew what was going on with the child, and made them feel like they were doing a good job: understood that I know child better than anyone else does; made me feel like I was doing a good job caring for child; seemed to know what was going on with child.

mothers at QE sites were more likely than control mothers to report depressive symptoms. At these sites, the odds of an intervention mother reporting depressive symptoms in the low income group were significantly higher than in the middle or high income group. At RND sites, we found no significant intervention-control differences or differences between income subgroups.

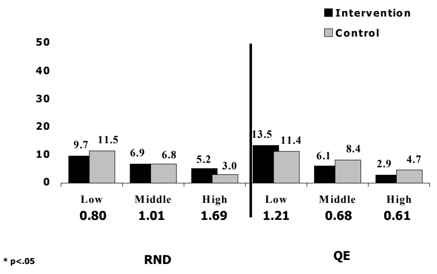
11.2.D.4. Parent Nurturing

At 30-33 months, mothers rated a series of statements from 1 (*always/almost always*) to 4 (*never/almost never*) from the Parent Behavior Checklist about how parents raise young children. The series of statements included 18 of 20 items in the nurturing subscale. This subscale measures specific parent behaviors that promote a child's psychological growth (e.g., "I read to my child at bedtime"). From this modified subscale, two dichotomous variables were created. The first variable measured <u>more</u> use of nurturing behaviors or higher scores on the subscale (mother scored 63 or more of a possible 72). Mothers in this group reported that they practiced these behaviors *frequently* to *always* in raising their child. The second variable measured <u>less</u> use of these nurturing behaviors or lower scores on the subscale (mother scored 44 or less on the 18 to 72 scale). Mothers in this less nurturing category reported that they *sometimes* to *never* used these behaviors. No significant differences were found between intervention and control mothers in the percentage of mothers who were either more or less nurturing. No significant differences in effects were found between income subgroups.

Percentage of mothers <u>more nurturing</u> (30-33 months)



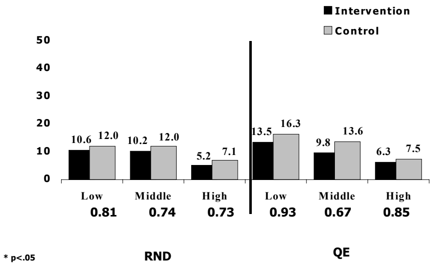
Percentage of mothers l<u>ess nurturing</u> (30-33 months)



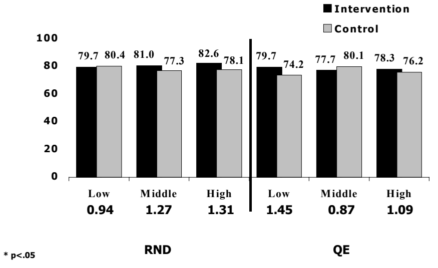
11.2.D.5. Discipline Practices

Mothers' responses were compared on two discipline measures drawn from the Parent Response to Child Misbehavior questionnaire. The first scale included harsh responses to misbehavior (threatening, yelling in anger, slapping on hand, and spanking with hand). A dichotomous variable created from the harsh discipline scale compared higher levels of reported use of harsh discipline strategies (mothers who scored 6 or higher on the 0 to 12 scale) among intervention and control groups. This group identified mothers who tended to report using some form of harsh discipline during any given week. Non-physical strategies (negotiating, explaining the rules or consequences, showing child a more acceptable activity, or giving time-out, ignoring misbehavior, or withdrawing privileges) comprised the second scale. A dichotomous variable was created to indicate the percentage of mothers who tended

Percentage of mothers using <u>harsh discipline</u> (30-33 months)



Percentage of mothers using <u>more reasoning</u> than most (30-33 months)

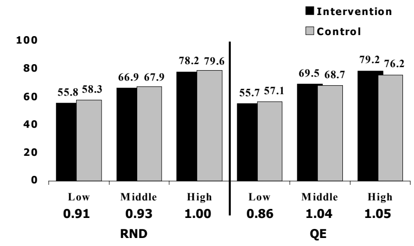


to report using non-physical or "reasoning" strategies (mothers who scored 9 or higher on the 0 to 18 scale). Whether comparing reports of the use of harsh discipline or reasoning strategies, no significant differences were found between intervention and control groups or in effects between income subgroups.

11.2.D.6. Reading

With increasing levels of income, greater percentages of mothers read to their children every day, regardless of whether they were in the intervention or control group. No intervention-control differences were found within subgroups and no significant differences in effects were found across groups.

Percentage of mothers who read books to their child every day (30-33 months)

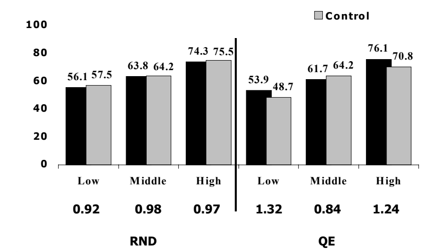


* p<.05

11.2.D.7. Use of Routines

Results for use of routines were similar to those for reading books. As income level increased, greater percentages of mothers tended to follow three routines for their child (bedtime naptime, and dinnertime usually the same every day). However, no differences were found between intervention and control groups and no differences were found in effects across income subgroups.

Percentage of mothers who followed at least 3 routines. (30-33 months)

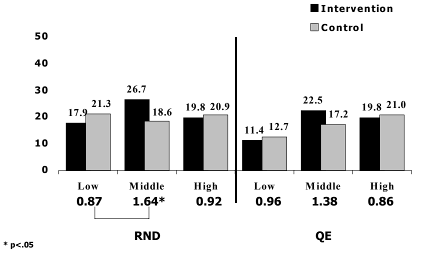


* p<.05

11.2.D.8. Father's Participation in Well Child Visits

Anecdotal observations at some HS sites suggested that intervention fathers were more likely to bring their child to well child visits. Despite these anecdotes, we found greater percentages of fathers attending well child visits among middle-income families only. These differences were significant at RND sites but not at QE sites. At RND sites fathers in the middle income group appear to be more likely than those in the lower income group to have participated in well child visits. There were no significant intervention-control differences for low-income and high income families nor other differences in effects across income subgroups.

Percentage of families where mothers and fathers equally or fathers usually took child to well child visits (30-33 months)

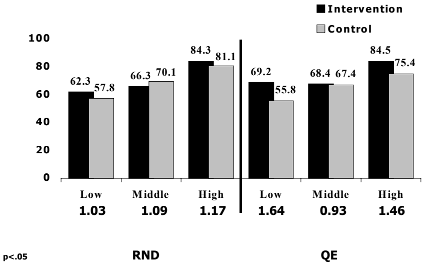


* p<.05

11.2.D.9. Parent Health Behaviors

The percentages of mothers currently smoking who smoked outside, rather than in the same room as their child or an adjacent room, tended to increase with income. However, the comparisons revealed no significant differences between intervention and control groups or between subgroups.

Percentage of mothers currently smoking who smoke outside (30-33 months)



* p<.05

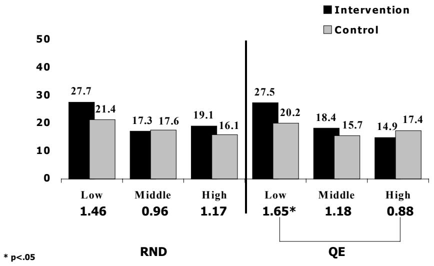
11.2.D.10. Child's Health Status and Health Care Utilization

Mothers' perceptions of their child's health were compared. From their ratings of several statements describing a child's general health, a scale was created to indicate whether the mother perceived the child's general health as *very healthy* as described in Chapter 10. Mothers scoring 11 or higher on the 5-20 point scale tended to give positive responses about their child's health. Intervention mothers in the low income groups tended to be more positive about their child's health than control mothers. However, this difference was significant at QE sites only. In addition, at QE sites, low income intervention mothers had a significantly higher odds of perceiving their child as *very healthy* than did high income intervention mothers. The trend at RND sites was similar, although not significant.

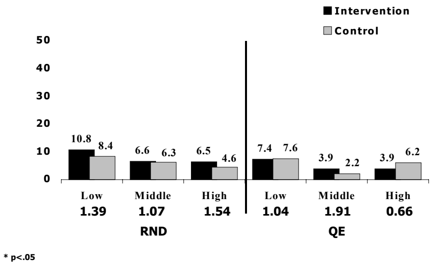
Effects related to injuries, overnight hospitalizations, and emergency department visits also were compared. These comparisons showed no significant differences between intervention and control groups, or across income subgroups, for injuries or hospitalizations. The percentages of children visiting emergency departments in the past year fell with increasing levels of income. No intervention-control differences were found within any subgroup. Significant differences in effects across income categories were found at the QE sites, where intervention children in the low income subgroup had a higher odds of emergency department use than those in the high and middle income subgroups. These differences were not seen at the RND sites and may reflect unobserved differences in practice characteristics rather than differences related to the program. For injury-related emergency department visits, significant intervention-control differences were found only for the middle income group at the QE sites.

Figures 11.1 and 11.2 show comparisons across income subgroups for selected well child visits and vaccinations. The trends seen for children overall were apparent in the income subgroup comparisons: Greater percentages of intervention than control children within each income subgroup made age-appropriate well child visits and received their vaccinations on time. These differences, however, were not always significant. Few differences were noted across income groups in the effects of HS on age-appropriate well child visits or vaccinations.

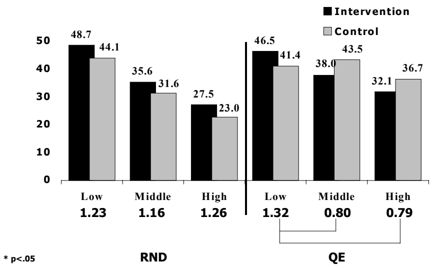
Percentage of children who were <u>perceived as very healthy</u> (30-33 months)



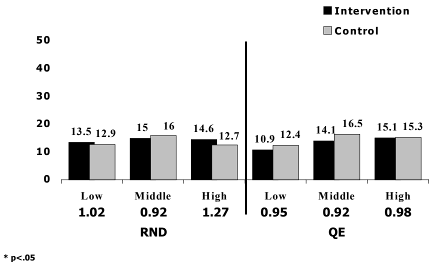
Percentage of children with one or more <u>overnight hospitalizations</u> in the past year (30-33 Months)



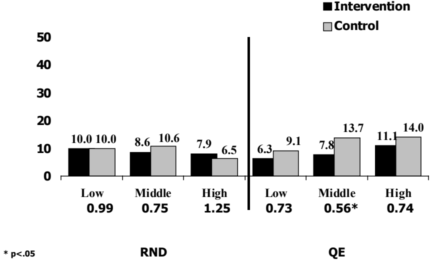
Percentage of children with <u>one or more emergency department visits</u> in the past year (30-33 months)



Percentage of children <u>injured</u> badly enough in the past year to see a doctor (30-33 months)



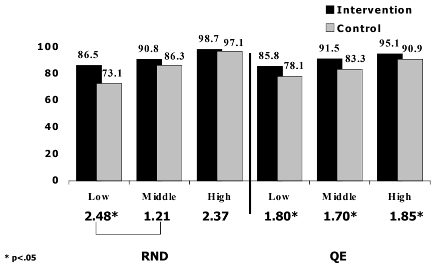
Percentage of children with <u>one or more emergency department visits for injury-related causes</u> in past year (30-33 months)



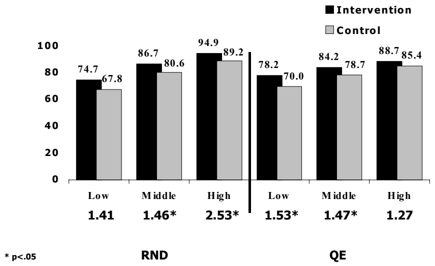
Comparisons of Age-Appropriate Well Child Visits Among Children in the Intervention and Control Groups Across Three Income Subgroups at Randomization and Quasi-Experimental Sites

Figure 11.1. Percentage of children in the intervention and control groups at Randomization and Quasi-Experimental Sites who made age-appropriate well child visits by income subgroup (low income, middle income, and high income).

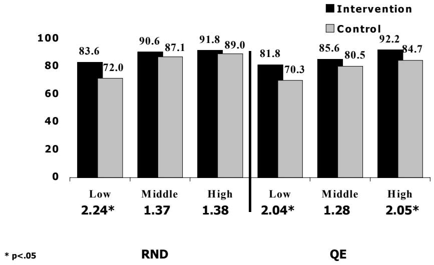
Percentage of children who made <u>2-month age appropriate well child visit</u> by household income level



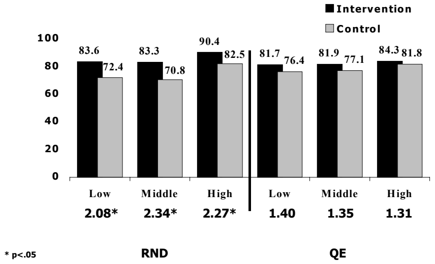
Percentage of children who made <u>6-month age appropriate well child visit</u> by household income level



Percentage of children who made <u>12-month age appropriate well child visit</u> by household income level



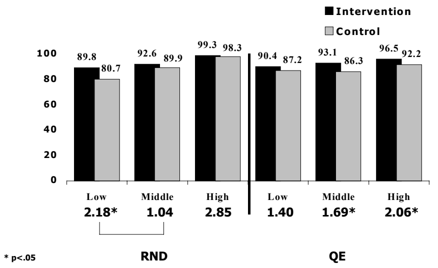
Percentage of children who made 2<u>4-month age appropriate well child visit</u> by household income level



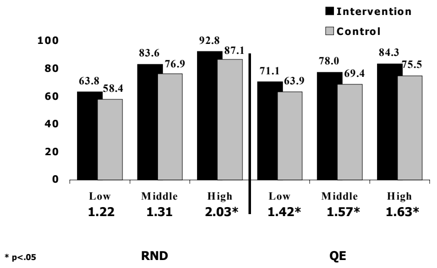
Comparisons of On-Time Vaccination Among Children in the Intervention and Control Groups Across Three Income Subgroups at Randomization and Quasi-Experimental Sites

Figure 11.2. Percentage of children in the intervention and control groups at Randomization and Quasi-Experimental Sites who received their vaccinations on-time by income subgroup (low income, middle income, and high income).

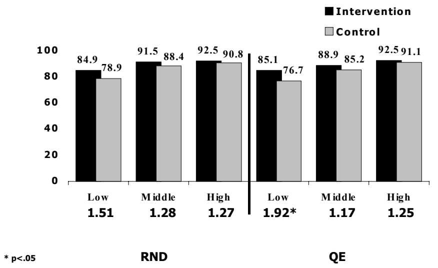
Percentage of children who received DTP 1 <u>age appropriate vaccination</u> by household income level



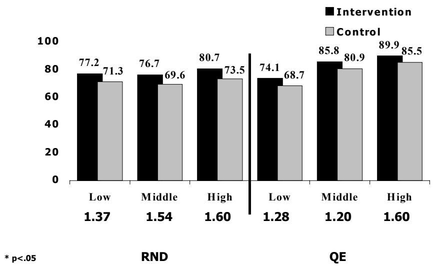
Percentage of children who received DTP 3 <u>age appropriate vaccination</u> by household income level



Percentage of children who received MMR 1 <u>age appropriate vaccination</u> by household income level



Percentage of children who were up-to-date by 24 months of age for 4 DTP, 3 polio, and 1 MMR by household income level



11.3. First-Time Mothers

11.3.A. Overview

In programs designed to improve child development, another subgroup of interest is first-time mothers. There are several reasons to think that first-time mothers might take more advantage of the HS services than more experienced mothers, and that they may benefit more from an intervention regarding child development than more experienced mothers. First, first-time mothers simply may be less experienced that mothers who have other children and, consequently, less informed about child care and child development. First-time mothers may also face more stressors than other mothers because of their limited experience. Finally, they may have more time to participate in the program as they have no other children to tend.

Birth order of the infant was defined by the number of live births of the mother; the one exception was for the handful of infants that were adopted. For these infants, birth order was defined by the number of living children of the mother. Two groups were formed for comparison: first time mothers, which consisted of mothers with their first live birth or child, if adopted, and second or greater time mothers, consisting of mothers with at least one other living child. For the sake of brevity, the two groups will be referred to as first-time and second-time mothers, recognizing that the latter group includes some mothers with more than two living children.

11.3.B. Demographic Characteristics

The mothers, fathers, families and infants of first- and second-time mothers differed in several important ways (**Table 11.3**). Not unexpectedly, first-time mothers were younger, had fewer years of education, were less likely to be employed, and were living in lower income households. Infants of first-time mothers were more likely to be born low birthweight than infants of second-time mothers. They also were more likely to have publicly-funded health insurance, although at the QE sites, this difference was not significant.

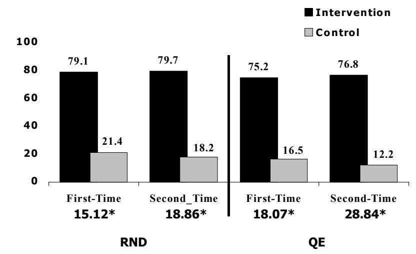
Table 11.3. Percentage Distribution of Mother's Demographic Characteristics, Insurance Status, and Baby's Birth Weight for Families in First-Time and Second-Time Subgroups at Randomization and Quasi-Experimental sites

	Randomization Sites		Quasi-Experimental Sites		All Sites
	MOTHER'S PARITY		MOTHER'S PARITY		
	First-Time	≥ Second-Time	First-Time	≥ Second-Time	
	(n =749)	(n = 764)	(n = 950)	(n = 1043)	(n = 3506)
	%	%	%	%	%
Mother's Age					
19 or less years	23.8	3.8	18.0	2.2	11.4
30 or more years	22.6	49.2	33.0	50.3	39.5
Mother's Education					
11 years or less	16.4	9.8	15.7	12.9	13.7
College Graduate	29.6	25.5	37.8	31.5	31.5
Mother's Race					
Black/African American	22.8	21.7	23.6	22.4	22.7
Mother's Ethnic Origin					
Hispanic	19.8	13.2	18.5	18.1	17.5
Mother's Employment					
Employed 2-4 months postpartum	41.1	37.2	34.4	33.6	36.2
Mother's Marital Status					
Married/living with baby's father	85.7	90.8	88.3	89.3	88.6
Father's Employment Status					
Employed at child's birth	79.6	88.9	85.7	92.5	87.1
Economic Status					
Family owned their home	55.0	62.0	51.0	58.4	56.5
Household Income					
Low	34.3	29.3	35.4	29.2	29.3
High	29.5	30.4	41.1	36.5	34.9
Baby's Insurance					
Medicaid	43.5	32.9	36.3	34.5	36.6
Baby's birth Weight					
Less than 2500 grams	8.8	5.4	7.2	4.4	

11.3.C. Receipt of Healthy Steps Services

The Healthy Steps intervention appeared to provide benefits to first-time and second-time mothers alike. Whether or not the mother was a first-time parent, she was significantly more likely to have received a variety of HS program services than her counterpart in the control group. In general, no evidence was found of differences in the extent to which HS affected the numbers and kinds of services the children of first-time and second-time mothers received.

Percentage of mothers who received 4 or more HS services (30-33 months)



* p<.05

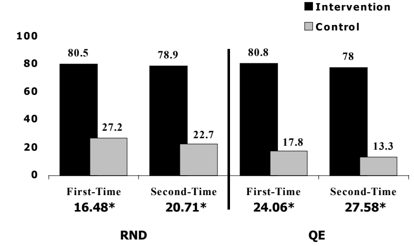
11.3.C.1. Receipt of Four or More Healthy Steps Services

Among program services offered to families were office visits addressing developmental issues and taking care of the child, a telephone line to discuss the child's development, a letter before office visits, written materials about development, parent groups and a special health booklet (the Child Health and Development Record). Intervention families, whether mothers were first-time or second-time, were far more likely than control families to report receiving 4 or more of these HS services. There were no differences between the two groups in the effects of HS on receipt of services based on a t-test comparing the coefficients from the logistic regression.

11.3.C.2. Home Visits

The analysis of the effect of HS on receipt of any home visit showed that significantly greater percentages of intervention than control families received home visits for first-time and second-time mothers alike. No significant differences were found between first-time and second-time groups in the effect of HS on receipt of any home visit.

Percentage of mothers reporting that someone had made a home visit since child was 6 months of age (30-33 months)

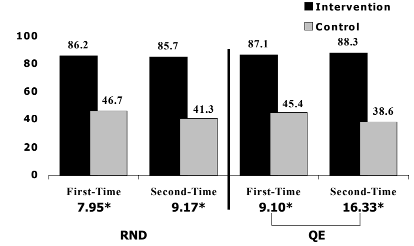


* p<.05

11.3.C.3. Age-Appropriate Topics

As with the other services evaluated, intervention mothers were significantly more likely to report having discussed six or more topics with someone in the practice than control mothers, whether they were first- or second-time mothers. At QE sites, effects were significantly greater for second-time than first-time mothers; this difference was due to the lower percentages of second-time than first-time mothers at control sties reporting discussion of the topics.

Percentage of mothers who reported that someone in practice talked to them or gave them information on more than 6 topics (30-33 months)

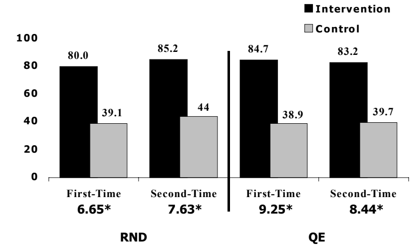


* p<.05

11.3.C.4. Developmental Assessments

Similar to the pattern seen for other program components, greater percentages of intervention children within each subgroup received developmental assessments than did control children. No significant differences were found between first-time and second-time mothers in whether their children had received assessments.

Percentage of children who received a developmental assessment (30-33 months)

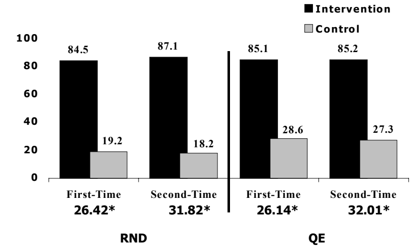


* p<.05

11.3.C.5. Books to Read

Within all subgroups at both RND and QE sites, significantly greater percentages of intervention families received books from the practice to read to the child than did control families. However, as was true for other services, there were no significant differences between first-time and second-time mothers with respect to receiving books.

Percentage of families that received books from the practice to read to the child (30-33 months)

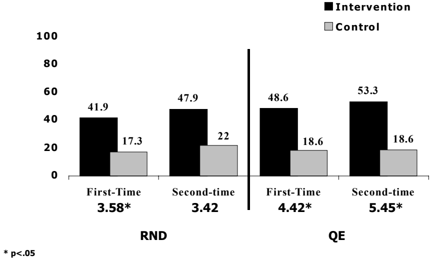


* p<.05

11.2.C.6. Information on Community Resources

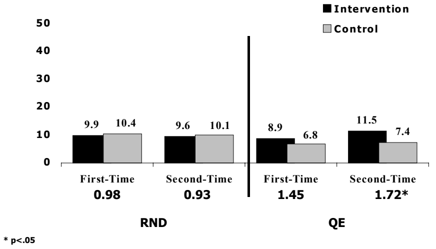
Although the percentages of intervention mothers who received information on community resources were smaller for each sub-group than for the other services mentioned, the pattern of significant differences within each subgroup persisted. No significant differences were found between first-time and second-time mothers in their receipt of information on community resources.

Percentage of mothers who received information about community resources from someone at the practice (30-33 Months)



> *Whether mothers were first-time or second-time parents, intervention families were significantly more likely to have received a variety of Healthy Steps program services than control families. The percentages receiving services tended to be similar across intervention families and control families in both subgroups. There were virtually no differences in effects between first- and second-time mothers.*

testing related to their developmental progress with walking, talking, hearing, or using their hands (30-33 Months)



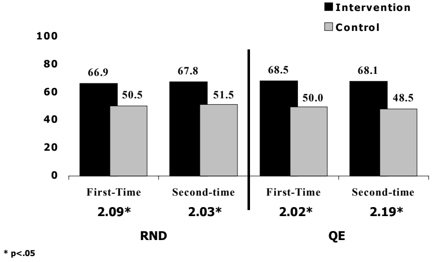
11.3.C.7. Child Diagnosed or Referred for Developmental Problem

Intervention children of second-time mothers at QE sites were significantly more likely than control children to have been diagnosed or referred for testing related to a developmental problem. No intervention-control differences were found for first-time mothers or for second-time mothers at RND sites. Neither were there differences in effects between first-time and second-time mothers at RND and QE sites.

11.3.D. The Effect of Healthy Steps on Parent and Child Outcomes

Few differences were found between first-time and second or greater-time mothers in the effect of HS on parent and child outcomes.

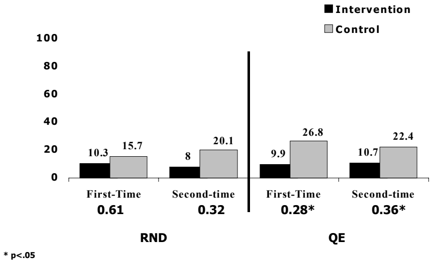
Percentage of mothers who reported that someone in the practice went out of the way to help (30-33 months)



11.3.D.1. Satisfaction with Their Child's Health Care

Effects of HS on satisfaction and dissatisfaction generally were similar for first-time and second-time mothers. Whether in the first-time or second-time subgroup, intervention mothers had approximately two times the odds of reporting that someone at their child's practice had gone out of the way for them. No significant differences were found in effects between sub-groups. The effect of HS on dissatisfaction was somewhat

Percentage of mothers who disagreed that MDs and NPs provided "support" to them (30-33 months)

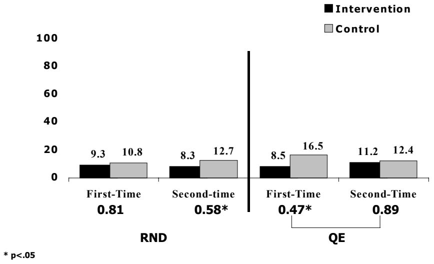


different for each variable. For dissatisfaction with "support"[11.4] from practice clinicians, intervention mothers in each subgroup were significantly less likely than control mothers to be dissatisfied at QE sites but not at RND sites. For dissatisfaction with "listening",[11.5] second-time intervention mothers at the RND sites and first-time intervention mothers at QE sites were significantly less likely to be dissatisfied than control mothers. For dissatisfaction with "respect for the mother's knowledge,"[11.6] the only significant difference noted was for first-time mothers at the QE sites. There were no differences in effects across subgroups for dissatisfaction with "support" and "respect for the mother's knowledge." For dissatisfaction with "listening," significant differences in effects between first-time and second-time mothers were found at QE sites only, where first-time compared with second time intervention mothers had a significantly lower odds of reporting dissatisfaction with "listening."

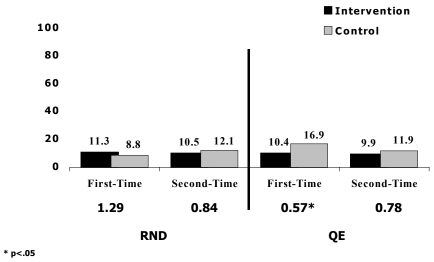
11.3.D.2. Mother's Willingness to Pay for Services

Whether they were first-time parents or more experienced, intervention mothers were significantly more likely to say they would pay $100 or more one time for the package of services offered through their child's doctor's office. The percentage of first-time intervention mothers willing to pay for the services was somewhat greater than for second-time intervention mothers at QE sites but very similar for first and second-time mothers at RND sites. The highest percentages were noted for first-time intervention families at QE sites. Between 44.7% and 55.5%% of intervention families would be willing to pay $100 or more in comparison to 24.3% to 28.8% of control families. There were no significant differences in effects between first-time and second-time parents.

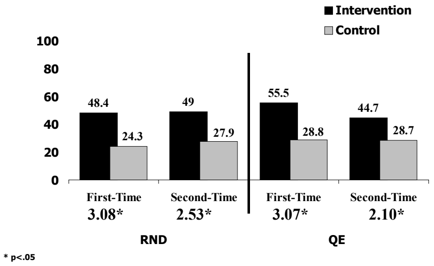
Percentage of mothers who <u>disagreed that MDs and NPs "listened" to them</u> (30-33 months)



Percentage of mothers who <u>disagreed that MDs and NPs "respected their knowledge"</u> (30-33 months)



Percentage of <u>willing pay more than $100</u> for Healthy Steps services (30-33 Months)



[11.4] Disagree that MDs and NPs provided "support" to mother: suggested things that I could do for child that fit into my family's daily life; helped me get all the information I need about child's growth and development; helped me get services for child from other agencies about programs; gave me advice on how to solve problems at home with child; gave me new ideas about things to do with child; pointed out what I did well as a parent.

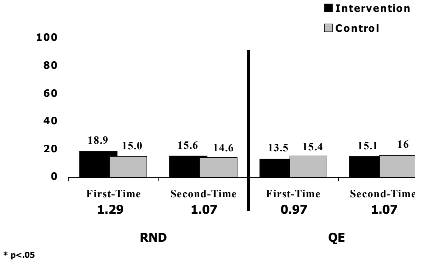
[11.5] Disagree that MDs and NPs "listened" to mother: always had time to answer my questions about child; seemed to have other things on their minds when I talked with them; acted like I couldn't understand information about child's growth and development; seemed to think carefully about my questions about child's development; were always in a rush when they saw child; encouraged me to ask questions about child's growth and development; did not really give me a chance to ask questions about child.

[11.6] Disagree that MDs and NPs respected mother's knowledge, knew what was going on with the child, and made them feel like they were doing a good job: understood that I know child better than anyone else does; made me feel like I was doing a good job caring for child; seemed to know what was going on with child.

11.3.D.3. Maternal Depression

The percentage of mothers reporting depressive symptoms on the 14-item modified Epidemiologic Studies of Depression (CES-D) scale was similar for first-time and second-time mothers. No significant differences were found between intervention and control groups. In addition, no differences were found in effects between the first-time and second-time subgroups regarding mother's reports of depressive symptoms.

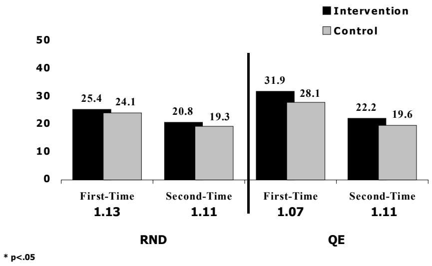
Percentage of mothers reporting depressive symptoms on modified CES-D depression (30-33 months)



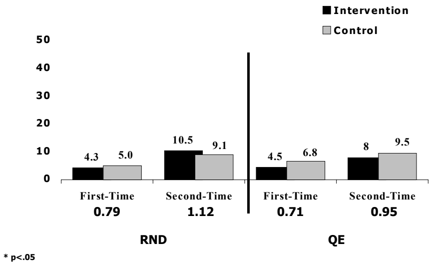
11.3.D.4. Parent Nurturing

At 30-33 months, mothers rated a series of statements from 1 (*always/almost always*) to 4 (*never/almost never*) from the Parent Behavior Checklist (PBC) about how parents raise young children. The series of statements included 18 of 20 items in the nurturing subscale. This subscale measures specific parent behaviors that promote a child's psychological growth (e.g., "I read to my child at bedtime"). From this modified subscale, two dichotomous variables were created. The first variable measured more use of nurturing behaviors or higher scores on the subscale (mother scored 63 or more on the 18 to 72 scale). Mothers in this group reported practicing these behaviors *frequently* to *always* in raising their child. The second variable measured less use of these nurturing behaviors or lower scores on the subscale (mother scored 44 or less on the 18 to 72 scale). Mothers in this less nurturing category reported *sometimes* to *never* using these behaviors. No significant differences between intervention and control mothers were found in the percentage of mothers who were either more or less nurturing. In addition, no differences were found between first and second-time mothers.

Percentage of mothers more nurturing (30-33 months)



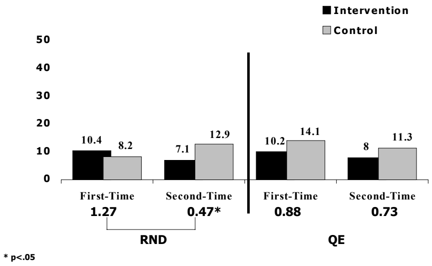
Percentage of mothers less nurturing (30-33 months)



11.3.D.5. Discipline Practices

We compared mothers on two discipline measures drawn from the Parent Response to Child Misbehavior instrument. The first scale included harsh responses to misbehavior (threatening, yelling in anger, slapping on hand, and spanking with hand). A dichotomous variable created from the harsh discipline scale compared higher levels of reported physical discipline use (mothers who scored 6 or higher on the 0 to 12 scale) among intervention and control groups. This group identified mothers who reported that they tended to use some form of harsh discipline during any given week.

Percentage of mothers using harsh discipline (30-33 Months)



Non-physical strategies (negotiating, explaining the rules or consequences, showing child a more acceptable activity, or giving time-out, ignoring misbehavior, or withdrawing privileges) comprised the second scale. A dichotomous variable was created to indicate the percentage of mothers who reported that they tended to use non-physical or "reasoning" strategies (mothers who scored 9 or higher on the 0 to 18 scale).

Second-time intervention mothers at the RND sites were less likely to report using harsh discipline strategies than were control mothers. Whether comparing use of harsh discipline or reasoning strategies, no other significant differences between intervention and control groups were found.

11.3.D.6. Reading

Similar percentages of intervention and control mothers, whether first-time or second-time, read to their children every day. No intervention-control differences were found within subgroups and no significant differences in effects were found across groups.

11.3.D.7. Use of Routines

Results for use of routines were similar to those for reading books. Similar percentages of intervention and control mothers, whether first-time or second-time, read to their children every day. We found no intervention-control differences within subgroups and no significant differences in effects across groups.

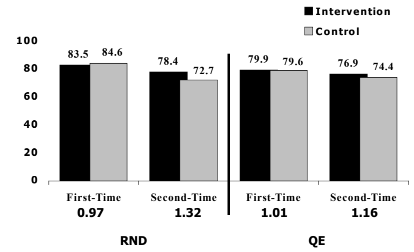
11.3.D.8. Father's Participation in Well Child Visits

Results for father's attendance at well child visits were similar to those for reading books. We found no intervention-control differences within subgroups and no significant differences in effects across groups in the extent to which fathers participated in well child visits.

11.3.D.9. Parent Health Behaviors

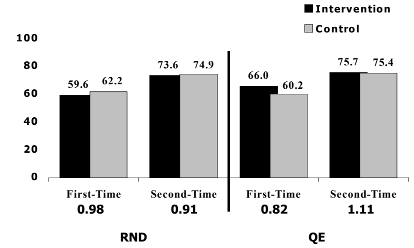
Similar percentages of intervention and control mothers who smoked reported smoking outside, rather than in the same room as the child or an adjacent room. No differences in effects between subgroups were found.

Percentage of mothers using <u>more reasoning</u> (30-33 months)



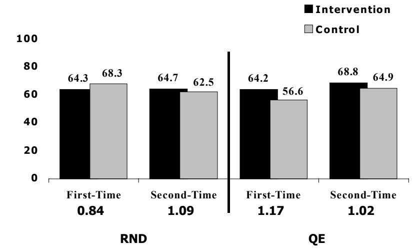
* p<.05

Percentage of mothers who <u>read books to their child every day</u> (30-33 Months)



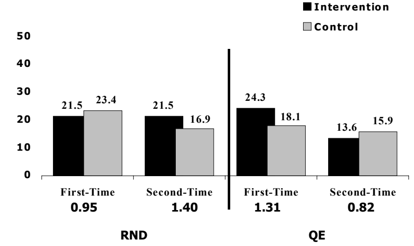
* p<.05

Percentage of mothers who <u>followed at least 3 routines</u> (30-33 Months)



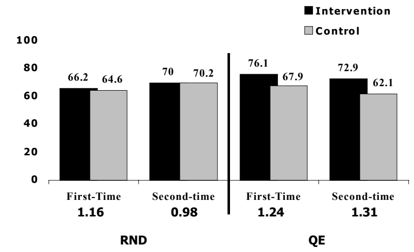
* p<.05

Percentage of families where mothers and fathers equally or fathers usually <u>took child to well child visits</u> (30-33 Months)



* p<.05

Percentage of <u>mothers currently smoking who smoke outside</u> (30-33 months)



* p<.05

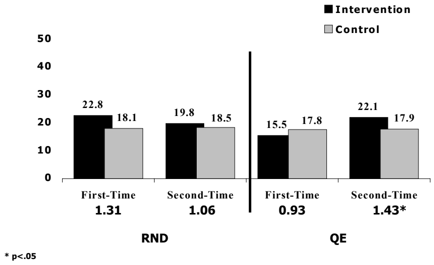
11.3.D.10. Child's Health Status and Health Care Utilization

Mothers' perceptions of their child's health were compared. From their ratings of several statements describing a child's general health, a scale was created to indicate whether the mother perceived the child's general health as *very healthy* as described above. Mothers scoring 11 or higher on the 5-20 point scale tended to give positive responses about their child's health. Second-time intervention mothers were significantly more likely than their counterpart control mothers to perceive their child as *very healthy*. There were, however, no other significant intervention-control differences noted and no significant differences in effects between subgroups.

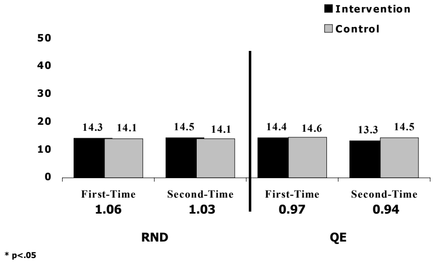
We also compared effects related to injuries, overnight hospitalizations, and emergency department visits. These comparisons showed no significant differences between intervention and control groups. In addition, no differences in effects of HS across income subgroups for injuries, hospitalizations, and emergency department visits were found.

Figures 11.3 and 11.4 show comparisons of first-time and second-time mothers for selected well child visits and vaccinations. The trends seen for children overall were apparent in the subgroup comparisons: Greater percentages of intervention than control children within each subgroup made age-appropriate well child visits and received their vaccinations on time. These differences, however, were not always significant and there were no significant differences in effects between subgroups.

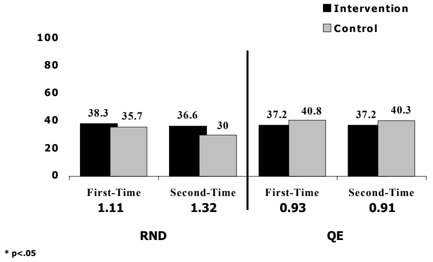
Percentage of children whose health was perceived as "very healthy" (30-33 Months)



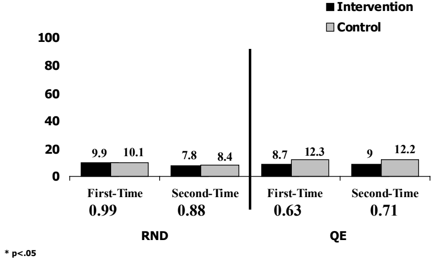
Percentage of children injured badly enough to see a doctor (30-33 months)



Percentage of children with one or more emergency department visits in the past year (30-33 months)

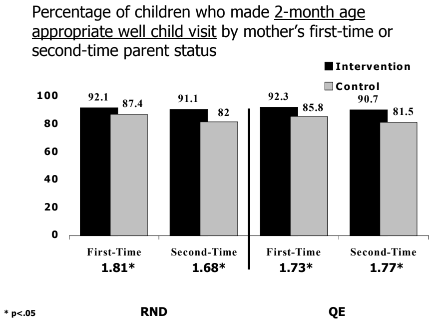


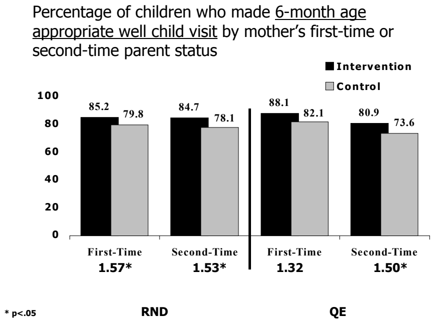
Percentage of children with one or more emergency department visits for injury-related causes in past year (30-33 months)

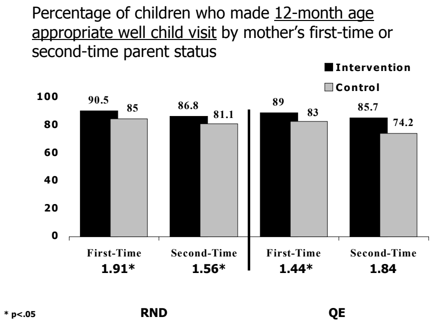


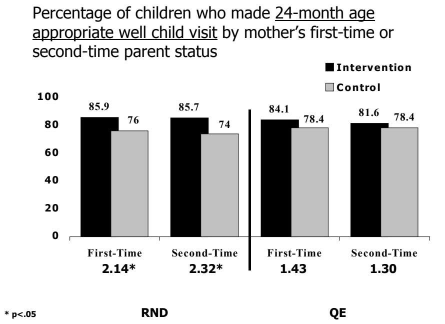
Comparisons of Age-Appropriate Well Child Visits Among Children in the Intervention and Control Subgroups for First-Time and Second-Time Mothers at Randomization and Quasi-Experimental Sites

Figure 11.3. Percentage of children in the intervention and control groups at Randomization and Quasi-Experimental Sites who made age-appropriate well child visits by mother's first-time or second-time parent status.


Percentage of children who made <u>2-month age appropriate well child visit</u> by mother's first-time or second-time parent status

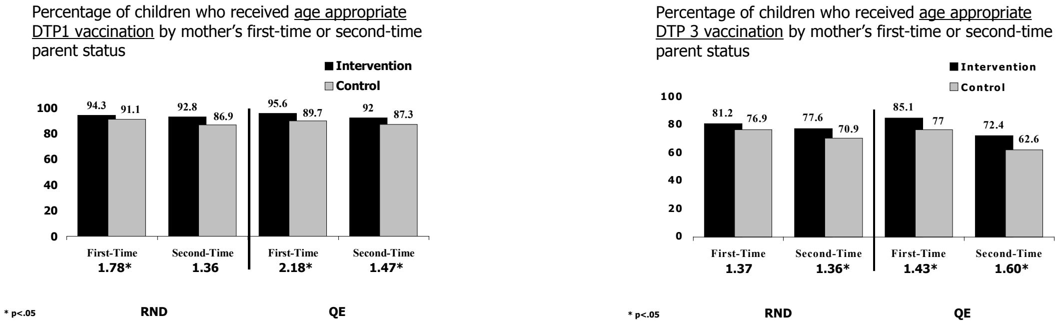

Percentage of children who made <u>6-month age appropriate well child visit</u> by mother's first-time or second-time parent status


Percentage of children who made <u>12-month age appropriate well child visit</u> by mother's first-time or second-time parent status

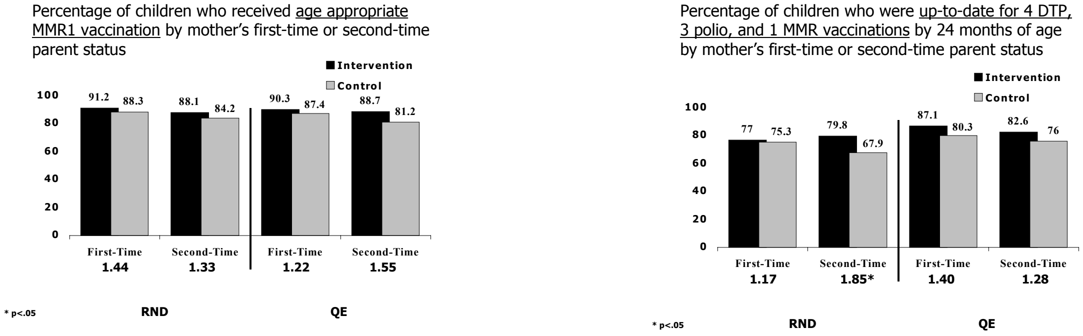

Percentage of children who made <u>24-month age appropriate well child visit</u> by mother's first-time or second-time parent status

Comparisons of On-Time Vaccination Among Children in the Intervention and Control Groups for First-time or Second-time Mothers at Randomization and Quasi-Experimental Sites

Figure 11.4. Percentage of children in the intervention and control groups at Randomization and Quasi-Experimental Sites who received their vaccinations on-time by mother's first-time or second-time parent status.


Percentage of children who received age appropriate DTP1 vaccination by mother's first-time or second-time parent status

Percentage of children who received age appropriate DTP 3 vaccination by mother's first-time or second-time parent status


Percentage of children who received age appropriate MMR1 vaccination by mother's first-time or second-time parent status

Percentage of children who were up-to-date for 4 DTP, 3 polio, and 1 MMR vaccinations by 24 months of age by mother's first-time or second-time parent status

11.4. Maternal Age

11.4.A. Overview

A third sub-group analysis assessed differences in receipt of services and program effects among three age groups of mothers (teens, young adults, and older mothers). Teen mothers comprise an at-risk group. They tend to have less knowledge about child development and appropriate parenting practices than older mothers. They also tend to have less realistic developmental expectations, and may be less sensitive to and accepting of their infant's behavior than older mothers. Teen mothers have an increased risk of child neglect or maltreatment. While they often decrease alcohol and cigarette use during pregnancy, they tend to quickly take them up again. About one-third of teen mothers experience a second pregnancy within 18 months of delivery.

11.4.B. Demographic Characteristics

When families in the three maternal age groups are compared demographically, differences are apparent in several areas **(Table 11.4)**. Teen mothers had the fewest years of education. They also were the most likely to be black/African-American, and the least likely to be employed, to own their home, and to live in high income households. Their children were the most likely to have been low birthweight and to have been insured by Medicaid. The fathers of their children also were the least likely to be employed.

11.4. C. Receipt of Healthy Steps Services

Within each age subgroup, intervention families were significantly more likely to have received a variety of HS program services than control families. Receipt of services tended to be similar across <u>intervention</u> families in all subgroups. However, the percentages of control families receiving services decreased with age. Consequently, the effect of HS was greatest for these older age groups than for teen mothers.

11.4.C.1. Receipt of 4 or More Healthy Steps Services

Regardless of maternal age, intervention mothers were significantly more likely to report receiving 4 or more HS services than were control families. There were differences among maternal age groups in the effects of HS on receipt of services based on a t-test comparing the coefficients from the logistic regression. The effects of HS in receipt of services were greater for the older age groups than for teen mothers. These differences were due primarily to a greater

Percentage of mothers who received <u>4 or more HS services</u> (30-33 months)

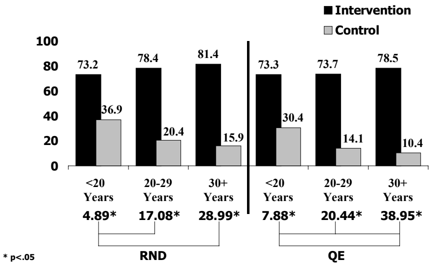


Table 11.4. Percentage Distribution of Mother's Demographic Characteristics, Insurance Status, and Baby's Birth Weight for Families in Three Maternal Age Subgroups at Randomization and Quasi-Experimental Sites

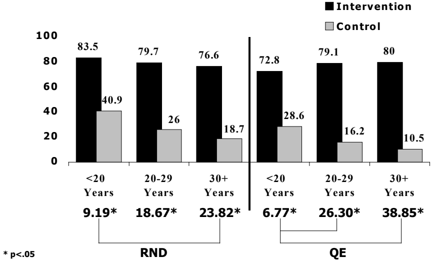
	Randomization Sites MATERNAL AGE (Years)			**Quasi-Experimental Sites** MATERNAL AGE (Years)			**All Sites**
	<20 (N = 216) %	20 - 29 (N = 805) %	≥30 (N = 571) %	<20 (N = 214) %	20 - 29 (N = 1036) %	≥30 (N = 889) %	(N= 3731) %
Mother's Education							
11 years or less	52.8	8.1	6.0	61.2	14.9	5.0	14.5
College Graduate	0.0	20.9	46.1	0.5	24.6	51.1	30.6
Mother's Race							
Black/African American	48.2	22.7	12.4	41.1	23.1	18.5	22.8
Mother's Ethnic Origin							
Hispanic	16.2	17.8	16.3	25.2	21.7	13.8	18.0
Mother's Employment							
Employed 2-4 months postpartum	24.5	39.9	38.2	25.2	33.4	30.8	33.9
Mother's Marital Status							
Married/living with baby's father	82.9	84.6	95.5	82.2	85.0	94.2	88.4
Father's Employment Status							
Employed at child's birth	57.9	85.2	92.5	52.5	89.4	93.8	86.7
Economic Status							
Family owned their home	41.2	49.7	69.7	42.1	44.8	60.6	53.1
Household Income							
Low	65.7	35.6	13.4	63.4	33.4	12.2	29.3
High	6.3	20.1	52.7	7.2	27.5	58.8	34.9
Live birth order							
First	86.0	52.9	31.0	88.1	48.5	37.4	48.5
Baby's Insurance							
Medicaid	75.0	41.0	14.9	68.7	38.4	18.0	34.4
Baby's Birth Weight							
Less than 2500 grams	13.4	6.0	6.3	5.3	7.5	6.0	6.4

baseline receipt of services among teen mothers.

11.4.C.2. Home Visits

The analysis of the effect of HS on receipt of any home visit indicated that significantly greater percentages of intervention than control families received any home visit in each age group. Moreover, intervention families, regardless of maternal age, received similar levels of home visits. The percentage of control families receiving any home visit declined with maternal age. Thus, the effect of HS on home visits was greater for mothers in the two older age groups than for teen mothers, although the difference was not significant between teens and mothers in the young adult group at RND sites.

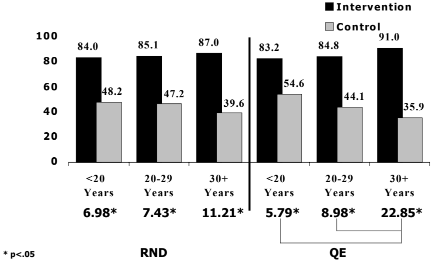
Percentage of mothers reporting that someone had made a home visit since child was 6 months of age (30-33 months)



11.4.C.3. Age-Appropriate Topics

Intervention mothers, regardless of their age, were significantly more likely to report having discussed 6 or more topics with someone in the practice. Effects tended to be greater for older mothers as the levels of baseline services (as indicated by services received by the control group) declined as maternal age increased. However, differences in effects between older mothers and younger mothers were significant at QE sites only.

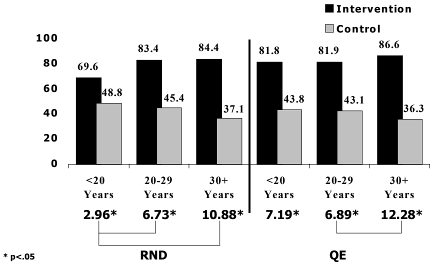
Percentage of mothers who reported that someone in practice talked to them or gave them information on more than 6 topics (30-33 months)



11.4.C.4. Developmental Assessments

Greater percentages of intervention children within each subgroup received developmental assessments than did control children. Baseline receipt of developmental assessments tended to decline as maternal age increased. At RND sites, intervention children of teen mothers had a lower odds of receiving a developmental assessment than did children of older mothers. At QE sites, children of mothers in the young adult (middle) age group had a significantly lower odds of an assessment than children whose mothers were older.

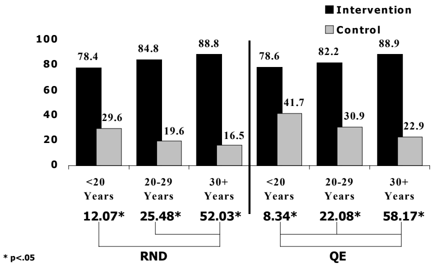
Percentage of children who received a developmental assessment (30-33 months)



11.4.C.5. Books to Read

Within all subgroups at both RND and QE sites, significantly greater percentages of intervention families received books to read to the child than did control families. The odds that a family received books from the practice was significantly greater for older mothers than teen mothers or mothers in the young adult age groups. This lower level of baseline services for older mothers explains the differences in effects across sub-groups.

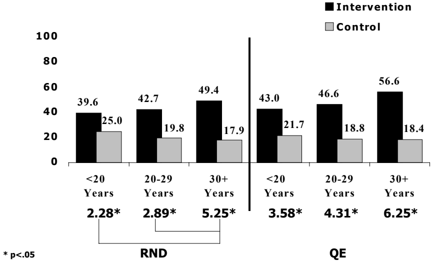
Percentage of families that received books from the practice to read to the child (30-33 months)



11.4.C.6. Information on Community Resources

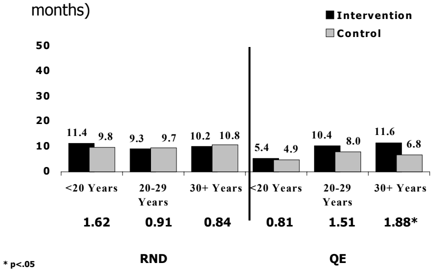
Although the percentages of intervention mothers who received information on community resources were smaller for each sub-group than for the other services mentioned, the pattern of significant differences within each subgroup persisted. Effects were significantly greater for the older age group than for young adult and teen age groups at RND sites. No significant differences in effects were found at QE sites.

Percentage of mothers who received information about community resources from someone at the practice (30-33 months)



Regardless of their age, intervention mothers were significantly more likely to have received a variety of Healthy Steps program services over time than control mothers. The percentages receiving services tended to be fairly similar across intervention families in all subgroups. However, receipt of services by control families generally declined as age increased. Consequently, the older the age group, the greater the effect of Healthy Steps.

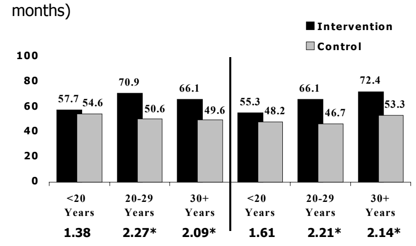
Percentage of children diagnosed or referred for further testing related to their developmental progress with walking, talking, hearing, or using their hands (30-33 months)



11.4.C.7. Child Diagnosed or Referred for Developmental Problem

Intervention children of mothers in the oldest age group at QE sites were more likely than control children to have been diagnosed or referred for testing related to a developmental problem. There were no other significant intervention-control differences and no significant differences in effects by maternal age.

Percentage of mothers who reported that someone in the practice went out of the way to help (30-33 months)



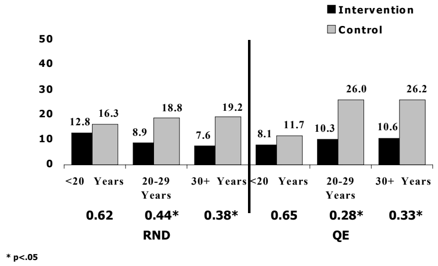
11.4.D. The Effect of Healthy Steps on Parent and Child Outcomes

Few differences were found between maternal age subgroups in the effects of HS on parent and child outcomes.

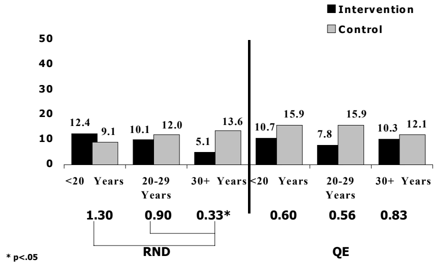
11.4.D.1. Satisfaction with Their Child's Health Care

Intervention mothers in the middle and older maternal age subgroups were more likely than those in the control group to report that someone at their child's practice had gone out of the way for them. No significant differences were found in effects, however, between age sub-groups. The effect of HS on dissatisfaction was somewhat different for each variable. For dissatisfaction with "support"[11.7] from practice clinicians, intervention mothers in the two older age groups were less likely than control mothers to be dissatisfied. For dissatisfaction with "listening"[11.8] significant differences in dissatisfaction were found only for the oldest age group at

Percentage of mothers who disagreed that MDs and NPs provided "support" to them (30-33 months)



Percentage of mothers who disagreed that MDs and NPs "listened" to them (30-33 months)

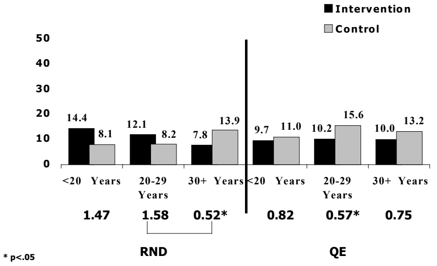


[11.7] Disagree that MDs and NPs provided "support" to mother: suggested things that I could do fo child that fit into my family's daily life; helped me get all the information I need about child's growth and development; helped me get services for child from other agencies about programs; gave me advice on how to solve problems at home with child; gave me new ideas about things to do with child; pointed out what I did well as a parent.

[11.8] Disagree that MDs and NPs "listened" to mother: always had time to answer my questions about child; seemed to have other things on their minds when I talked with them; acted like I couldn't understand information about child's growth and development; seemed to think carefully about my questions about child's development; were always in a rush when they saw child; encouraged me to ask questions about child's growth and development; did not really give me a chance to ask questions about child.

RND sites. The odds of being dissatisfied for intervention vs. control older mothers was significantly lower than for intervention vs. control younger mothers. For dissatisfaction with "respect for the mother's knowledge,"[11.9] significant intervention-control differences were noted for mothers in the oldest age group at RND sites and for 20-29 year old mothers at the QE sites. Intervention mothers in the oldest age group at RND sites had a lower odds of being dissatisfied than mothers in the middle age group.

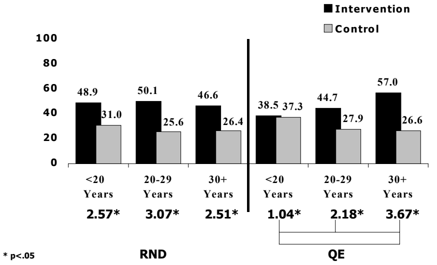
Percentage of mothers who disagreed that MDs and NPs "respected their knowledge" (30-33 months)



11.4.D.2. Mother's Willingness to Pay for Services

Mothers' willingness to pay for the HS services was also a measure of their satisfaction with those services. Intervention mothers were significantly more likely to say they would pay $100 or more one time for the package of services offered through their child's doctor's office. The percentage of intervention mothers willing to pay for the services tended to increase with age at the QE sites but was very similar across age groups at RND sites. The highest percentages were noted for older intervention families at QE sites. Between 38.5% and 57.0% of intervention families would be willing to pay $100 or more in comparison to 25.6% to 37.3% of control families. At QE sites, young adult and older intervention mothers alike, had a greater odds of being willing to pay $100 for the services than did younger mothers. No differences in effects between age groups were seen at RND sites.

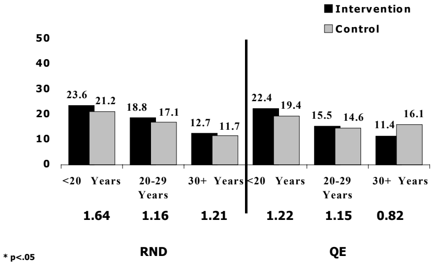
Percentage of willing pay more than $100 for Healthy Steps services (30-33 Months)



11.4.D.3. Maternal Depression

The percentage of mothers reporting depressive symptoms on the 14-item modified Epidemiologic Studies of Depression (CES-D) scale decreased with maternal age. No intervention-control differences were found in the percentage of mothers reporting depressive symptoms, and no differences were found in effects between age groups.

Percentage of mothers reporting depressive symptoms on modified CES-D depression (30-33 months)



Among mothers who reported sadness or depression and needed help, intervention mothers in the teenage group at RND sites were significantly less likely to have discussed their sadness with someone in the practice. They had a significantly lower odds of discussing their sadness than mothers in the young adult age group at these sites. There were no other

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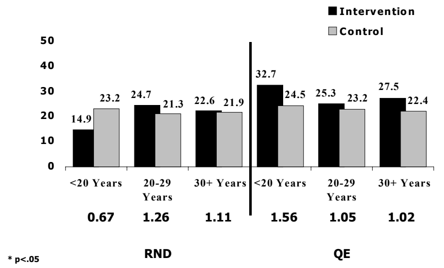
[11.9] Disagree that MDs and NPs respected mother's knowledge, knew what was going on with the child, and made them feel like they were doing a good job: understood that I know child better than anyone else does; made me feel like I was doing a good job caring for child; seemed to know what was going on with child.

significant intervention-control differences and no other significant differences in effects across age groups.

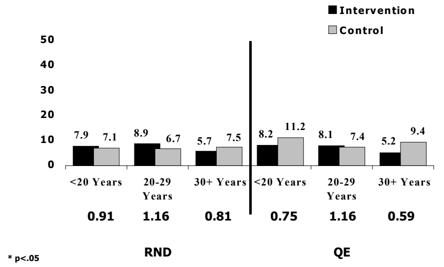
11.4.D.4. Parent Nurturing

At 30-33 months, mothers rated a series of statements from 1 (*always/almost always*) to 4 (*never/almost never*) from the Parent Behavior Checklist (PBC) about how parents raise young children. The series of statements included 18 of 20 items in the nurturing subscale. This subscale measures specific parent behaviors that promote a child's psychological growth (e.g., "I read to my child at bedtime"). From this modified subscale, two dichotomous variables were created. The first variable measured more use of nurturing behaviors or higher scores on the subscale (mother scored 63 or more on the 18 to 72 scale). Mothers in this group reported practicing these behaviors *frequently* to *always* in raising their child. The second variable measured less use of these nurturing behaviors or lower scores on the subscale (mother scored 44 or less on the 18 to 72 scale). Mothers in this less nurturing category reported *sometimes* to *never* using these behaviors. No significant differences were found between intervention and control mothers in the percentage of mothers who were either more or less nurturing. In addition, no differences were found between subgroups.

Percentage of mothers more nurturing (30-33 months)



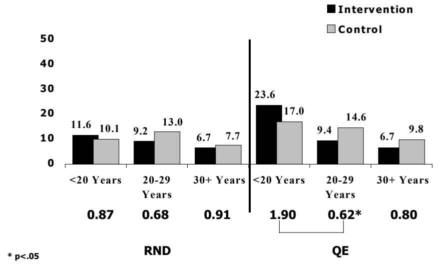
Percentage of mothers less nurturing (30-33 months)



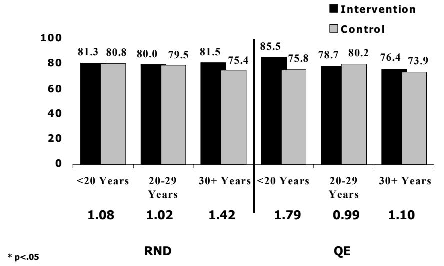
11.4.D.5. Discipline Practices

Mothers' responses on two discipline measures drawn from the Parent Response to Child Misbehavior instrument were compared. A dichotomous variable created from the harsh discipline scale compared higher levels of reported harsh discipline use (mothers who scored 6 or higher on the 0 to 12 scale). Non-physical strategies (negotiating, explaining the rules or consequences, showing child a more acceptable activity, or giving time-out, ignoring misbehavior, or withdrawing privileges) comprised the second scale. A dichotomous variable was created to indicate the percentage of mothers who tended to report using non-physical or "reasoning" strategies (mothers who scored 9 or higher on the 0 to 18 scale). In comparing reported use of harsh discipline or reasoning strategies, the only significant intervention-control difference found was for reported use of harsh discipline by mothers in the young adult age group at QE sites. These intervention mothers had a lower odds of reporting the use of harsh discipline strategies (relative to control mothers) than did intervention mothers in the teen group.

Percentage of mothers using harsh discipline (30-33 Months)



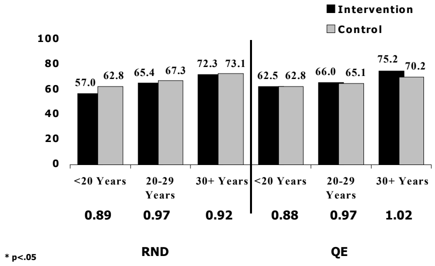
Percentage of mothers using more reasoning (30-33 months)



11.4.D.6. Reading

Substantial percentages of mothers overall read to their children every day whether they were in the intervention or control group. We found no intervention-control differences within subgroups and no significant differences in effects across groups.

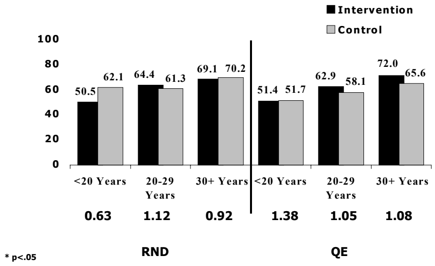
Percentage of mothers who read books to their child every day (30-33 months)



11.4.D.7. Use of Routines

Results for use of routines were similar to those for reading books. As maternal age increased, greater percentages of mothers tended to follow at least 3 routines (bedtime naptime, and dinnertime usually the same every day) for their child. However, no significant differences were found between intervention and control groups and no differences were found in effects across income subgroups.

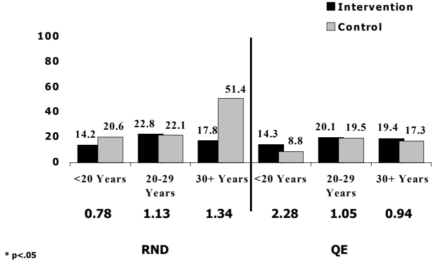
Percentage of mothers who followed at least 3 routines (30-33 months)



11.4.D.8. Father's Participation in Well Child Visits

No significant intervention-control differences were found in this measure of father's involvement, nor were there differences in effects across age subgroups.

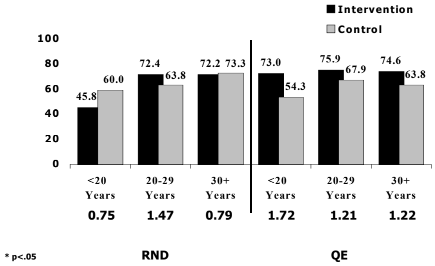
Percentage of families where mothers and fathers equally or fathers usually took child to well child visits (30-33 months)



11.4.D.9. Parent Health Behaviors

The percentages of mothers currently smoking who smoked outside, rather than in the same room as the child or an adjacent room tended to increase with maternal age. However, the comparisons revealed no significant differences between intervention and control groups or across subgroups.

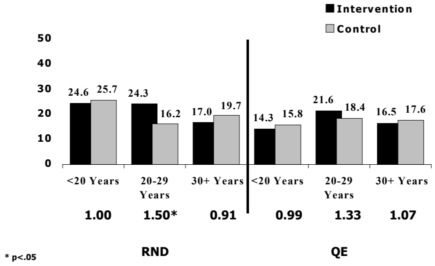
Percentage of mothers currently smoking who smoke outside (30-33 months)



11.2.D.10. Child's Health Status and Health Care Utilization

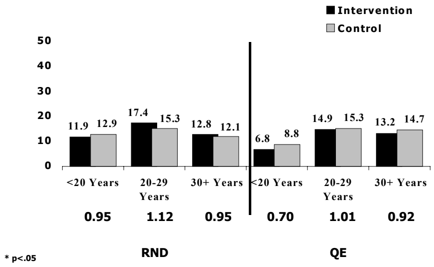
Mothers' perceptions of their child's health were compared. From their ratings of several statements describing a child's general health, a scale was created to indicate whether the mother perceived the child's general health as *very healthy* as described above. The only significant intervention-control difference was for mothers in the young adult age group at RND sites. Intervention mothers in this group were more likely than control mothers to perceive their child as *very healthy*. However, there were no significant differences in effects across age groups.

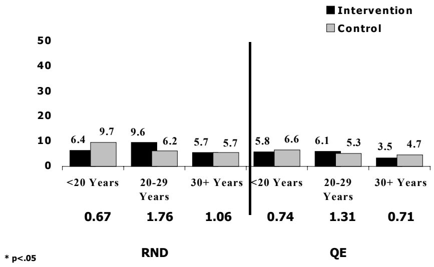
Percentage of children whose health was perceived as "very healthy" (30-33 months)

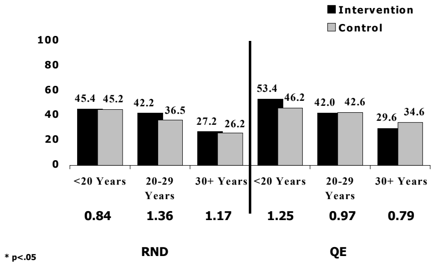


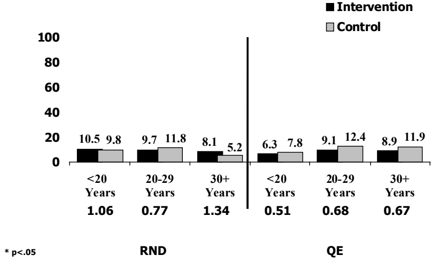
Effects related to injuries, overnight hospitalizations, and emergency department visits were also compared. These comparisons showed no significant differences between intervention and control groups and none in effects across subgroups for injuries or hospitalizations. The percentages of children visiting emergency departments in the past year fell as maternal age increased. We found no intervention-control differences within any subgroup and no differences in effects across age groups.

Figures 11.5 and 11.6 show comparisons across maternal age subgroups for selected well child visits and vaccinations. The percentage of children making age-appropriate visits and vaccinations tended to increase with maternal age. The trends seen for children overall were apparent in the large majority of subgroups with greater percentages of intervention than control children making age-appropriate well child visits and receiving their vaccinations on time. These differences, however, were not always significant. There was only one significant difference among age groups. That is, young adult mothers at QE sites had a greater odds of having their child receive his/her age appropriate DTP1 than teenage mothers.


Percentage of children injured badly enough to see a doctor (30-33 months)

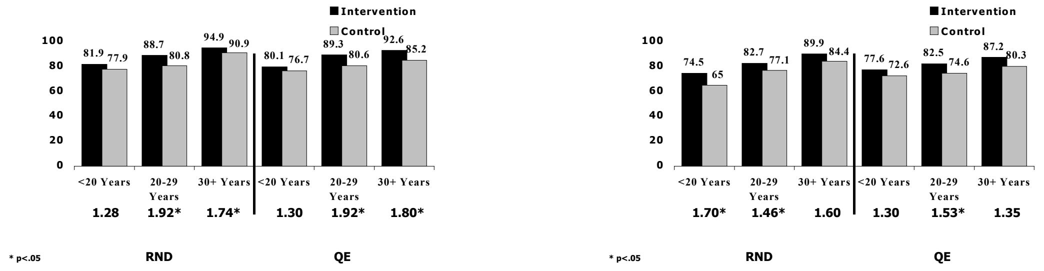

Percentage of children with one or more overnight hospitalizations in the past year (30-33 months)


Percentage of children with one or more emergency department visits in the past year (30-33 months)


Percentage of children with one or more emergency department visits for injury-related causes in past year (30-33 months)

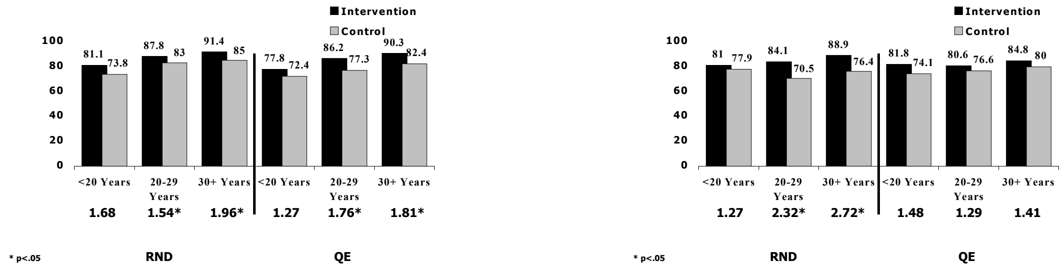
Comparisons of Age-Appropriate Well Child Visits Among Children in the Intervention and Control Groups Across Three Maternal Age Sub-Groups at Randomization and Quasi-Experimental Sites

Figure 11.5. Percentage of children in the intervention and control groups at Randomization and Quasi-Experimental Sites who made age-appropriate well child visits by maternal age subgroup.



Percentage of children who made 2-month age appropriate well child visit by mother's age

Percentage of children who made 6-month age appropriate well child visit by mother's age



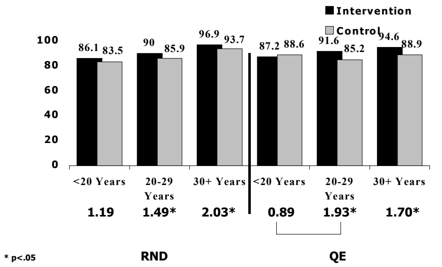
Percentage of children who made 12-month age appropriate well child visit by mother's age

Percentage of children who made 24-month age appropriate well child visit by mother's age

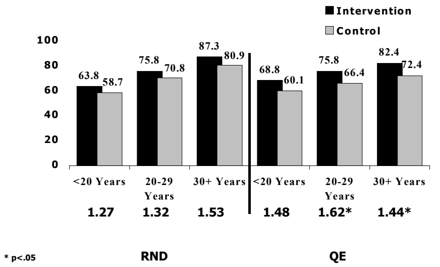
Comparisons of On-Time Vaccination Among Children in the Intervention and Control Groups Across Three Maternal Age Sub-Groups at Randomization and Quasi-Experimental Sites

Figure 11.6. Percentage of children in the intervention and control groups at Randomization and Quasi-Experimental Sites who received their vaccinations on-time by maternal age subgroup.

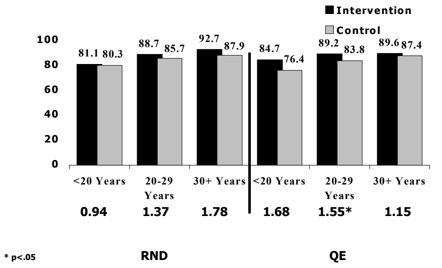
Percentage of children who received age appropriate DTP 1 vaccination by mother's age



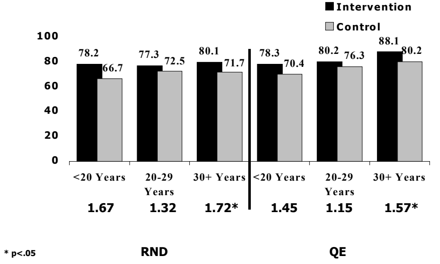
Percentage of children who received age appropriate DTP 3 vaccination by mother's age



Percentage of children who received age appropriate MMR 1 vaccination by mother's age



Percentage of children who were up-to-date for 4 DTP, 3 polio, and 1 MMR vaccinations by 24 months of age by mother's age



12. Variation in Implementation

Variation in Implementation

Over the course of the evaluation several hypotheses were proposed to explain potential variation in the implementation of Healthy Steps. To better inform future programs and funders, we examined two areas of potential variation in site characteristics. These related to variation in the National Program Office's rating of the quality of implementation at each site and variation in the extent to which the site had experience implementing the program at the time the family entered care.

Irrespective of whether a family received care at a "top rated" site or whether they enrolled after sites had more experience with the program, families in the intervention group within each category compared had a higher odds of receiving Healthy Steps services than control families.

We found stronger effects on receipt of some services for intervention families at "top rated" sites than for those at less highly rated sites.

The variation in effects between intervention children enrolled later (when sites had more experience in delivering program services) and those enrolled earlier differed for randomization and quasi-experimental sites. Children enrolled later in the program had a significantly lower odds than those enrolled earlier of receiving some Healthy Steps services and an age-appropriate well child visit at 24 months of age. However, these differential effects were seen only at QE sites. At RND sites, intervention children enrolled later had a higher odds of receiving information on community resources as well as diagnosis and referral for developmental problems. Intervention children enrolled later, at both RND and QE sites, had a significantly higher odds of being up-to-date on their vaccinations by 24 months of age.

In both comparisons, the effects of raising the already high levels of service receipt to even higher levels generally did not seem to affect outcomes. These findings reinforce key informant reports, which indicated that the Healthy Steps components were made available at the start of the program and were implemented at all 15 sites.

12. VARIATION IN IMPLEMENTATION

12.1. Introduction

Over the course of the evaluation several hypotheses were proposed to explain potential variation in the implementation of Healthy Steps (HS). Key informants at the sites associated smoother implementation with strong consistent leadership to assure the structural changes needed to accommodate the program, thorough orientation and buy-in at all levels, and a well-developed training and orientation program. The National Program leadership and funders also developed impressions about implementation from their contacts with the sites---by and large forming similar views to those expressed above and noting variation in the "quality" of implementation. Other early childhood interventions, most recently, Early Head Start (Love et al., 2002) have noted variations in implementation due to differences in program characteristics.

To better inform future programs and funders, we examined two areas of potential variation in characteristics related to implementing the program: (1) variation in the National Program Office's (NPO's) assessment of the quality of implementation at each site; and (2) variation in the extent to which the site had experience implementing the program at the time the family entered care.

This evaluation component addresses the first question of the evaluation:

> *1. How did providers and local foundations implement the Healthy Steps program in their sites and what were the factors that facilitated or impeded implementation?*

In the first comparison, we found stronger effects on receipt of some services for intervention families at "top rated" sites. However the effect of raising the already high levels of service receipt to even higher levels did not seem to affect outcomes.

In the second analysis, intervention children enrolled later had a lower odds than children who enrolled earlier of receiving some services and a higher odds of receiving others. There were few differential effects on outcomes. The findings from these two analyses reinforce key informant reports, which indicated that the HS components were made available at the start of the program and were implemented at all 15 sites.

Interpreting Odds Ratios

Regression results for dichotomous outcomes, adjusting for baseline family characteristics and site, are reported in terms of odds ratios. An odds ratio of *greater* than 1 indicates that subjects in the intervention group were *more* likely to report a given characteristic than were subjects in the control group; an odds ratio of *less* than 1 indicates that subjects in the intervention group were *less* likely to report a given characteristic than were subjects in the control group. An odds ratio of 1 indicates that there was no difference between intervention and control groups. Ninety-five percent confidence intervals are estimated; when this interval does not include one, it indicates a statistically significant difference (at the 0.05 level) between the intervention and control group.

12.2 Variation in National Program Site Ratings

The intent of the first comparison was to assess whether the variation in implementation observed by the NPO affected receipt of services by families and in turn parent and child outcomes. In this analysis, the quality ratings the NPO assigned to each site provided the measure of variation. The program ratings likely capture not only the "quality" of program implementation but also the "quality" of the site overall.

The NPO used an interactive statistical technique to elicit site ratings from staff at the NPO, The Commonwealth Fund, and Boston University (Trochim, 1985; Trochim, 1997; Trochim, 1998). For purposes of both developing the site rating factors and in providing ratings, the NPO team could draw upon multiple sources of information on implementation at the sites that had been available to them throughout the project. During two monitoring visits to sites, the team met with key clinicians, staff, and funders, and observed HS activities. After each visit, a formal report was circulated to staff at the NPO offices. Prior to the second monitoring visit, each site completed a self-report form that provided information on clinical and operational issues. In addition, regular Boston University technical assistance teleconferences were monitored and summarized by NPO staff, who circulated these to staff throughout the program.

The combined information from the interactive process provided a set of key site factors and quantitative rankings of the quality of implementation. The NPO analysis suggested that high quality sites were characterized by strong "buy-in" by practice staff, presence of a champion for HS, strong communication with the practice, and teamwork.

Seeking to answer the question, "Is the impact of HS greater at sites with the highest NPO ratings than at the less highly rated sites?", we assessed the difference in the effects of HS between families in care at the four "top rated" sites and those at the other 11 sites. The same co-variates were included in these analyses as were included in the overall analyses.

Children in the intervention group, whether at a "top rated" site or less highly rated site had significantly higher odds than children in the control group of receiving HS services (**Table 12.1**). Children at the four "top rated" sites had a higher odds than children at the other sites of receiving four or more HS services and information on community resources, discussing six topics, and receiving books. With few random exceptions, there were no differential effects on parent and child outcomes. The effect of raising the already high levels of service receipt to even higher levels did not seem to affect outcomes.

12.3 Variation in Experience with Implementation

In the second analysis, we hypothesized that as sites gained experience with the program, they might become more efficient at delivering HS services to families or that the nature or quality of the services might improve. If found, these changes might affect families in terms of receipt of services or program effects. Receipt of services and program effects were compared for families that entered care when sites had substantial experience implementing HS (after the first 100 families had been enrolled) and when they had less program experience (when 100 or fewer families had been enrolled). We included the same co-variates in these analyses as were in the overall analyses.

Intervention families, whether they enrolled early or late, had a far higher odds than their counterparts in the control group of receiving HS services (**Table 12.2**). Intervention children had higher odds of being vaccinated on time (although the differences for up-to-date vaccination were not significant for children who enrolled earlier). Mothers of children in the intervention group had a higher odds of being satisfied with care, regardless of when their children enrolled.

We found variation in the impact of HS on receipt of some services and on some outcomes between the two groups but they were not consistent between RND and QE sites. At QE sites, intervention children who enrolled later (after the first 100 children) had a significantly lower odds than children who enrolled earlier (first 100 children enrolled) of receiving several of the HS services. These services included one or more home visits, developmental assessments, and books to read. At QE sites, later-enrolled intervention children also had a lower odds than those enrolled earlier of receiving their 24-month well child visit on time. At RND sites, later-enrolled intervention children had a higher odds of receiving information on community resources as well as diagnosis and referral for developmental problems. At both RND and QE sites, intervention children in the later enrolled group also had a higher odds of being up-to-date on their vaccinations by 24 months of age.

The meaning of these results is not clear. It is possible that as the HS Specialist's workload increased at the QE sites, it became more difficult to schedule home visits, to schedule 24-month office visits, and to provide developmental assessments. HS Specialists may have had less time to spend developing relationships with families. Also, they may have taken advantage of referrals to outside resources rather than providing the service on site. Having more experience in providing services seemed to promote up-to-date vaccination. Nonetheless, the timing of the child's entry into the program seemed to have little influence on parent and child outcomes.

Healthy Steps Intervention Families:
■ Significantly More Likely than Control
◆ Significantly Less Likely than Control
□ Significant Effect Not Noted
▣ Significant Difference in Effects Between "Top Rated" and "Less Highly Rated" Groups

Table 12.1. Results of Regression Analyses Comparing Impacts on Receipt of Services and Program Effects for Families at 4 "Top Rated" Sites with Families at 11 Other Sites: Adjusted Odds Ratios and 95% Confidence Intervals

	Families at 4 "Top Rated" Sites	Families at 11 "Less Highly Rated" Sites	Difference Between Groups (t statistic)
RECEIPT OF SERVICES			
Received 4 or More HS Services from Practice (Excluding Home Visiting)	■ 34.68 (23.69, 50.79)	■ 15.55 (12.41, 19.47)	▣ 3.57
Someone Visited Parent or Child in Their Home Since 6 Months	■ 16.21 (11.56, 22.73)	■ 14.74 (11.92, 18.24)	□ 0.47
Someone in the Practice Talked with Parent or Gave them Information more than 6 topics	■ 14.22 (9.75, 20.76)	■ 8.78 (7.02, 10.98)	▣ 2.16
Given Developmental Assessment by Someone in Practice	■ 8.87 (6.29, 12.52)	■ 7.51 (6.12, 9.21)	□ 0.82
Received Books to Read to Their Child from Practice	■ 75.63 (46.55, 122.88)	■ 20.84 (16.54, 26.24)	▣ 4.71
Received Information About Community Resources From Someone in Practice	■ 6.46 (4.67, 8.94)	■ 3.59 (2.94, 4.38)	▣ 3.03
Child Received Services (Other Than Testing) For Problem With Walking, Taking, Hearing, or Using His/Her Hands	□ 0.85 (0.56, 1.29)	■ 1.42 (1.07, 1.89)	▣ -1.98
SATISFACTION WITH CARE			
Someone Went Out of Way to Help	■2.17 (1.64, 2.89)	■2.08 (1.74, 2.48)	□0.26
Disagree That MDs And NPs Provided "Support"To Parent	◆0.24 (0.14, 0.39)	◆0.42 (0.32, 0.54)	□-1.95
Disagree That MDs And NPs "Listened" To Parent	◆0.49 (0.31, 0.79)	◆0.74 (0.57, 0.97)	□-1.48
Disagree That MDs And NPs Respected Parent's Knowledge, Knew What Was Going On with the Child, and Made Them Feel Like They Were Doing a Good Job	□0.7 (0.45, 1.08)	□0.83 (0.64, 1.09)	□-0.69
Overall Perception Of Care At Practice (Good / Excellent)	□1.47 (0.89, 2.44)	□1.1 (0.82, 1.48)	□0.99
Overall Perception that Doctors and Nurses at the Practice Are Easy to Reach by Telephone	□0.87 (0.58, 1.29)	□0.94 (0.76, 1.16)	□-0.34
PARENT KNOWLEDGE, BELIEFS, PSYCHOLOGICAL HEALTH: MATERNAL DEPRESSION			
Percentage of Mothers with Depressive Symptoms (Score of 11 or Higher on Modified CES-D)	□1.43 (0.99, 2.08)	□1 (0.8, 1.25)	□1.62
PARENT KNOWLEDGE, BELIEFS, PSYCHOLOGICAL HEALTH: PARENT BEHAVIOR			
(Modified) Parent Behavior Checklist: nurturing % More Nurturing (≥63)	□1.15 (0.85, 1.55)	□1.08 (0.89, 1.31)	□0.35
(Modified) Parent Behavior Checklist: nurturing % Less Nurturing (≤44)	□0.77 (0.42, 1.4)	□0.98 (0.72, 1.33)	□-0.71
(Modified) Parent Behavior Checklist: Higher Expectations (>1 SD above mean)	□1.03 (0.71, 1.49)	□0.97 (0.79, 1.2)	□0.27
(Modified) Parent Behavior Checklist: Lower Expectations(>1 SD below mean)	□0.98 (0.67, 1.43)	□1.14 (0.9, 1.46)	□-0.68

	Families at 4 "Top Rated" Sites	Families at 11 "Less Highly Rated" Sites	Difference Between Groups (t statistic)
PARENT KNOWLEDGE, BELIEFS, PSYCHOLOGICAL HEALTH: PARENT BEHAVIOR			
(Modified): Parent Response to Misbehavior: Severe Physical Discipline: % ever slapped child in face or spanked with object	☐0.64 (0.37, 1.11)	☐0.76 (0.55, 1.04)	☐-0.53
(Modified): Parent Response to Misbehavior: Discipline: % Using Harsh Discipline (≥6)	☐0.64 (0.38, 1.06)	☐0.79 (0.61, 1.03)	☐-0.75
(Modified): Parent Response to Misbehavir: Discipline: % Using More Reasoning (≥9)	☐1 (0.72, 1.4)	☐1.17 (0.96, 1.42)	☐-0.78
PARENT KNOWLEDGE, BELIEFS, PSYCHOLOGICAL HEALTH: PARENT PRACTICES			
Parent Showed Picture Books Every day or More Often	☐0.81 (0.6, 1.09)	☐1.02 (0.85, 1.22)	☐-1.32
Family Follows At Least 3 Routines at Bedtime, Naptime, or Mealtime	☐1.05 (0.78, 1.41)	☐1.04 (0.87, 1.24)	☐0.03
Mother And Father Equally Or Father Usually Takes Child To Well Child Visits	☐1.32 (0.94, 1.84)	☐1.04 (0.85, 1.28)	☐1.17
Parent Lowered Temperature on Water Heater	☐0.95 (0.71, 1.25)	☐1.06 (0.89, 1.27)	☐-0.69
Family Uses Covers on Electric Outlets	☐0.79 (0.49, 1.28)	■1.32 (1.01, 1.72)	☐-1.81
Family Has Safety Latches on Cabinets	☐0.88 (0.67, 1.17)	☐1.11 (0.94, 1.32)	☐-1.39
Parent Knows a Number to Call if Concerned Child May Have Swallowed Something Harmful	☐1.5 (0.93, 2.43)	☐0.99 (0.76, 1.3)	☐1.47
Current Smokers in Household Who Smoke Outside	☐0.93 (0.52, 1.66)	☐1.33 (0.93, 1.91)	☐-1.02
CHILD OUTCOMES: HEALTH AND DEVELOPMENT			
Child is Very Healthy	☐1.39 (0.996, 1.94)	☐1.1 (0.9, 1.36)	☐1.16
Child's Health is Excellent	☐0.86 (0.66, 1.13)	☐1.01 (0.85, 1.2)	☐-0.98
Since Child Came Home from Hospital S/He Had Been Seriously Ill	☐0.88 (0.61, 1.26)	☐0.9 (0.7, 1.16)	☐-0.14
Age Child spoke Two-Word Sentences (did not speak 2-word sentences before 24 months of age)	☐0.94 (0.69, 1.28)	☐0.98 (0.8, 1.19)	☐-0.21
Age Child First Walked Without Holding On	☐1.28 (0.99, 1.66)	☐0.92 (0.78, 1.08)	☐2.14
Parent Very Satisfied with Child's Eating Habits	☐0.85 (0.72, 1.00)	☐0.92 (0.71, 1.19)	☐0.51
Parent Very Satisfied With Child's Sleeping Habits	◆0.76 (0.64, 0.91)	☐1.13 (0.86, 1.48)	■2.41
Parent Very Satisfied With Child's Bowel Habits	☐0.93 (0.69, 1.25)	☐0.94 (0.79, 1.13)	☐-0.07
Parent Very Satisfied With Progress Walking And Talking	☐1.1 (0.74, 1.64)	☐0.92 (0.72, 1.18)	☐0.76
Very Satisfied With How Well Child Understands What Respondent Says	☐0.9 (0.55, 1.47)	☐0.88 (0.66, 1.16)	☐0.11
CHILD OUTCOMES: CHILD'S PROBLEM BEHAVIOR			
CBCL: % More Aggressive (≥14)	☐1.06 (0.73, 1.55)	■1.4 (1.11, 1.76)	☐-1.21
CBCL: % More Destructive (≥8)	☐0.99 (0.61, 1.62)	☐1.01 (0.77, 1.33)	☐-0.06

	Families at 4 "Top Rated" Sites	Families at 11 "Less Highly Rated" Sites	Difference Between Groups (t statistic)
CHILD OUTCOMES: INJURIES AND HEALTH CARE UTILIZATION			
Injured Badly Enough To See Doctor	□1.35 (0.94, 1.95)	□0.86 (0.68, 1.09)	▣2.04
Number Of Emergency Room Visits In Past Year (1 or more)	□0.95 (0.7, 1.27)	□1.07 (0.9, 1.27)	□-0.71
One or More Emergency Room Visit for Injury-Related Causes in Past Year	□0.91 (0.58, 1.42)	□0.75 (0.57, 0.97)	□0.75
Number Of Hospitalizations (1 or More Times In Past Year)	□1.57 (0.89, 2.77)	□0.94 (0.66, 1.34)	□1.51
CHILD OUTCOMES: AGE-APPROPRIATE WELL CHILD CARE			
1 Month Well Child Visit *(Visit within 41 days of birth)*	■4.94 (2.11, 11.55)	■1.71 (1.15, 2.52)	▣2.23
2 Month Well Child Visit *(Visit between 42 days (1.5 months) and 92 days(3 months), inclusive)*	■2.51 (1.68, 3.75)	■1.86 (1.5, 2.3)	□1.29
4 Month Well Child Visit (*Visit between 93 days (3 months) and 151 days (5 months), inclusive)*	■2.07 (1.44, 2.97)	■1.42 (1.17, 1.72)	□1.78
6 Month Well Child Visit *(Visit between 152 days (5 months) and 213 days (7 months), inclusive)*	■1.89 (1.35, 2.64)	■1.39 (1.16, 1.66)	□1.59
9 Month Well Child Visit *(Visit between 244 days (8 months) and 305 days (10 months), inclusive)*	■2.08 (1.55, 2.8)	■1.55 (1.31, 1.83)	□1.71
12 Month Well Child Visit *(Visit between 336 days (11 months) and 397 days (14 months), inclusive)*	■1.86 (1.28, 2.72)	■1.77 (1.44, 2.18)	□0.23
15 Month Well Child Visit *(Visit between 427 days (14 months) and 488 days (17 months), inclusive)*	■1.69 (1.26, 2.27)	■1.83 (1.53, 2.2)	□-0.48
18 Month Well Child Visit (*Visit between 519 days (17 months) and 580 days (20 months), inclusive)*	■2.73 (2.03, 3.66)	■2.74 (2.28, 3.3)	□-0.04
24 Month Well Child Visit *(Visit between 701 days (23 months) and 762 days (28 months), inclusive)*	■1.83 (1.23, 2.71)	■1.66 (1.34, 2.06)	□0.42
CHILD OUTCOMES: AGE-APPROPRIATE VACCINATIONS			
DTP 1	■2.15 (1.33, 3.47)	■1.71 (1.35, 2.18)	□0.83
DTP 3	■1.99 (1.46, 2.7)	■1.36 (1.15, 1.61)	▣2.12
MMR 1	■1.78 (1.2, 2.64)	■1.45 (1.16, 1.82)	□0.89
CHILD OUTCOMES: CHILD UP-TO-DATE ON VACCINATIONS			
Up To Date At 24 Months (4 DTP, 3 OPV/IPV, 1MMR)	■1.78 (1.27, 2.49)	■1.36 (1.07, 1.74)	□1.25

Healthy Steps Intervention Families:
■ Significantly More Likely than Control
◆ Significantly Less Likely than Control
☐ Significant Difference Not Noted
▣ Significant Difference in Effects Between Experience Groups

Table 12.2. Receipt of Developmental Services and Healthy Steps Program Effects for Children Enrolled When the Site Had More Experience or Less: Adjusted Odds Ratios and 95% Confidence Intervals

	MORE EXPERIENCE More than 100 children enrolled at time of entry	LESS EXPERIENCE Less than or equal to 100 children enrolled at time of entry	Difference Between Groups (t statistic)
RECEIPT OF SERVICES			
Received 4 or More HS Services from Practice *(Excluding Home Visiting)*			
Randomization	■ 17.75 (12.66, 24.88)	■ 16.11 (11.56, 22.46)	☐ 0.51
Quasi-Experimental	■ 20.95 (15.33, 28.62)	■ 26.02 (18.64, 36.33)	☐ -1.37
Pooled	■ 18.58 (14.86, 23.24)	■ 20.64 (16.37, 26.02)	☐ -0.88
Someone Visited Parent or Child in Their Home Since 6 Months (30-33 Months)			
Randomization	■ 11.6 (8.47, 15.89)	■ 15.62 (11.22, 21.75)	☐ -1.68
Quasi-Experimental	■ 16.02 (12.12, 21.17)	■ 21.99 (16.31, 29.65)	▣ -2.22
Pooled	■ 13.11 (10.69, 16.07)	■ 17.99 (14.48, 22.34)	▣ -2.88
Someone in the Practice Talked with Parent or Gave them Information More than 6 Topics @ 30-33 Months			
Randomization	■ 8.54 (6.03, 12.11)	■ 8.58 (6.01, 12.24)	☐ -0.02
Quasi-Experimental	■ 11.39 (8.23, 15.77)	■ 13.55 (9.47, 19.4)	☐ -0.84
Pooled	■ 9.49 (7.51, 11.99)	■ 10.66 (8.31, 13.68)	☐ -0.78
Given Developmental Assessment by Someone in Practice			
Randomization	■ 6.79 (4.89, 9.44)	■ 7.46 (5.35, 10.4)	☐ -0.45
Quasi-Experimental	■ 7.45 (5.61, 9.89)	■ 11.01 (7.94, 15.28)	▣ -2.09
Pooled	■ 6.87 (5.56, 8.49)	■ 9.16 (7.27, 11.54)	▣ -2.11
Received Books to Read to Their Child from Practice			
Randomization	■ 32.88 (22.52, 48.01)	■ 25.85 (18.05, 37.02)	☐ 1.11
Quasi-Experimental	■ 24.09 (17.26, 33.6)	■ 37.74 (25.85, 55.09)	▣ -2.33
Pooled	■ 26.1 (20.46, 33.29)	■ 30.09 (23.28, 38.89)	☐ -1.01
Received Information About Community Resources From Someone in Practice			
Randomization	■ 4.19 (3.11, 5.63)	■ 2.93 (2.18, 3.94)	▣ 2.26
Quasi-Experimental	■ 4.97 (3.81, 6.48)	■ 4.94 (3.73, 6.54)	☐ 0.04
Pooled	■ 4.55 (3.74, 5.53)	■ 3.96 (3.24, 4.84)	☐ 1.35

	MORE EXPERIENCE More than 100 children enrolled at time of entry	LESS EXPERIENCE Less than or equal to 100 children enrolled at time of entry	Difference Between Groups (t statistic)
Child Diagnosed or Referred for Problem with Walking, Talking, Hearing, or Using His/Her Hands			
Randomization	□ 1.34 (0.91, 1.99)	◆ 0.62 (0.39, 0.98)	▣ 3.02
Quasi-Experimental	■ 1.79 (1.23, 2.6)	□ 1.37 (0.9, 2.09)	□ 1.25
Pooled	■ 1.51 (1.15, 1.97)	□ 0.91 (0.67, 1.24)	▣ 3.11
PARENT KNOWLEDGE, BELIEFS, PSYCHOLOGICAL HEALTH: SATISFACTION WITH CARE			
Someone Went Out of Way to Help			
Randomization	■ 1.98 (1.50, 2.60)	■ 2.15 (1.63, 2.83)	□ -0.51
Quasi-Experimental	■ 2.00 (1.58, 2.54)	■ 2.25 (1.74, 2.91)	□ -0.82
Pooled	■ 1.99 (1.67, 2.38)	■ 2.24 (1.86, 2.69)	□ -1.07
Disagree that MDs and NPs Provided "Support" to Parent [6]			
Randomization	◆ 0.41 (0.26, 0.65)	◆ 0.47 (0.3, 0.74)	□ -0.52
Quasi-Experimental	◆ 0.27 (0.18, 0.39)	◆ 0.39 (0.27, 0.56)	□ -1.59
Pooled	◆ 0.32 (0.24, 0.43)	◆ 0.42 (0.32, 0.56)	□ -1.5
Disagree that MDs and NPs "Listened" to Parent			
Randomization	◆ 0.61 (0.38, 0.97)	□ 0.76 (0.49, 1.17)	□ -0.78
Quasi-Experimental	◆ 0.55 (0.37, 0.8)	□ 0.8 (0.55, 1.15)	□ -1.72
Pooled	◆ 0.57 (0.43, 0.76)	□ 0.79 (0.6, 1.04)	□ -1.91
Disagree that MDs and NPs Respected Parent's Knowledge, Knew What Was Going On with the Child, and Made Them Feel Like Thy Were Doing a Good Job [8]			
Randomization	□ 0.96 (0.62, 1.48)	□ 1.09 (0.71, 1.65)	□ -0.52
Quasi-Experimental	◆ 0.67 (0.47, 0.96)	◆ 0.65 (0.44, 0.95)	□ 0.14
Pooled	□ 0.78 (0.59, 1.02)	□ 0.81 (0.61, 1.07)	□ -0.28
Overall Perception of Care at Practice (good/excellent)			
Randomization	□ 1.05 (0.65, 1.69)	□ 1.34 (0.82, 2.2)	□ -0.86
Quasi-Experimental	□ 1.31 (0.87, 1.97)	□ 1.12 (0.74, 1.7)	□ 0.64
Pooled	□ 1.19 (0.87, 1.62)	□ 1.18 (0.86, 1.62)	□ 0.04
Overall perception that Doctors and Nurses at the Practice Are Easy to Reach by Telephone			
Randomization	□ 0.93 (0.67, 1.29)	□ 1.13 (0.81, 1.58)	□ -1
Quasi-Experimental	□ 0.84 (0.62, 1.14)	□ 0.79 (0.58, 1.09)	□ 0.34
Pooled	□ 0.89 (0.72, 1.11)	□ 0.95 (0.76, 1.2)	□ -0.52

	MORE EXPERIENCE More than 100 children enrolled at time of entry	LESS EXPERIENCE Less than or equal to 100 children enrolled at time of entry	Difference Between Groups (t statistic)
PARENT KNOWLEDGE, BELIEFS, PSYCHOLOGICAL HEALTH: MATERNAL DEPRESSION			
CES-D 11 Or Higher			
Randomization	☐ 1.02 (0.71, 1.45)	☐ 1.34 (0.95, 1.88)	☐ -1.39
Quasi-Experimental	☐ 1.02 (0.75, 1.39)	☐ 1.03 (0.74, 1.43)	☐ -0.05
Pooled	☐ 1.02 (0.81, 1.29)	☐ 1.19 (0.95, 1.51)	☐ -1.16
PARENT KNOWLEDGE, BELIEFS, PSYCHOLOGICAL HEALTH: PARENT BEHAVIOR			
(Modified) Parent Behavior Checklist: % More Nurturing (≥ 63)			
Randomization	☐ 1.06 (0.78, 1.44)	☐ 1.18 (0.88, 1.6)	☐ -0.65
Quasi-Experimental	☐ 1.08 (0.84, 1.4)	☐ 1.09 (0.84, 1.43)	☐ -0.07
Pooled	☐ 1.06 (0.87, 1.29)	☐ 1.14 (0.93, 1.39)	☐ -0.65
(Modified) Parent Behavior Checklist: % Less Nurturing (≤ 44)			
Randomization	☐ 1.17 (0.73, 1.89)	☐ 0.82 (0.49, 1.38)	☐ 1.22
Quasi-Experimental	☐ 0.81 (0.52, 1.26)	☐ 0.9 (0.56, 1.44)	☐ -0.42
Pooled	☐ 0.98 (0.71, 1.35)	☐ 0.89 (0.63, 1.25)	☐ 0.5
(Modified) Parent Behavior Checklist: Higher Expectations (>1 SD above mean)			
Randomization	☐ 0.92 (0.66, 1.29)	☐ 1.01 (0.73, 1.41)	☐ -0.48
Quasi-Experimental	☐ 1.03 (0.78, 1.38)	☐ 0.92 (0.67, 1.25)	☐ 0.70
Pooled	☐ 1 (0.8, 1.24)	☐ 0.97 (0.78, 1.21)	☐ 0.22
(Modified) Parent Behavior Checklist: Lower Expectations (> 1 SD below mean)			
Randomization	☐ 1.13 (0.78, 1.62)	☐ 0.78 (0.53, 1.16)	☐ 1.63
Quasi-Experimental	☐ 1.1 (0.79, 1.54)	☐ 1.36 (0.97, 1.9)	☐ -1.16
Pooled	☐ 1.1 (0.86, 1.4)	☐ 1.09 (0.85, 1.39)	☐ 0.10
PARENT KNOWLEDGE, BELIEFS, PSYCHOLOGICAL HEALTH: PARENTING BEHAVIOR			
(Modified): Parent Response to Misbehavior: % slapped child in face or spanked with object			
Randomization	☐ 0.9 (0.54, 1.5)	☐ 0.75 (0.44, 1.28)	☐ 0.60
Quasi-Experimental	☐ 0.66 (0.42, 1.02)	0.69 (0.43, 1.11)	☐ -0.19
Pooled	☐ 0.74 (0.53, 1.02)	☐ 0.71 (0.5, 1.01)	☐ 0.16
(Modified): Parent Response to Misbehavior: % Using Harsh Discipline (≥6)			
Randomization	☐ 0.63 (0.4, 1)	☐ 0.91 (0.59, 1.4)	☐ -1.38
Quasi-Experimental	☐ 0.86 (0.6, 1.23)	☐ 0.73 (0.49, 1.1)	☐ 0.68
Pooled	☐ 0.74 (0.56, 0.97)	☐ 0.78 (0.59, 1.05)	☐ -0.38

	MORE EXPERIENCE More than 100 children enrolled at time of entry	LESS EXPERIENCE Less than or equal to 100 children enrolled at time of entry	Difference Between Groups (t statistic)
(Modified): Parent Response to Misbehavior: Discipline: % Using More Reasoning (≥ 9)			
Randomization	☐ 1.23 (0.89, 1.7)	☐ 1.1 (0.8, 1.51)	☐ 0.61
Quasi-Experimental	☐ 0.97 (0.75, 1.26)	☐ 1.27 (0.95, 1.69)	☐ -1.71
Pooled	☐ 1.06 (0.87, 1.29)	☐ 1.2 (0.97, 1.48)	☐ -1.07
PARENT KNOWLEDGE, BELIEFS, PSYCHOLOGICAL HEALTH: PARENT PRACTICES			
Parent Showed Picture Books Every Day or More Often			
Randomization	☐ 0.92 (0.69, 1.21)	☐ 0.96 (0.73, 1.27)	☐ -0.28
Quasi-Experimental	☐ 0.99 (0.77, 1.26)	☐ 0.98 (0.75, 1.27)	☐ 0.06
Pooled	☐ 0.95 (0.79, 1.14)	☐ 0.97 (0.8, 1.17)	☐ -0.17
Family Followed at Least 3 Routines at 30-33 Months			
Randomization	☐ 0.9 (0.68, 1.2)	☐ 1.02 (0.76, 1.35)	☐ -0.71
Quasi-Experimental	☐ 0.99 (0.78, 1.25)	☐ 1.24 (0.96, 1.61)	☐ -1.6
Pooled	☐ 0.96 (0.8, 1.15)	☐ 1.15 (0.95, 1.39)	☐ -1.73
Mother and Father Equally or Father Usually Take Child to Well Child Visits			
Randomization	☐ 1.11 (0.81, 1.52)	☐ 1.18 (0.87, 1.61)	☐ -0.35
Quasi-Experimental	☐ 0.99 (0.74, 1.32)	☐ 1.13 (0.84, 1.51)	☐ -0.8
Pooled	☐ 1.05 (0.85, 1.3)	☐ 1.17 (0.95, 1.45)	☐ -0.93
Parent Lowered Temperature on Water Heater			
Randomization	☐ 1.19 (0.9, 1.57)	■ 1.45 (1.1, 1.91)	☐ -1.22
Quasi-Experimental	☐ 0.81 (0.63, 1.03)	☐ 0.88 (0.69, 1.14)	☐ -0.65
Pooled	☐ 0.96 (0.81, 1.15)	☐ 1.1 (0.92, 1.32)	☐ -1.27
Family Uses Covers on Electric Outlets			
Randomization	☐ 1.06 (0.7, 1.61)	■ 2.05 (1.24, 3.4)	▣ -2.34
Quasi-Experimental	☐ 1.2 (0.82, 1.76)	☐ 0.85 (0.58, 1.24)	☐ 1.59
Pooled	☐ 1.14 (0.86, 1.5)	☐ 1.2 (0.9, 1.61)	☐ -0.32
Family Has Safety Latches on Cabinets			
Randomization	☐ 1.16 (0.89, 1.51)	☐ 1.07 (0.82, 1.39)	☐ 0.5
Quasi-Experimental	☐ 1.05 (0.84, 1.33)	☐ 0.9 (0.7, 1.15)	☐ 1.19
Pooled	☐ 1.11 (0.93, 1.32)	☐ 0.98 (0.82, 1.17)	☐ 1.27

	MORE EXPERIENCE More than 100 children enrolled at time of entry	LESS EXPERIENCE Less than or equal to 100 children enrolled at time of entry	Difference Between Groups (t statistic)
Parent Knows a Number to Call if Concerned Child May have Swallowed Something Harmful			
Randomization	☐ 1.2 (0.76, 1.88)	☐ 1.56 (0.96, 2.54)	☐ -0.94
Quasi-Experimental	☐ 0.98 (0.68, 1.41)	☐ 0.9 (0.62, 1.32)	☐ 0.39
Pooled	☐ 1.06 (0.8, 1.41)	☐ 1.13 (0.85, 1.52)	☐ -0.38
Current Smokers in Household Who Smoke Outside			
Randomization	☐ 1.14 (0.67, 1.94)	☐ 1.01 (0.6, 1.71)	☐ 0.38
Quasi-Experimental	☐ 1.03 (0.62, 1.71)	☐ 1.76 (0.97, 3.2)	☐ -1.65
Pooled	☐ 1.1 (0.77, 1.58)	☐ 1.34 (0.91, 1.97)	☐ -0.91
CHILD OUTCOMES: HEALTH AND DEVELOPMENT			
Child Is Very Healthy			
Randomization	☐ 1.05 (0.76, 1.44)	☐ 1.33 (0.97, 1.81)	☐ -1.33
Quasi-Experimental	☐ 1.13 (0.86, 1.5)	☐ 1.26 (0.94, 1.69)	☐ -0.67
Pooled	☐ 1.09 (0.89, 1.35)	■ 1.27 (1.03, 1.57)	☐ -1.28
Child's Health Is Excellent			
Randomization	☐ 0.99 (0.76, 1.3)	☐ 0.82 (0.63, 1.06)	☐ 1.29
Quasi-Experimental	☐ 1.16 (0.92, 1.47)	☐ 0.89 (0.7, 1.14)	☐ 1.94
Pooled	☐ 1.08 (0.91, 1.29)	☐ 0.86 (0.72, 1.03)	■ 2.26
Since Child Came Home from Hospital S/He Had Been Seriously Ill			
Randomization	☐ 0.85 (0.59, 1.23)	☐ 0.79 (0.54, 1.14)	☐ 0.37
Quasi-Experimental	☐ 0.88 (0.62, 1.26)	☐ 1.06 (0.74, 1.51)	☐ -0.92
Pooled	☐ 0.87 (0.68, 1.12)	☐ 0.92 (0.71, 1.18)	☐ -0.32
Age Child Spoke Two-Word Sentences (did not speak 2-word sentences before 24 months of age)			
Randomization	☐ 0.78 (0.56, 1.08)	☐ 0.99 (0.73, 1.36)	☐ -1.29
Quasi-Experimental	☐ 1.14 (0.88, 1.47)	☐ 0.92 (0.7, 1.22)	☐ 1.39
Pooled	☐ 0.98 (0.8, 1.19)	☐ 0.95 (0.78, 1.17)	☐ 0.26
Age Child First Walked without Holding On (walked before 12 months of age)			
Randomization	☐ 1.23 (0.95, 1.59)	☐ 1.26 (0.98, 1.63)	☐ -0.18
Quasi-Experimental	☐ 0.84 (0.68, 1.04)	☐ 0.86 (0.68, 1.08)	☐ -0.20
Pooled	☐ 0.99 (0.84, 1.17)	☐ 1.02 (0.86, 1.2)	☐ -0.24

	MORE EXPERIENCE More than 100 children enrolled at time of entry	LESS EXPERIENCE Less than or equal to 100 children enrolled at time of entry	Difference Between Groups (t statistic)
Parent Very Satisfied with Child's Eating Habits			
Randomization	☐ 0.83 (0.65, 1.07)	☐ 0.98 (0.76, 1.26)	☐ -1.10
Quasi-Experimental	◆ 0.80 (0.65, 1.00)	☐ 0.87 (0.69, 1.10)	◆ -0.64
Pooled	◆ 0.83 (0.70, 0.97)	☐ 0.92 (0.78, 1.09)	☐ –1.16
Parent Very Satisfied with Child's Sleeping Habits			
Randomization	☐ 0.88 (0.67, 1.15)	☐ 0.82 (0.63, 1.07)	☐ 0.47
Quasi-Experimental	☐ 0.83 (0.66, 1.05)	☐ 0.86 (0.67, 1.10)	☐ –0.25
Pooled	☐ 0.86 (0.73, 1.03)	☐ 0.85 (0.71, 1.01)	☐ 0.18
Parent Very Satisfied with Child's Bowel Habits			
Randomization	☐ 0.85 (0.64, 1.14)	☐ 0.88 (0.66, 1.17)	☐ -0.17
Quasi-Experimental	☐ 1 (0.79, 1.28)	☐ 0.94 (0.72, 1.21)	☐ 0.49
Pooled	☐ 0.94 (0.78, 1.13)	☐ 0.94 (0.78, 1.13)	☐ 0.04
CHILD OUTCOMES: HEALTH AND DEVELOPMENT			
Parent Very Satisfied with Progress Walking and Talking			
Randomization	☐ 1.03 (0.69, 1.53)	■ 1.65 (1.07, 2.54)	☐ -1.91
Quasi-Experimental	◆ 0.72 (0.52, 0.99)	☐ 0.91 (0.63, 1.3)	☐ -1.25
Pooled	☐ 0.84 (0.66, 1.07)	☐ 1.16 (0.88, 1.52)	▣ -2.17
Very Satisfied with How Well Child Understands What Respondent Says			
Randomization	☐ 1.14 (0.72, 1.81)	☐ 1.37 (0.86, 2.17)	☐ -0.66
Quasi-Experimental	☐ 0.69 (0.47, 1.01)	☐ 0.68 (0.45, 1.03)	☐ 0.03
Pooled	☐ 0.86 (0.65, 1.15)	☐ 0.91 (0.67, 1.23)	☐ -0.31
CHILD OUTCOMES: CHILD'S PROBLEM BEHAVIOR			
CBCL: % More Aggressive (≥ 14)			
Randomization	■ 1.48 (1.05, 2.09)	☐ 0.96 (0.66, 1.39)	▣ 2.11
Quasi-Experimental	◆ 1.45 (1.06, 1.98)	☐ 1.34 (0.95, 1.88)	☐ 0.45
Pooled	■ 1.44 (1.15, 1.81)	☐ 1.14 (0.89, 1.46)	☐ 1.76
CBCL: % More Problems Sleeping (≥ 6)			
Randomization	☐ 1.43 (0.99, 2.06)	☐ 1.3 (0.9, 1.89)	☐ 0.45
Quasi-Experimental	☐ 1.24 (0.9, 1.71)	☐ 1.18 (0.84, 1.67)	☐ 0.27
Pooled	■ 1.3 (1.03, 1.65)	☐ 1.23 (0.96, 1.57)	☐ 0.44

	MORE EXPERIENCE More than 100 children enrolled at time of entry	LESS EXPERIENCE Less than or equal to 100 children enrolled at time of entry	Difference Between Groups (t statistic)
CHILD OUTCOMES: INJURIES AND HEALTH CARE UTILIZATION			
Injured Badly Enough to See a Doctor			
Randomization	☐ 1.13 (0.79, 1.62)	☐ 0.97 (0.67, 1.39)	☐ 0.75
Quasi-Experimental	☐ 0.93 (0.67, 1.27)	☐ 0.99 (0.71, 1.38)	☐ -0.34
Pooled	☐ 1 (0.79, 1.26)	☐ 0.98 (0.77, 1.25)	☐ 0.14
Number of Emergency Room Visits in Past Year (1 or more)			
Randomization	☐ 1.19 (0.9, 1.57)	☐ 1.23 (0.93, 1.62)	☐ -0.21
Quasi-Experimental	☐ 0.84 (0.67, 1.06)	☐ 1.02 (0.8, 1.3)	☐ -1.37
Pooled	☐ 0.97 (0.81, 1.15)	☐ 1.13 (0.94, 1.35)	☐ -1.5
One or More Emergency Room Visit for Injury-Related Causes in Past Year			
Randomization	☐ 0.96 (0.62, 1.49)	☐ 0.91 (0.59, 1.41)	☐ 0.2
Quasi-Experimental	◆ 0.66 (0.46, 0.95)	◆ 0.67 (0.46, 0.99)	☐ -0.06
Pooled	☐ 0.78 (0.59, 1.03)	☐ 0.79 (0.6, 1.05)	☐ -0.06
Number of Hospitalizations (1 0r More Times in Past Year @ 30-33 Months)			
Randomization	☐ 1.5 (0.91, 2.46)	☐ 1.11 (0.66, 1.87)	☐ 1.04
Quasi-Experimental	☐ 0.81 (0.48, 1.38)	☐ 1.25 (0.74, 2.11)	☐ -1.42
Pooled	☐ 1.08 (0.76, 1.54)	☐ 1.1 (0.76, 1.57)	☐ -0.07
CHILD OUTCOMES: AGE-APPROPRIATE WELL CHILD CARE			
1 Month Well Child Visit (*Visit within 41 days of birth*)			
Randomization	☐ 1.88 (0.97, 3.66)	☐ 1.5 (0.82, 2.73)	☐ 0.57
Quasi-Experimental	■ 3.13 (1.6, 6.13)	■ 2.62 (1.37, 5.02)	☐ 0.41
Pooled	■ 2.42 (1.51, 3.86)	■ 1.89 (1.23, 2.92)	☐ 0.85
2 Month Well Child Visit (*Visit between 42 days (1.5 months) and 92 days (3 months), inclusive)*			
Randomization	■ 2.74 (1.82, 4.14)	■ 1.9 (1.32, 2.73)	☐ 1.5
Quasi-Experimental	■ 2.03 (1.5, 2.76)	■ 1.86 (1.37, 2.53)	☐ 0.48
Pooled	■ 2.22 (1.74, 2.83)	■ 1.79 (1.42, 2.26)	☐ 1.47
4 Month Well Child Visit (*Visit between 93 days (3 months) and 151 days (5 months), inclusive*)			
Randomization	■ 1.44 (1.04, 2)	■ 1.56 (1.12, 2.15)	☐ -0.39
Quasi-Experimental	■ 1.72 (1.3, 2.26)	■ 1.58 (1.19, 2.1)	☐ 0.48
Pooled	■ 1.59 (1.29, 1.96)	■ 1.5 (1.22, 1.86)	☐ 0.42

	MORE EXPERIENCE More than 100 children enrolled at time of entry	LESS EXPERIENCE Less than or equal to 100 children enrolled at time of entry	Difference Between Groups (t statistic)
6 Month Well Child Visit (*Visit between 152 days (5 months) and 213 days (7 months), inclusive*)			
Randomization	■ 1.88 (1.36, 2.61)	■ 1.47 (1.08, 2.01)	☐ 1.28
Quasi-Experimental	■ 1.41 (1.09, 1.81)	■ 1.44 (1.11, 1.87)	☐ -0.17
Pooled	■ 1.54 (1.27, 1.88)	■ 1.44 (1.18, 1.75)	☐ 0.61
9 Month Well Child Visit (*Visit between 244 days (8 months) and 305 days (10 months), inclusive)*			
Randomization	☐ 1.23 (0.9, 1.68)	☐ 1.1 (0.81, 1.48)	☐ 0.65
Quasi-Experimental	■ 2.15 (1.73, 2.67)	■ 1.87 (1.5, 2.33)	☐ 1.08
Pooled	■ 1.78 (1.49, 2.12)	■ 1.55 (1.3, 1.85)	☐ 1.31
12 Month Well Child Visit *(Visit between 336 days (11 months) and 397 days (14 months), inclusive)*			
Randomization	■ 1.85 (1.27, 2.69)	■ 1.68 (1.17, 2.4)	☐ 0.43
Quasi-Experimental	■ 1.85 (1.4, 2.46)	■ 1.85 (1.37, 2.49)	☐ 0.01
Pooled	■ 1.82 (1.46, 2.28)	■ 1.76 (1.4, 2.21)	☐ 0.26
15 Month Well Child Visit *(Visit between 427 days (14 months) and 488 days (17 months), inclusive)*			
Randomization	■ 1.61 (1.18, 2.19)	☐ 1.17 (0.87, 1.57)	☐ 1.8
Quasi-Experimental	■ 2.22 (1.75, 2.82)	■ 2.14 (1.67, 2.74)	☐ 0.27
Pooled	■ 1.94 (1.61, 2.34)	■ 1.65 (1.37, 1.99)	☐ 1.49
18 Month Well Child *(Visit between 519 days (17 months) and 580 days (20 months), inclusive*)			
Randomization	■ 2.17 (1.61, 2.93)	■ 2.01 (1.5, 2.71)	☐ 0.44
Quasi-Experimental	■ 3.35 (2.61, 4.32)	■ 3.42 (2.63, 4.43)	☐ -0.12
Pooled	■ 2.73 (2.26, 3.31)	■ 2.74 (2.26, 3.33)	☐ -0.02
24 Month Well Child Visit *(Visit between 701 days (23 months) and 762 days (28 months), inclusive)*			
Randomization	■ 1.91 (1.34, 2.71)	■ 2.84 (1.94, 4.15)	☐ -1.78
Quasi-Experimental	☐ 1.16 (0.86, 1.55)	■ 1.68 (1.22, 2.31)	▣ -2.16
Pooled	■ 1.41 (1.13, 1.76)	■ 2.09 (1.65, 2.66)	▣ -2.91

	MORE EXPERIENCE More than 100 children enrolled at time of entry	LESS EXPERIENCE Less than or equal to 100 children enrolled at time of entry	Difference Between Groups (t statistic)
CHILD OUTCOMES: AGE-APPROPRIATE VACCINATIONS			
DTP 1			
Randomization	■ 2.15 (1.37, 3.38)	■ 1.89 (1.24, 2.87)	□ 0.48
Quasi-Experimental	■ 1.91 (1.34, 2.73)	■ 1.59 (1.12, 2.26)	□ 0.83
Pooled	■ 1.95 (1.48, 2.58)	■ 1.66 (1.27, 2.16)	□ 0.98
DTP 3			
Randomization	■ 1.55 (1.15, 2.09)	■ 1.42 (1.06, 1.91)	□ 0.49
Quasi-Experimental	■ 1.67 (1.33, 2.11)	■ 1.39 (1.1, 1.75)	□ 1.37
Pooled	■ 1.6 (1.34, 1.92)	■ 1.38 (1.15, 1.66)	□ 1.39
MMR 1			
Randomization	□ 1.37 (0.93, 2.02)	■ 1.52 (1.04, 2.23)	□ -0.44
Quasi-Experimental	■ 1.66 (1.21, 2.27)	■ 1.54 (1.12, 2.13)	□ 0.38
Pooled	■ 1.54 (1.21, 1.96)	■ 1.52 (1.19, 1.94)	□ 0.08
CHILD OUTCOMES: CHILD UP-TO-DATE ON VACCINATIONS			
Up-to-Date at 24 Months (4 DTP, 3 OPV/IPV, 1 MMR)			
Randomization	■ 1.88 (1.31, 2.69)	□ 1.26 (0.91, 1.76)	▣ 2.00
Quasi-Experimental	■ 1.84 (1.29, 2.64)	□ 1.1 (0.79, 1.53)	▣ 2.59
Pooled	■ 1.9 (1.48, 2.44)	□ 1.22 (0.97, 1.53)	▣ 3.22

13. The Evaluation at Affiliate Sites

The Evaluation at Affiliate Sites

In this chapter, the results of the affiliate evaluation are summarized. Six sites, comprising seven primary care practices, participated in the affiliate evaluation. These sites met the same requirements as the sites selected for the national evaluation *except they did not have a comparison group*.

The affiliate sites fully implemented the same program as the sites in the national evaluation. However, families participating in the affiliate evaluation were somewhat different from families participating in the national evaluation. They tended to be younger, less well educated, poorer, and more diverse racially and ethnically.

Results from the affiliate evaluation reinforce the results of the national evaluation. Healthy Steps was well implemented. The key to the program was the relationship that developed between the Healthy Steps Specialist and families, which in turn strengthened the relationship of the family with their primary care provider and ultimately the practice. Healthy Steps improved clinicians' and families' satisfaction with pediatric care. It increased the amount of preventive health care children received. The unique contribution of the affiliation evaluation is that it demonstrated that HS can be successfully implemented with a low income, high risk population.

13. THE EVALUATION AT AFFILIATE SITES

13.1. Introduction

In this chapter, the results of the affiliate evaluation are summarized. Six sites, comprising seven primary care practices, participated in the affiliate evaluation. These sites met the same requirements as the sites selected for the national evaluation *except they did not have a comparison group*. The sites fully implemented the same program as the sites in the national evaluation.

Families participating in the affiliate evaluation were somewhat different from families participating in the national evaluation. Compared to families at the national sites, families at the affiliate sites tended to be:

- younger -- 24% were teenagers at the time of their child's birth compared to 14%;
- less well educated -- 46% had not graduated from high school compared to 18%;
- of Hispanic origin -- 50% described their race as White and 56% reported they were of Hispanic origin, compared to 58% and 20%, respectively; and,
- poorer -- for 54%, maternity care was paid for by Medicaid, compared to 32%.

Families and clinicians participating in the affiliate evaluation completed many of the same evaluation instruments used in the national evaluation. These included key informant interviews at baseline and 30 months; provider surveys at baseline and 30 months; Healthy Steps (HS) Specialists' logs of contacts; a newborn form at enrollment; and parent questionnaires at 6, 12, 18 and 24 months. Unlike families in the national evaluation, affiliate families did not participate in the telephone interviews at 2-4 months or 30-33 months. Instead, they participated in a telephone interview when their child was 18 months old. In addition, although a review of the child's medical record was conducted, data were abstracted through only the first year of the child's life.

In general, the results from the affiliate evaluation tell a story that is very similar to the results of the national evaluation. All affiliate sites implemented the HS program. This included not only implementing the seven components of the program, but also integrating the HS Specialist into the practice and establishing a team approach to the delivery of pediatric care.

13.2. Implementing Healthy Steps

As was the case with sites in the national evaluation:

- Lead pediatricians at affiliate sites ranked the role of the HS Specialist as the most valuable part of the program. The HS components ranked most valuable by the majority of lead pediatricians and HS Specialists included linked/joint well child visits and enhanced pediatric strategies.

- Key informants reported the overall practice environment generally improved from start-up to 30 months into the program. Informants at affiliate sites had a slightly more favorable impression of the practice environment than did key informants at national sites. At 30 months, all site administrators and lead pediatricians who were interviewed at affiliate sites rated the practice environment as *good or very good*, compared to 73% and 87% (respectively) at national sites. At both national and affiliate sites, the HS Specialists interviewed rated the practice environment less favorably than other respondents. However, the HS Specialists at affiliate sites were slightly more positive than those at national sites: 30 months into the program, 37% of HS Specialists rated the practice environment as *okay, poor or very poor*, compared to 42% at national sites.

- Key informants and other providers at affiliate sites reported that team work improved over the course of the program—perhaps less so than at the national sites. In a survey of providers at start-up, 38% of clinicians (physicians and nurse practitioners) at affiliate sites said they *rarely* or *never* worked as a team during well child visits; 30 months into the program, only 14% felt that way. However, only 38% said they *always* or *often* worked as a team, compared to 65% of clinicians at national sites.

Interestingly, HS Specialists' reports of their overall relationships with other clinicians and administrative staff at the practice were, in general, more favorable at affiliate sites. HS Specialists reported the least favorable relationship with the lead pediatrician; 67% rated their overall relationship with the lead pediatrician as *good* or *very good.* At national sites, HS Specialists reported the least positive relationship with the site administrator. Only 39% rated this relationship as *good* or *very good.*

- Affiliate sites had the most difficulty implementing the parent groups. No sites had weekly parent groups; few sites had monthly parent groups. Two sites discontinued the parent groups.

13.3. Clinicians and Practice Staff

As was the case with clinical and administrative staff in the national evaluation:

- All those in the practice who worked with the HS Specialists acknowledged the benefits that this new professional brought to the practice. In general, however, they were less favorable than clinicians and staff at national sites. Their appreciation of the HS Specialists' role increased over time. Nurses and other clinical staff generally had a less favorable view of the benefits of the HS Specialist and program than clinicians.

13.4. Affiliate Families

As was the case with families in the national evaluation:

- The vast majority of affiliate families received HS services. According to HS Specialists' reports:
    - 99% of affiliate families received at least one office visit; 84% had at least one phone contact; 81% had at least one home visit; and 20% attended at least one parent group during the first 32 months of life.
    - During the first year, the average family received 5.4 office visits, 3 telephone contacts and 1.4 home visits. The average

affiliate family did not attend a parent group during the first year.

- Sites varied considerably in the type and number of contacts made with families.
- Child development was almost universally discussed with affiliate families. Other important topics such as child nutrition and health, injury prevention, family and maternal health, and support were addressed with a large proportion of families.

Affiliate parents reported receiving HS services at high levels similar to those reported by national evaluation families. At 18 months, the majority of families who were interviewed reported receiving enhanced well child visits (99%), home visits (91%), and telephone contacts with the HS Specialist (67%). Only 39% of interviewed parents said they attended a parent group. They also reported receiving information on: home safety (94%); child development (91%); car seats (86%); routines (86%); and discipline (81%). Fewer parents reported receiving information on: sleep problems (74%); language development (74%); child independence (61%); sibling rivalry (42%); and toilet training (41%).

- The majority of affiliate families found all HS services to be *very helpful* or *helpful.* The most helpful service was the enhanced office visits: 71% found it to be *very helpful* and 25% *helpful.* Nearly all families who received information on child development found it to be *very helpful* or *helpful (*less than 1% reported it was not useful at all). The least useful information parents received had to do with sibling rivalry: 8% of families who received information on this topic said it was *not useful at all (*41% of affiliate families were first-time parents).

- Affiliate families were extremely satisfied with their HS Specialists -- 84% found the HS Specialist to be *very helpful* and 72% said the HS Specialist was the person at the practice who *went out of their way to help them.*

- Affiliate families appeared to be highly satisfied with the care they received as part of HS. Nearly all families (97%) said they would recommend their pediatric provider to a friend. Nearly half of interviewed families (48%) said they would spend $100 or more to continue to receive HS services for a year.

- Levels of recommended parenting practices were high among affiliate parents. The majority of families reported using safety devices; establishing routines regarding mealtime, naptime, and bedtime; and talking and playing with their child. There was limited evidence to suggest that parenting practices changed during the program. Over the course of the program, the probability that an affiliate mother or father read or showed a book to their child every day increased. However, at 18 months, only 60% of mothers said they read to their child at least once a day and reported that even fewer fathers (38%) did so.

As was the case with children in the national evaluation:

- Affiliate children received age-appropriate well child care. A greater percentage of affiliate children than children who received care at the practice prior to HS received a Denver Developmental Screening Tool (DDST) by 12 months and made age-appropriate well child visits. At several sites, more affiliate children had immunizations that were up-to-date at 12 months than did children who received care at the practice prior to HS.

Results from the affiliate evaluation reinforce the results of the national evaluation. Healthy Steps was well implemented. The key to the program was the relationship that developed between the HS Specialist and families, which in turn strengthened the relationship of the family with their primary care provider and ultimately the practice. Healthy Steps improved clinicians' and families' satisfaction with pediatric care. It increased the amount of preventive health care children received. The unique contribution of the affiliation evaluation is that it demonstrated that HS can be successfully implemented with a low income, high risk population.

14. Healthy Steps: The Embedded Study

The Embedded Study

The Embedded Study was designed to supplement the National Evaluation of the Healthy Steps for Young Children Program. Because some of the effects of Healthy Steps on parents and children were likely to be subtle, it was important to collect data by direct observation, which would provide an enhanced picture of parent and child functioning through more sensitive measures of parental and child behaviors. However, because the national evaluation followed a cohort of 5,565 families, direct observation of all participating families was prohibitively expensive. The Embedded Study addressed these issues through observational assessments of families at two of the national evaluation sites.

Two in-home observations were conducted by trained interviewers when the Healthy Steps children were 16-18 months old (Time 1) and 34-37 months old (Time 2). Additional data for this study were collected by a self-administered questionnaire that mothers completed prior to each home observation. 57% of eligible families completed the first home observation, 39% completed the second home observation, and 30% completed both.

At Time 2 (34-37 months), results revealed that Healthy Steps mothers interacted more positively with their children—showed greater warmth and sensitivity--than control mothers during both a teaching activity and at play. There was no significant impact of Healthy Steps on the child outcomes measured in this study during the first three years.

14. HEALTHY STEPS: THE EMBEDDED STUDY

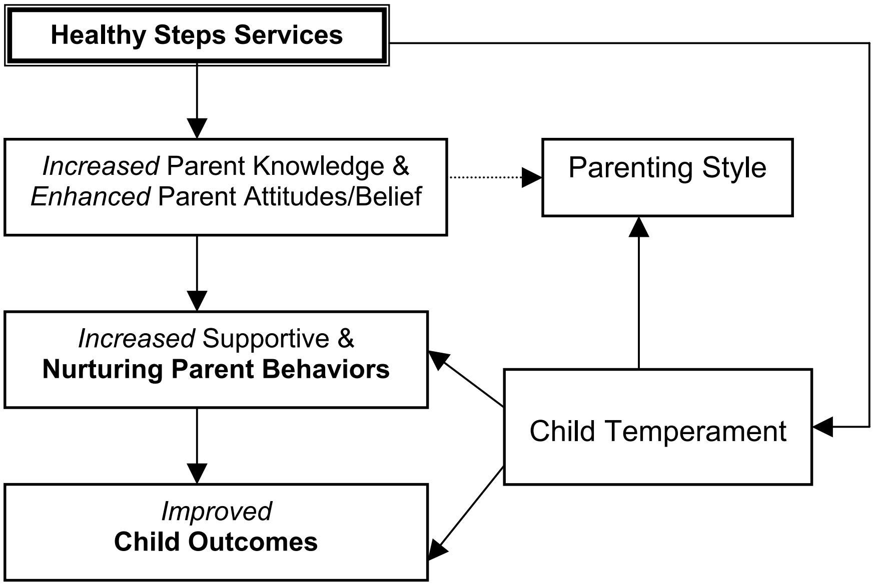
14.1. Introduction

The Embedded Study was designed to supplement the National Evaluation of the Healthy Steps for Young Children Program. The overall objective of the national evaluation was to assess whether Healthy Steps (HS) was successful in reorienting pediatric practice to emphasize child development issues, thereby increasing parent' knowledge about early nurturing of infants, involving parents more in their children's development, and promoting practices that improve the health, safety and health care utilization of their children. The data collected as part of the national evaluation were limited to self-reported measures collected by telephone interviews and self-administered questionnaires and to data abstracted from the child's medical record. Because some of the effects of HS on parents and children were likely to be subtle, it was important to collect data by direct observation which would provide an enhanced picture of parent/child functioning through more sensitive measures of parental and child behaviors. However, because the national evaluation followed a cohort of 5,565 families, direct observation of all participating families was prohibitively expensive. This project addressed these issues through observational assessments of families at two of the national evaluation sites, Amarillo, Texas and Florence, South Carolina. These two sites were selected for this direct observation study because they were two of six sites that had utilized a randomized study design and because the populations served were relatively diverse.

14.2. Conceptual Model

Similar to the national evaluation, the conceptual model for the Embedded Study suggests that participation in the HS program would have a *direct* effect on parents' attitudes (e.g., about discipline) and on their behaviors (e.g., the methods of discipline they chose), but the effects of participation in the program on children's developmental outcomes would be *indirect*, as these effects would be mediated through changes in the parent-child relationship and in the ways parents interacted with their children. **Figure 14.1** illustrates this mediational model. Parenting style and child temperament have been included in the conceptual model, both as potential outcomes and moderators. That is, a mother's style of parenting and a child's temperament could potentially be influenced by participation in HS and moderate the effect of HS on other parent and child outcomes.

Figure 14.1. Conceptual Model



14.3. Study Questions

Three broad study questions were specified based on the conceptual model and intervention activities to address issues of parent/child interaction, cognitive stimulation, home environment and child development. These included:

1. Are parents more likely to interact positively with their child as a result of participation in the HS program?
2. Do parents demonstrate better skills in promoting the development of their children as a result of participation in the HS program?
3. Is the developmental potential of children enhanced as a result of the HS program?

14.4. Methods

This prospective study was conducted when the HS children at the two selected sites were 16-18 months old (Time 1) and 34-37 months old (Time 2). At each time, a trained interviewer conducted an in-home observation. During each home observation, mothers and children participated in a series of standardized tasks including a teaching task (6 minutes), a free play task (15 minutes), and an attachment sorting task (by mother). At Time 2, a 10-minute toy-clean-up task was added at the end of the free-play. In addition, the interviewer assessed the quality of the home environment through a 20-minute interview with the mother and direct observation. Each home observation lasted approximately two hours and was videotaped. Additional data for this study were collected by a self-administered questionnaire that mothers completed two weeks prior to each home observation. The main outcome measures with reliability estimates are described in the appendix at the end of this chapter. Maternal outcomes included: warmth and sensitivity (NCAST and Parent/Caregiver Involvement Scale); stimulation of learning (HOME scale); and effective discipline (Parental Response to Child Misbehavior). Child outcomes were: attachment (Attachment Q-sort); problem behaviors (Child Behavior Checklist); and self-regulation (a child compliance task).

A total of 758 families enrolled in the National Evaluation at Amarillo (370) and Florence (388). Of these families, 658 (337 intervention and 321 control) were selected to participate in the direct observation study. Families were excluded from the direct observation study if: (1) the child never made a visit to the pediatric practice; (2) the family withdrew from the National Evaluation; (3) the family had moved out of the study range, a one-hour travel distance by car; (4) the study child died; (5) the study child no longer lived with the biological mother; (6) the mother did not speak English; or (7) the child was born after September 15, 1998.

As **Table 14.1** indicates, a total of 378 of the eligible families (57%) completed at least part of the first home observation at 16-18 months. 126 (19%) refused to participate; 72 (11%) could not be located; 61 (9%) of the children were over 18 months before they could be located and interviewed; and 21 (3%) did not complete the visit for other reasons.

Table 14.1. Embedded Study: Sample Characteristics

	Final Status 16-18 Months		Final Status 34-37 Months	
	N	%	N	%
Total Sample	758	100.0	758	100.0
Family Excluded from National Evaluation	30	4.0	44	5.8
Family Moved Out of Study Area	35	4.6	67	8.8
Child not with Biological Mother	8	1.1	15	2.0
Mother Did not Speak English	2	0.3	3	0.4
Child Born after 9/15/98	25	3.3	25	3.3
Eligible Sample	658	86.8	604	79.7
Completed Home Observation	368	55.9	224	37.1
Partially Completed Home Observation	10	1.5	9	1.5
Refused	126	19.1	185	30.6
Not Located	72	10.9	112	18.5
In the Field	0	0.0	72	11.9
Child Too Old	61	9.3	0	0.0
Other	21	3.2	2	0.3
Total Sample Completed	378	57.4	233	38.6

At the second home observation at 34-37 months, a total of 233 of the eligible families (39%) completed at least part of the home observation. 185 (31%) refused to participate; 112 (19%) could not be located; 72 (12%) were not able to be located and interviewed during the study period; and 2 families (< 1.0%) did not complete the observation for other reasons. Of the 233 families who completed the second home observation, 179 families also had completed the first home observation. That is, 30% of all eligible families completed both home observations. Fifty-four families completed only the second home observation.

The overall study attrition, which was higher than we anticipated, can be attributed to several factors. First, each home observation required a considerable amount of a mother's time to complete the written questionnaire and direct observation. The direct observation alone took approximately two hours. The home observation also caused a fair amount of inconvenience for the family. During the direct observation, we asked that child care arrangements be made for other children and that other family members refrain from participating. Perhaps the compensation we offered for the time and inconvenience, $25, was too low. We have learned that comparable studies offer $60. The higher refusal rate at Time 2 (31% versus 19% respectively) may also be attributed to the time needed to participate. By this time, many mothers may have had another baby or gone back to work. Finally, the costs to conduct the study were higher than originally estimated. Our subcontractor encountered numerous challenges in recruiting, training and monitoring interviewers off-site. Due to these increased costs, we had to reduce the study period for the second home observation. Twelve percent of cases could not be located and interviewed before the study period ended.

The study attrition has caused several biases in our samples. In general, mothers who completed either or both home observations tended to be older, better educated, married, and wealthier (as measured by use of Medicaid to cover the expenses of pregnancy) than the mothers who did not complete the home observations. In general, even after attrition, there were few statistically significant differences between intervention mothers and control mothers. Among mothers who completed Time 2 only, more mothers in the intervention group used Medicaid to cover the costs of pregnancy and delivery than mothers in the control group (54% vs 38%, respectively). Thus, the mothers who participated in the Embedded Study were a self-selected subset of mothers, representing a relatively low-risk population. The substantial attrition and resulting biases influenced our analytic approach and limited our ability to conduct analyses by subgroups, for example, racial/ethnic groups. However, it is important to keep in mind, that relative to other direct observation studies, our final sample is still quite large.

There are a number of analytic strategies designed to reduce the bias associated with attrition. One strategy involves utilizing only the data available from participants, identifying how participants differ from non-participants and adjusting for these known differences in regression models. We used another analytic strategy in order to account for additional selection bias. This was a particular concern at Time 2 when attrition was quite high and only 39% of eligible families completed the home observation. This strategy involved using linear regression models and re-weighting observed data to reflect the missing data. This strategy enabled us to drawn upon any available data, increasing the sample to 726 families. Weights were based on data from the newborn form, 2-4 month telephone interview and the 16-18 month home—including site, treatment status, demographic characteristics and parenting outcomes at Time 1—to predict the probability of completing the second home observation.

14.5. Major Findings

At Time 2 (34-37 months), results revealed that HS mothers interacted more positively with their child than did control mothers (see Tables 2 and 3), as hypothesized. Results from the P/CIS Appropriateness subscale and General Impression score suggest that HS mothers were more likely to match their behavior to their child's development, interest and capabilities and thus, to create a more nurturing and interactional environment than control mothers. Further, results from the NCAST (total score) indicate that during a teaching activity, HS mothers and children showed more sensitivity to each others' cues than did mothers and children in the control group.

In addition to parent-child interaction, we also evaluated whether participation of HS improved parenting behaviors/skills in promoting child's development at Time 2. These behaviors and skills included providing an optimal learning environment and appropriate use of discipline strategies. There were no statistically significant differences between HS mothers and control mothers in terms of their provision of a home environment more likely to promote optimal child development or their choice of discipline strategies.

Finally, we examined whether the developmental potential of children was enhanced as a result of HS. Child developmental outcomes primarily focused on socio-emotional development and included measures of secure attachment development, problem behaviors and self-regulation. Healthy Steps children did not differ significantly from children in the control group in any of the socio-emotional outcome measurements.

Table 14.2. Embedded Study**:** Parent Outcomes at 34-37 Months

	Parenting outcomes				
N	NCAST	P/CIS General	P/CIS Approp	Cognitive Discipline	Physical Discipline
726	1.51 (0.70) (0.16, 2.86)	0.27 (0.10) (0.06, 0.46)	0.25 (0.08) (0.09, 0.38)	0.00 (0.14) (-0.28, 0.27)	-0.11 (0.16) (-0.43, 0.20)

Unstandardized betas, S.E., and 95% CI are reported; positive direction favors treatment group. Shading represents p-value < 0.05.

Table 14.3. Embedded Study**:** Child Outcomes at 34-37 Months

	Child Outcomes	
N	Attachment	CBCL
726	0.03 (0.04) (-0.05, 0.10)	-1.19 (1.39) (-3.65, 1.80)

14.6 Implications for the Field, Policy and Service Programs

The results of the embedded study are consistent with other studies of early intervention programs designed to promote children's development indirectly through interventions with parents. Such programs are more likely to produce significant observable changes in parent outcomes than in child outcomes. The magnitude of effects on the parent outcomes that were significantly altered by participation in the HS programs, which included increased sensitivity of the mother during interactions with her child, would be considered moderate. This is consistent with other early intervention programs, whose effect sizes tend to be in the small to moderate range.

It is difficult to compare findings from the HS evaluation with the results of other evaluations of early intervention programs. Unlike most other early childhood intervention programs that have been rigorously evaluated, HS was offered universally to families within participating practices; most early intervention programs are targeted to families with specific risk characteristics or children with identified difficulties or disabilities. HS services were also of modest intensity and frequency in comparison to services delivered in programs such as Early Head Start or other similar programs. However, the results from the embedded study indicate that HS was effective in changing specific types of parent-child interactions that have been identified as being particularly important in promoting children's development. These results are striking given that HS served a general population of parents. Although effect sizes for the significant parent outcomes observed in the study were generally modest, these results are impressive considering that a relatively low risk population of families was served.

The results of the embedded study offer evidence that an intervention of modest intensity and frequency offered to all parents through their pediatric practices can be effective in enhancing parents' skills and abilities in interacting with their young children in ways that have been identified as promoting healthy development. This has implications for the design of early childhood intervention programs in terms of both the populations served and in the use of the pediatric primary care system as an avenue for delivering high-quality behavioral and developmental services to very young children and their families.

14.7. Future Research

Work continues to fine tune the analyses regarding the effects of HS on parent and child outcomes. In addition, further analysis of the data obtained in this study will be pursued to investigate possible treatment effect modifications based on characteristics of parents and children, such as race and ethnicity, child temperament, and other family risk factors such as maternal depression. In addition, the observational data from the Embedded Study will be used to investigate questions related to normative processes of development and how these are influenced by differences in mother/child interaction. Follow-up studies of families participating in the Embedded Study would also make it possible to investigate possible long-term, cumulative effects of the HS program on parenting practices and child development.

Appendix: Embedded Study Instruments for Major Parent and Child Outcomes

Instrument	Description of Instrument	Administration	Sample		Reliability	
			16-18	**34-37**	**16-18**	**34-37**
PARENTING OUTCOMES						
WARMTH AND NURTURANCE						
NCAST *The Teaching Scale Score of the Nursing Child Assessment by Satellite Training*	The NCAST instruments are based on theoretical constructs suggesting that the infant should have the ability to give clear cues and respond to the caregiver and the caregiver should have "the ability to respond to the infant's cues, alleviate distress, and promote situations that foster growth and competence by encouraging appropriate child initiated behavior and reinforcing the child's attempts at a task." The teaching scale consists of 73 items. Higher scores indicate a more optimal relationship between caregiver and child and more sensitive parenting. (1, 2)	Administered by interviewer at in-home observation. Videotapes coded at JHU	N=315	N=200	ICC=0.78 total score	ICC=0.78 total score
P/CIS *Parent/Caregiver Involvement Scale*	The scale is divided into 11 types of behaviors and then into 3 different aspects of those behaviors; amount, quality and appropriateness. Each aspect of each behavior is scored on a 5-point likert scale. In addition, there are 5 global assessments that reflect the overall quality of parental involvement. Higher scores indicate greater amount, higher quality or more appropriate parenting behavior. (3)	15 minute free play part of in-home observation. Videotapes coded at JHU	N=343	N=199	ICC=0.77 total score	ICC=0.85 total score
STIMULATION OF LEARNING						
HOME *Home Observation for Measurement of the Environment Inventory, Infant/Toddlers Version*	The Infant/Toddlers Scale consists of 45 items; 28 are based on an interview with the mother and 17 are from direct observation. Higher scores indicate a more optimal relationship between caregiver and child or a more optimal home environment. (4, 5)	Interview with mother & direct observation of home	N=366	N=225	ICC=0.68 total score	ICC=0.78 total score

Instrument	Description of Instrument	Administration	Sample		Reliability	
			16-18	34-37	16-18	34-37
EFFECTIVE DISCIPLINE						
PRM *Parental Response to Child Misbehavior*	PRM measures the frequency of different types of parental reactions to common child misbehaviors. It consists of 12 items asking the respondent to indicate how frequently, in an average week over the past month, each of the ten types of responses was used. Seven points anchor ratings of frequency ranging from "never" to "9 or more times a week". (6)	Self-administered prior to observations.	N=366	N=228	Cronbach Alpha range from .63 - .68 for reasoning & physical discipline scales	Cronbach Alpha range from .66 - .76 for reasoning & physical discipline scales
CHILD OUTCOMES						
ATTACHMENT						
Attachment Q-set	The Attachment Q-set offers a behaviorally-referenced system for assessing security of attachment and dependency in young children. The Q-set consists of 90 items. Each item is a description of a specific behavior; items are sorted by the mother/caregiver into 9 piles of 10 cards each (a forced distribution). Results of the sort are compared to criterion sorts by correlating each mother's sort with the criterion sort. These correlations (typically transformed using Fisher's r-to-z transformation) are then used in analyses as attachment scores. (7)	Self-administered—mom performed sort as part of in-home observations. Interviewer recorded pile numbers for each item.	N=321	N=197	N/A	N/A

Instrument	Description of Instrument	Administration	Sample 16-18	Sample 34-37	Reliability 16-18	Reliability 34-37
TEMPERAMENT						
TBAQ *Toddler Behavior Assessment Questionnaire*	It has been suggested that the abilities of young children to regulate attention and activate or inhibit behavior in response to external stimuli and to integrate emotion, cognition and behavior relate to later social functioning and adjustment. The construction of the TBAQ was guided by an understanding of temperament as "the individual difference aspect of emotionality in early development." It consists of 108 items scored into 5 scales: Activity Level, Pleasure, Social Fearfulness, Anger Proneness and Interest/Persistence. (8)	Self-administered prior to observations.	N=369	N=227	Cronbach Alpha=.89 for total scale; .57-.86 for subscales	Cronbach Alpha =.88 for total scale; .78-.90 for subscales
SELF-REGULATION						
Toy Clean-up	Kochanska has proposed that children's "self-regulated compliance" with maternal directives and prohibitions represents "an early form of internalization." Children's behaviors during a 10-minute joint toy clean-up session with their mothers were videotaped and coded following the methods described by Kochanska. (9)	10 minute toy clean-up part of in-home observation at 34-37 months. Videotapes coded at JHU.	None	N=205	N/A	Compliant ICC=0.98 Non-Compliant ICC=0.96

Instrument	Description of Instrument	Administration	Sample		Reliability	
			16-18	34-37	16-18	34-37
PROBLEM BEHVIORS						
CBCL *Child Behavior Checklist/Ages 2-3*	The CBCL/2-3 was designed to assess behavioral/emotional problems in children age 2 to 3. The scale can be rated by parents and others who interact with children in a variety of everyday contexts. The CBCL consists of 100 items, with space for parents to write in additional problems. Parents are asked to think about their child's behavior in the past 2 months and indicate if the item is often true, somewhat true or never true of their child. The scoring profile consists of six scales and two broad factors (internalizing & externalizing). (10)	Self-administered prior to observation at 34-37 months.	None	N=197	N/A	Cronbach Alpha=.94 Total scale

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15. The Costs and Benefits of Healthy Steps

The Costs and Benefits of Healthy Steps

This section describes the cost per family of offering Healthy Steps services based on data collected from practices involved in the national evaluation of HS from 1996-1999 and offers estimates of some benefits and enumerates those that cannot be estimated.

The program was *designed* with each Healthy Steps Specialist responsible for 100 families. However, early experience at field sites indicated that Healthy Steps Specialists could and did care for more families than those enrolled in the national evaluation. We use adjusted expenditure data from each site in the national evaluation over two years to compute three estimates of average cost: (1) *Evaluation model estimate:* cost to the practice of serving national evaluation families divided by the number of national evaluation families. (2) *Extension estimate*: cost of serving all families divided by estimates of the number of all families served. (3) *Mature program estimate*: cost of seeing a mixed cohort of newborns, infants and toddlers at full capacity divided by estimates provided by Healthy Steps Specialists about the number of families that could be served in this situation.

In year 2000 dollars, the cost of offering Healthy Steps services under the controlled and unrealistic evaluation conditions was $933 per family per year in the evaluation model estimate where caseload and case mix were constrained by research requirements. In a mature Healthy Steps program, the cost is estimated to be $402 per family per year. There were no measured savings from reduced rates of hospitalization or emergency room utilization.

The benefits of Healthy Steps fall into three categories: (1) Short term benefits that can be monetized;(2) Short term benefits that cannot be monetized; and (3) Potential benefits over the long term. In the first category are benefits associated with reduced SIDS mortality, improved immunization rates, parental satisfaction with care, and practice retention. While valuation is complex and uncertain, when monetized using conventional techniques, these benefits would likely fall in a range of approximately $100 per family per year to $317 per family per year. The evaluation found beneficial behavioral changes in the following categories, but sufficient literature does not exist connecting these behaviors to monetizable outcomes to provide a basis on which to monetize these: improvement in the overall quality of primary pediatric care; reduction in use of severe physical discipline by parents; increased provision of development assessments to young children; and increased assistance to mothers exhibiting depressive symptoms. Finally, other studies have shown that early childhood interventions have the potential to provide significant benefits when the participants are followed into young adulthood. These benefits result from increased socialization and enhanced cognitive skills and can manifest themselves in increased employment, reduced unemployment, and in the reduced receipt of welfare assistance.

15. COSTS AND BENEFITS

15.1. Introduction

The Healthy Steps (HS) program is an intervention designed to improve the quality of developmental and behavioral services in pediatric practices. Using the criteria set out by the Institute of Medicine (Berwick DM, 2002; Institute of Medicine, 2001), the HS intervention improves service quality. The intervention results in more children receiving immunizations, more families keeping well child visit schedules and more families receiving developmental and behavioral services. The intervention also results in greater parental and clinician satisfaction and positive changes in parental disciplining behavior. A key factor in the decision to provide HS services relates to the program's cost. In the present era of budget constraints it is not enough to know what a program achieves, one must also understand the costs of an intervention.

Short-term cost effectiveness analysis would require one to convert these improvements in service quality into measures of patient outcomes (e.g. Quality Adjusted Life Years (QALYs) or Disability Adjusted Life Years (DALYs) (Drummond, 1987; Pantell and Berwick, 1990; Gold et al, 2002). The prevailing evidence from the evaluation is that HS does not lead to detectable short-term improvements in patient quality of life as currently measured or reductions in disability by the third year of life. Another approach would be to monetize these improvements in service quality by asking parents, providers, or insurers how much they would be willing to pay to implement a HS program. Indeed the study team found that 48.2% of HS Families reported that they would be willing to pay more than $100 per year out of pocket to access Healthy Steps services. Although these numbers may be unlikely to motivate insurance companies to cover the services, they provide motivation for determining the cost to implement HS.

Programs such as HS can be evaluated from three perspectives: (1) *private*, for example, the benefits to and costs incurred by a pediatric or family practice or insurer or managed care organization; (2) *government*, for example, whether or not from its budgetary perspective the Medicaid program would find it cost-effective to add HS services to its list of required services; and (3) *societal*, i.e., *all* benefits and opportunity costs of the program regardless of who receives or incurs them. In today's world of highly constrained health care and public sector budgets, the private and governmental perspectives may be somewhat short-term in nature. This can be problematical for early childhood programs where costs are incurred in the present, but whose benefit stream may extend over the lifetime of the child. Evidence suggests that long-term follow-up can reveal strikingly large benefits over time (Heckman; Karoly, 1998; Ounce of Prevention). The long-term social perspective can and should reflect not only the short-term costs and benefits, but also the long-term payoffs to human capital investment. This report cannot capture long-term benefits, even if they will be large and enduring. We offer estimates of the monetary value of a few benefits whose value can be monetized and enumerate other factors shown to have been positively affected, whose value cannot be monetized.

The primary purpose of this section is to estimate the cost per family of providing HS services to families. We will consider that cost in the context of a medical practice weighing a decision to begin implementing the HS program, recognizing the very limited evaluation perspective this offers. A clearer picture of the costs of HS per family (together with a framework for valuing the benefits per family) will lay the groundwork for the long-term evaluation that cannot be conducted at this time.

This section is extracted from a larger report with a set of appendices (footnoted in this section) that seek to provide full documentation for the data analysis supporting this report. The body of this report is restricted to HS national evaluation sites. *Appendix F* of the larger report provides for the HS affiliate sites much of the data provided in the text and appendices for the national evaluation sites. (For further information, please contact the HS National Program Office at mbarth@icfconsulting.com.)

15.2. Data Sources and Analysis for Costs

The overall strategy employed to compute the average cost per family of providing HS services is to estimate the cost of the resources required to provide services to a group of families and divide those costs by the number of families served. The program was *designed* to enroll and serve 100 families per HS Specialist. From the very beginning of operations, many sites as well as the HS National Program Office (NPO) realized that each HS Specialist was able to maintain caseloads in excess of the evaluation model caseload of 100. Several sites developed and implemented plans in conjunction with the NPO to *extend* HS services to additional families who were in the practice, but who would not be enrolled in the research study. Sites with "extension programs" tracked the number of extension families seen and reported the additional time this required of the staff.

Consequently, we have data on costs and numbers of families for two real world versions of HS as it was implemented during the research study: an *evaluation model* version and an *extension* version.

The research study imposed an artificial constraint on the capacity of the program in that the cohort of children seen by each HS Specialist were all enrolled as infants and aged together. In a mature HS program children would enter as infants and exit at age three (or perhaps earlier), leading to a mixed caseload of children of all ages. During the research study many HS Specialists informally mentioned that they would be able to see more families if their caseload was a mix of older and younger children. To explore this topic further, a set of three focus groups was performed with the HS Specialists, permitting a more formal examination of the possibility that the enrollment pattern necessitated by the research evaluation model distorted the estimates of the cost per family of offering HS.

In order to give the most complete information on the costs of offering HS services this report provides three estimates of HS costs. Two estimates are based on what it cost to actually provide HS services during the national evaluation:

- *The Evaluation Model Average Cost*: the cost per family based on data for families who received HS services while participating in the national evaluation.
- *The Extension-Adjusted Average Cost*: the cost per family based on data for families who received HS services as part of an extension program or while participating in the national evaluation.

The section also uses data from the focus groups to estimate what HS might hypothetically cost in a mature program that does not have an artificially inefficient caseload. This version is defined as:

- *The Mature Program Average Cost:* the average cost per family if the full capacity of the resources used in the research trial were used to offer rolling enrollment to as many families as each HS Specialist could handle without compromising the quality of services, while providing services at the evaluation model level.

15.2.A. Cost Data from the National Evaluation

In the national evaluation of HS, a cohort of children was followed from birth to age three years at 15 national evaluation sites across the country. The sites represent a range of existing organizational practice settings that include private group practices, hospital-based clinics, and pediatric practices in health maintenance organizations. Cost estimates generated for years two and three of the evaluation are included in this report.

Healthy Steps sites reported expenditure data for each of their three fiscal years to the NPO.[15.1,15.2] These data were reviewed to ensure completeness and comparability. Expenditure data included amounts paid for salary and fringe benefits for HS Specialists. Also included were the expenditures for clerical staff, enrollment staff, transportation, office equipment, handout materials, and the telephone warm line. In order to determine which expenditures should be considered as "costs of Healthy Steps," additional data were obtained from the practices on the amount of time each staff person devoted to the HS program, and the amount of administrative and capital overhead that was attributable to the HS program.

To compute the *evaluation model* costs of seeing only the national evaluation families, expenditures on HS Specialists' salaries and fringe benefits were adjusted downward by the percent of time each HS Specialist reported she spent on activities other than providing services to national evaluation families (e.g., all research activities). To compute the *extension* costs of seeing families in the national cohorts as well as extension families, HS Specialists' salaries and fringe benefits were adjusted downward by the percent of time each HS Specialist reported she spent on activities other than providing services to both national evaluation and extension families. To compute the *mature caseload* costs, 100% of HS Specialists' salaries and fringe benefits were used and an additional sum was added to the total costs to account for increased administrative requirements at sites observed to be operating at the mature level. For sites with two full-time equivalent HS Specialists the amount added for administrative support was $10,903 (an amount based on experience at HS sites providing what we consider to be necessary administrative support).[15.3] Accordingly, when cost-per-family based on the mature caseload estimate is presented, we conservatively add to costs an amount that effectively doubles the cost of administrative support. Variation in cost per family depends largely on variation in the denominator, the number of HS families.

[15.1] At the Healthy Steps National Program Office at ICF Consulting, Juliet Fried, Samantha Gill, Kristen Paynter, and Sarah Rogers, supervised in a highly competent manner the interactions with sites to collect the expenditure data and the checking and processing of the data.

[15.2] See Appendix A of the larger report for a copy of the data collection template used. Contact the Healthy Steps National Program Office at mbarth@icfconsulting.com.

[15.3] For sites with fewer than two full-time equivalent HS Specialists the amount added to total costs for administrative support was reduced in proportion to the number of full-time equivalent HS Specialists.

15.2.B. Cost Offsets from Changes in Utilization

For each fiscal year, both intervention and comparison practices provided files from billing records that included either the charged or reimbursed amount and CPT and/or ICD-9 codes for each well- and sick-child visit. The majority of these files were electronically generated; two sites hand-entered the data and two sites were unable to provide complete data for all three years. At the latter two sites, medical record reviews were used to determine date and type of visit. The CPT and ICD-9 codes for these charges were inspected to eliminate double coding and to identify visits with what appeared to be unusually high charges. Outlier charges for services that would be unaffected by HS (e.g., outpatient chemotherapy charges) and for procedures not generally available in pediatric practices (e.g., ECGs and MRIs) were eliminated. Visits were classified as well-child or sick-child by applying the HEDIS 2000 criteria to the CPT and ICD-9 codes. Any visit not meeting the criteria for a well-child visit was classified as a sick-child visit. Some sites were able to supply the recovery rate for that practice and, if so, charges were converted to costs by using the ratio of collections to billed charges reported by those practices. For sites unable to supply this ratio, costs were calculated using the average recovery rate for the other sites. Finally, we computed the medical outlays per family by dividing the total medical outlays at each site by the number of families. Two sided t-tests were used to test the hypothesis that average medical costs were different between HS families and control families.

15.2.C. Estimating the Number of Healthy Steps Families

15.2.C.1. Evaluation Model Caseloads

There were 5565 children enrolled in the national evaluation; 4896 (88%) were followed up at 2-4 months and 3737 (67%) were followed up at 30-33 months. Although these are the official numbers of families who completed follow up interviews, many more families received services.

The *evaluation model* caseload estimate is based on medical record data collected for the national evaluation. A child is counted in the evaluation model caseload for years two and three if they had at least one home or office visit with the practice in that fiscal year, as reflected in the medical record data abstracted by evaluation staff. Although it is possible that families can remain "in the practice" without any visits, the above definition excludes such "lurking" families from the group benefiting from HS and from program cost calculations. Families could potentially benefit from telephone contacts with a HS Specialist without a documented visit, so excluding from the population of beneficiaries families who did not visit, but who may have been in the practice, makes the estimates of cost per family conservative.

15.2.C.2. Extension Adjusted Caseloads

Once enrollment in the original evaluation cohort of approximately 100 families per HS Specialist was complete, some HS sites requested the opportunity to enroll more families. This fact alone suggests that the HS Specialists had excess capacity.

To become an extension site a practice had to complete the enrollment of an original evaluation cohort of 100 families per HS Specialist and then to submit a plan to offer HS services to additional families not in the research study. The plans listed the types of services that the extension families would receive – sometimes omitting some components of the full HS package. Eventually, permission to enroll extension families within the evaluation protocols was granted at nine sites in year two and ten sites in year three. An analysis by the NPO of data provided by sites indicated that the average number of extension families per HS Specialist was 36 in year two and 67 in year three. The extension plans submitted by the sites indicated that children in the extension families generally received a less intensive set of services than children enrolled in the national evaluation. The NPO devised an intensity scale ranging from 0 to 100% and ranked the intensity of each site's extension plans. The average intensity of extension sites was 73% in year 2 and 77% in year 3. In computing the cost per family of extending HS services, the number of extension families served at any site in any year was reduced by the intensity rating at that site (i.e., if the intensity rating was 75%, only three-fourths of the reported extension families were counted in the denominator of the cost-per-family measure).[15.4]

15.2.C.3. Mature Caseload

In order to determine the maximum number of families each HS Specialist could serve in a mature program with no research activities, a professional focus group facilitator was engaged to develop and implement a written focus group questionnaire and guide. A total of eighteen HS Specialists participated in three focus groups led by the facilitator.[15.5] The facilitator read a standardized description of the mature caseload and asked each HS Specialist to answer questions regarding their caseload capabilities under the assumption that the amount and quality of

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[15.4] See Appendix B of the larger report for detail on the concepts and calculations.

[15.5] The details of the questionnaire and results are given in Appendix C of the larger report.

care provided would be roughly the same as that provided during the national evaluation. This assumption was emphasized because it is clear that one could readily expand the number of families served while allowing the program quality to diminish, a clearly unacceptable result.

The focus groups indicated that the HS Specialists clearly thought they could handle a caseload that is larger than that served during the national evaluation. The estimated number of families per HS Specialist ranged from 195 to 278, with an average of 244.[15.6] In calculations of HS cost per family, estimates from the focus group will be used and referred to as "mature caseload" estimates.

Healthy Steps Specialists who reported being able to serve relatively large caseloads also typically reported having the benefit of administrative support, thus the cost numerators for this estimate include an additional amount for administrative support.[15.7] Finally, it is important to note that the mature caseload explicitly assumes a program in "equilibrium" in the sense that the same number of families are entering and exiting the program each period. As a consequence, the cohort being served spans the zero to three age distribution of the children.

The average cost of medical care for well child visits and sick visits at each practice was $375 (SD=$51) per family for control families and $383 (SD=$42) for HS families. The difference is neither materially nor statistically significant. Accordingly, there were no apparent measured, short-run medical cost savings from HS.

The cost per family of receiving HS services is estimated to lie between $402 and $933 per family. The upper estimate is based on the average of the evaluation model cost estimates for years 2 and 3. The lower estimate is the average of the mature program cost estimates for years 2 and 3. **Table 15.1** breaks down the cost estimates by type of estimate.[15.8] Detailed analysis of the sites' HS program costs show that salaries of clinical and office staff devoted to HS activities account for between 70% and 80% of the costs of the program.[15.9]

[15.6] Calculated as a weighted average across HS Specialists from the data in the table on page 5 of Appendix C. The weights are the number of HS Specialists per category of family.

[15.7] See Appendix D of the larger report for details on these calculations.

[15.8] See Appendix E of the larger report for the site-specific build-up of the cost data.

[15.9] For an analysis of HS costs by cost category and program year, see Bishai D, and Jones AS. Year Thee Cost Analysis. The Healthy Steps for Young Children Program, National Evaluation Working Paper Series, Volume 2, Number 6. Johns Hopkins Bloomberg School of Public Health, December 15, 2001.

Table 15.1. Costs, Caseloads, and Average Costs of Offering Healthy Steps Services

	Total Costs (Standard Deviation)		Total Caseload (Standard Deviation)		Average Cost/Family
Evaluation Model	$151,212	(37,316)	162	(26)	$ 933
Extension Adjusted	$171,088	(30,167)	251	(80)	$ 682
Mature Program	$185,958	(34,838)	463	NA	$ 402

Note: All data are site weighted averages of years 2 and 3 figures. Cost numbers are all put into year 2000 by adjustment using the medical care CPI.

15.3. Analysis of Benefits

A reasonable question to ask is what benefits can be compared with the costs. Valuing the benefits of an inherently preventive program is fraught with difficulty and may, in the near term, simply be impossible. Recently, Heckman (Heckman) has argued in favor of early childhood intervention programs based on the long-term cost-effectiveness of several programs that followed children into young adulthood. The benefits of these early intervention programs did not become apparent until the children served reached young adulthood or beyond. The existence of these benefits in other programs certainly does not guarantee that HS will produce the same effects. But it is suggestive, telling us not to look only at short-term benefits.

Here we offer here a crude estimation and discussion of these benefits. They are arrayed in **Table 15.2.** Included are costs we could measure, albeit with great uncertainty, and those we cannot.

15.3.A. Parental Satisfaction with Pediatric Care

The most direct methodological pathway from a subjective valuation to monetization is contingent valuation or "willingness to pay" (WTP). That is, what would a family pay for Healthy Steps in the medical market place? We have a single WTP question in the 30-33 month survey of HS intervention families. The survey question reads: "How much would you pay to use HS services for one year?" with categories, "$20", "$50", "$75", "$100", and "$125 or more". We can make the most of the results from the single WTP question by computing a weighted average WTP. By weighting each dollar value WTP by its frequency of endorsement, one can compute an average WTP of $75.46 per year. This is the most comprehensive monetization of benefits from the parents' perspective. This estimate is, unfortunately, subject to serious methodological limitations. It is subject to "framing bias" (Mitchell and Carson, 1989) because the question suggested a price range to the parents rather than allowing parents to spontaneously indicate what value they put on the services. It is also important to note that two HS practices attempted without success to induce parents to make out-of-pocket payments. Other limitations exist in the opposite direction: the $75 figure omits value from the provider's perspective and any altruistic values that society at large may hold for outcomes experienced by HS families. The $75 figure also omits parents' realization of any delayed benefits on HS. A value of this imperfect measure is that it indicates clearly that the value of HS to parents is not zero. The benefits estimates are shown in **Table 15.2.**

Table 15.2. Benefits of Healthy Steps

Benefits	Value/Cost Per Child
Parent's greater satisfaction with care -- parent's willingness to pay	$75
Practice retention	$2
Reduced SIDS mortality (Value of One Saved Life Range: $1 m to $10 m)	$132 ($24 to $240)
Improved immunization rates	< $1
Less severe physical discipline	N/A
Increased developmental assessment	N/A
Increased help for mothers w/depressive symptoms	N/A
Improved quality of care	N/A

N/A = not available

15.3.B. Practice Retention

The evaluation found that HS intervention children were retained in the practice by nine percentage points more than control children. In order to monetize patient retention we require the assumption of entrepreneurial physicians. Salaried physicians in academic practices or staff model HMOs do value retention of patients. However, salaried physicians see (or ought to see) patient retention through the eyes of their institutional employer. For these institutions, "retention" may tend to be viewed as the retention of contracts with large groups of patients amassed in insurance pools. In the US health system these contracts are driven less by the quality of care than by competitive bidding on price. To their credit, many HMOs have arranged for a variety of financial rewards to flow to physicians based on quality and productivity. Theses incentives are too variable for us to model. It is simplest to model a self-employed physician.

Assuming a self-employed fee-for-service physician, profits can be described as:

$$\text{Profit} = \text{Revenue} - \text{Cost}$$

Where

$$\text{Revenue} = (\text{Receipts per patient}) \times (\#\text{patients})$$

Cost = (Cost per patient) × (#patients)

The average income per patient is the excess of receipts over costs.[15.10] Assume that the average pediatrician income of $90,000 is based on a patient population of 1700. Thus the average income per patient would be $90,000 / 1700 = $53 per patient per year.

Implementing HS for 100 patients may result in the retention of 9 additional patients out to 24 months. Assuming a linear loss[15.11] of 4.5 additional patients per year, implementing HS for 100 children would yield, on average $238.50 (=4.5 x $53). Expressed per child this is $2.39 per child, per year of value to the provider, attributable to HS.

15.3.C. Sleep Practices

The evaluation found that of 100 mothers, 11 intervention and 14 control placed their baby to sleep on his or her stomach (the incorrect position). Accordingly, out of 100 children in HS there would be 3 additional infants using the *correct* position. The U.S. incidence of SIDS dropped from 1.2 per 1000 in 1992 to 0.8 per 1000 in 1997. This drop coincided with a drop in the prevalence of prone sleeping from 70% in 1992 to 20% in 1997 (American Academy of Pediatrics, 2000). Thus when sleep position changed 50 percentage points in the US population, SIDS risk dropped by 0.4 per 1000. Extrapolating from these trends, changing sleep position for children from 100% prone to 0% prone could change the risk of SIDS by 0.8/1000.

Adopting this assumption, if HS leads to improved sleep position for three children out of one hundred, these three children will have 3 × 0.8/1000= 2.4/1000 or 0.0024 prevented deaths per 100 children. Expressed per child, this is 0.000024 saved statistical lives. Economists have estimated the value of a statistical life, with consensus estimates falling between $1 million and $10 million per statistical life (Viscusi, 1993). Multiplying 0.000024 lives times $1-$10 million leads to monetized estimates of $24 to $240 per child.

15.3.D. Higher Vaccination Rates

The HS evaluation found that an additional 6 per 100 children are up to date by 24 months for DTP, Polio, and MMR vaccinations. To monetize this outcome we rely on prior work by Bishai and colleagues (Bishai and Mercer, 2001; Bishai et al., 2002) on

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[15.10] Note that marginal revenue and marginal cost estimates would acknowledge that receipts per patient and costs per patient are not constants but are functions that themselves depend on the number of patients and reflect economies and diseconomies of scale in the practice of medicine.

[15.11] The plots of retention over time do reflect linearity.

vaccine benefits. They describe the expected benefit of a vaccine as follows:

> $ Benefit = vaccine efficacy × disease incidence × (1+secondary cases per case) × dollar cost of a case of disease

The bottom right hand corner of **Table 15.3** shows the estimate stemming from this model that the expected benefit per year for a child vaccinated with DTP, Polio, and MMR is $0.44. If we assume that the non-HS children spend the next three years unvaccinated then society is missing out on 3 × $0.44 = $1.32 (Non Discounted) of the value of immunity to these diseases for child who is not up to date by age 24 months. Since HS generates 6 additional children up to date by age 24 months, it generates

Table 15.3. Expected Benefit Per Year for a Child Vaccinated with DTP, Polio, and MMR

	Efficacy	Incidence (cases per 100,000) (Centers for Disease Control 2002)	Secondary Cases per Case[15.12]	Cost per Case Due to Deaths	Cost per Case Due to Morbidity	Marginal Benefit Per Vaccinated Child	NOTES
Measles	0.85	0.03	10	$50,000	$1,600	$0.145	[1]
Mumps	0.85	0.83	10	$0	$200	$0.016	[2]
Rubella	0.85	0.06	10	$0	$1,600	$0.009	[3]
Pertussis	0.85	2.88	10	$0	$1,000	$0.269	[4]
Diphtheria	0.85	0.00001	10	$0	$1,000	$0.000	
Tetanus	0.85	0.01	0	$0	$10,000	$0.001	
Polio	0.85	0	10	$0	$1,000,000	$0.000	[5]
TOTAL						**$0.439**	

[1] Measles case fatality estimated at 1% (Rodgers, Gindler et al. 1993). Value of statistical life estimated at $5 million. Hospitalization for measles in US costs $8000 (Chavez and Ellis 1996). I assume 20% of cases are hospitalized.
[2] Mumps cases in an outbreak in Tenessee in the mid 1980s cost $154 per case. I have inflated this to $200 (Wharton, Cochi et al. 1988). Mumps fatalities are extremely rare in childhood, but can occur in adults.
[3] Immediate rubella costs are assumed to be $500 in lost time for parents. Rubella is seldom if ever fatal in childhood. The potential harm of rubella is the potential for a sick child to come in contact with a pregnant, unvaccinated woman and thereby infect the fetus leading to congenital rubella. With current screening of pregnant women, this probability is extremely low. We make an ad hoc assumption that 1 in 10,000 rubella infected children will infect a fetus. The cost of an infected fetus is assumed (ad hoc) at $1 million. This results in an additional $10^{-4} \times \$10^{6} = \$100$ of costs per case of rubella.
[4] In 2000 there were 4 cases of tetanus in children, 1 case of diphtheria, and 7,867 cases of whooping cough. CDC best estimate of the case fatality rate from these diseases is 0, but the estimates are not precise due to too few cases.
[5] Costs of polio morbidity, assumed ad hoc at $1 million.

[15.12] Assuming 10 secondary cases per case of these diseases is almost certainly an overstatement, considering the herd immunity of the US population.

$7.92 (6×$1.32) in value per 100 children, or $0.079 per HS child.[15.13]

15.3.E. Potential Benefits

There are other effects of HS that are likely to have positive social benefits over time that cannot be estimated. The evaluation of HS found four effects that are extremely difficult to quantify, but which appear to be very clearly of potential value. Three of these are related:

- HS mothers use less severe physical discipline;
- HS children receive more than twice as many developmental assessments; and
- HS mothers with depressive symptoms receive significantly more help.

It is quite likely that each of the phenomena involved (less severe discipline; more developmental assessments; and referral of mothers with depressive symptoms) would result in better adjusted children over time. It is known that better adjusted children perform better in school.[15.14] Further, better school performance earlier builds on itself to increase the desire for knowledge and, therefore, better school performance through one's educational career (Heckman). Accordingly, although we cannot quantify these effects, they would seem to be of potentially great importance. It may well be that in combination, benefits such as these are what have led earlier long-term evaluations of early intervention programs to find significant and monetarily positive effects in young adults. It is important to note that these benefits tend to accrue to organizations outside the health care area (e.g., education, juvenile justice, employment). This raises another challenge in demonstrating the ability of a preventive health program to pay for itself. If the benefits of an investment made by a managed care organization, for example, accrue in terms of lower justice agency costs, the managed care organization tends not to reflect these in its decision-making.

The fourth difficult-to-monetize effect of HS relates to increasing the awareness of the pediatric delivery system to a set of practices and materials that enhance the quality of care. As noted in the

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[15.13] Note that the estimate reflects the "value of preserving the herd" in reference to herd immunity. Indeed it overestimates the positive externality of vaccination by assuming that for all diseases except (non-contagious) tetanus, that any child who got sick would successfully infect an additional 10 children, whose costs are included.

[15.14] See, *Set for Success: Building a Strong Foundation for School Readiness Based on the Social-Emotional Development of Young Children*. The Kauffman Early Education Exchange, The Ewing Marion Kauffman Foundation. http://www.emkf.org/pages/314.cfm; accessed 11/25/2002.

body of this report, HS has been demonstrated to be consistent in a variety of ways with the sort of healthcare delivery urged by the Institute of Medicine's "Crossing the Quality Chasm Report" report (Institute of Medicine, 2001). It is difficult to believe that the set of changes recommended by the Institute of Medicine are valueless. We have no way to put a precise or even a range of monetary values on these changes. Accordingly, these effects (and the three preceding) are listed in **Table 15.2** without dollar values.

Finally, we note that one HS practice is using the fact that they offer the HS approach as a marketing device and is finding that they gain significantly in market share. Should this gain persist, this benefit to a HS practice could, in subsequent economic analysis of HS, be an offset to practice-specific costs.

15.4. Discussion and Conclusion

There was speculation that physicians in practices with HS would be able to operate more efficiently by specializing in medical issues during well child visits—leaving behavioral and developmental counseling to the Healthy Steps Specialists. If this translated into shorter physician contact time during well child visits, the physician would be able to see more families per day and recoup some of the costs of HS. All physicians in the national evaluation were surveyed about their visit lengths and there was no evidence that physician contact time was shorter for HS families' well visits. Nonetheless, at one currently operating private pediatric practice, HS Specialists' time is being effectively substituted for physician time in a ratio that yields time for the physicians to see additional patients. The value of these additional visits is approximately equal to 65% of the mature HS program cost. In addition, there is evidence from HS random assignment sites that physicians tended to spend more time discussing behavior and development with families in the control group. Presumably, this would be because the physicians knew HS intervention families received such behavioral and developmental information from the HS Specialist.

Measuring the short-term benefits is complex and can serve to deflect attention from both (1) the unmeasurable short-term benefits of the system change in pediatric care that HS has sought to effect and (2) the long-term benefits, both noted earlier. The fact that *measured* costs exceed *measured* benefits should not, in our judgment, cause one to conclude that HS is not cost-effective. It is certainly true that short-term cost-effectiveness has not been demonstrated. Nonetheless, the existence of some measurable short-run benefits plus some short-run effects that seem clearly to be of value but are unmeasurable, plus a reasonable prospect for long-term benefits are a cause for optimism regarding the potential cost-effectiveness of HS.

Further research to detect improved developmental outcomes and other effects (e.g., school readiness) that emerge after the third year of life will be necessary before the cost-effectiveness of HS can be assessed from a parental or a societal perspective. In addition, it may be worthwhile to make efforts to improve the program's efficiency by altering the intensity of service delivery, increasing the HS Specialist's caseload and/or decreasing physician time spent with HS children during well-child visits. In fact, both original HS sites and practices newly adopting the program have shown themselves to be quite creative in making use of the flexibility the program provides, and all of the above suggestions are being implemented by sites. As noted, one practice is explicitly substituting HS Specialist time for physician time.

17. Summary and Implications

17. SUMMARY AND IMPLICATIONS

17.1. Introduction

In a complex clinical trial involving more than 5,000 families, the National Evaluation of the Healthy Steps Program documented the program's implementation, evaluated its effects, measured its costs and benefits, and assessed its short-term sustainability.

The Healthy Steps (HS) demonstration was developed by The Commonwealth Fund in conjunction with its partners at Boston University School of Medicine and with the advice of several nationally recognized expert consultants in child development and pediatric care. It was implemented in 15 pediatric practices across the country participating in the national evaluation and nine additional "affiliate" practices. The model incorporated a new professional – the HS Specialist – into the practice, expanded the content of pediatric well-child visits, and enhanced exposure to the pediatric practice through home visits and parent groups. It strengthened the support provided to families with young children by the pediatric practice and the relationship of the practice with families through a number of strategies, including direct consultation with the HS Specialist both in the pediatric office and during home visits, telephone information lines, and child development and health care information sheets. The program was popular with parents and clinicians alike, and led to improvements in pediatric care and outcomes for parents and children.

Given the broad scope and multiple components of the evaluation, the evaluation findings span a range of parenting and child health issues. One of the next significant challenges for the child health and development arena will be to understand these findings in light of other national research and programmatic policy efforts to improve the health, development, and well-being of children nationwide. In this concluding chapter, therefore, we highlight the core messages found in the results of the national evaluation, and preliminarily identify a set of considerations for practice, research, and policy. The intended audiences for these findings include: pediatric and family practices; health plans and other health service organizations; academic institutions; residency training programs and certifying boards; and local, state, and national level governmental public health entities and child health "advocates."

As observed in Chapter 2, Healthy Steps evolved amidst new knowledge about child development, which included findings from longitudinal studies of child development interventions and large-scale initiatives, such as *Starting Points*, and *Bright Futures for Children*. Some initiatives focused specifically on enhancing development of very young children. Others sought to promote enhancements in pediatric care that would embrace emerging concepts related to "new morbidities" and emphasize coordination and continuity of care (e.g., Medical Home).

The nature of well-being for all children is multi-faceted – spanning concerns such as parental employment, safe homes and neighborhoods, preventive and curative health care, school readiness, and parenting that is both well-informed and optimally nurturing. Over the decades, intervention programs in the U.S. have tended to evolve as uni-focus programs, often targeted to vulnerable sub-groups.

Although no single intervention has emerged to date to concurrently address all of these areas, the HS approach -- providing enhanced and high quality preventive health, developmental, and parenting support services – offered the potential to affect several of the basic needs of all families. Pediatric care is a service with which most families interact with significant frequency, especially in the first two years of life.

The evaluation findings indicate that an intervention can be designed and implemented to meet the needs of a diverse group of families. Regardless of socio-economic status, age of the mother or prior exposure to parenting, families need and seek advice and guidance from their pediatric providers. Although their needs were not the same, these families all benefited from the services provided by the dedicated HS Specialists and by the enhanced services available through the HS practices.

Although it is well recognized that changes in professional practice and institutional processes take place over significant periods of time, the experience of HS suggests that these changes are, nonetheless, within reach for many providers of pediatric care. From its introduction, HS was fully and faithfully implemented by all 15 sites. This happened despite numerous challenges such as scheduling, space constraints, lack of support staff, and role conflicts, and not withstanding changes in practice ownership, administration and staffing.

Further, the results of the evaluation demonstrate that the practice changes documented in HS can improve the quality of pediatric care and subsequently, enhance parenting capabilities. These improved health care and parenting practices are among those known to promote health and development (e.g., complete immunization, use of appropriate sleep position, good disciplinary practices, etc.).

17.2. Improvements in Quality of Care

The degree to which HS achieved its goal of "increasing the capacity and effectiveness of pediatric care" can be described by highlighting results that are consistent with five of the six key domains of quality described by the Institute of Medicine (IOM): effectiveness, patient or family-centeredness, timeliness, efficiency, and equity (IOM, 2001).

1) *effectiveness:* providing services that are consistent with current scientific knowledge;
2) *patient centeredness:* improving families' experiences seeking care for their children and developing effective partnerships with clinicians and pediatric practices;
3) *timeliness:* obtaining needed care and avoiding unnecessary delays;
4) *efficiency*: health care services delivered in such a way as to avoid waste, such as frequent changes in practice; and
5) *equity:* not varying in quality because of personal characteristics, including socioeconomic status.

Healthy Steps did not directly address the sixth domain, *safety*, which the IOM defines as avoiding injuries to patients from care that is intended to help. Nonetheless, robust findings related to the five domains of quality indicate that such efforts can result in parenting and child health "outcomes" that are consistent with national objectives for children's health.

17.2.A. Effectiveness

Healthy Steps dramatically improved the effectiveness of practices in providing parenting support and core developmental services to young children and their families. Families in the intervention group, at all 15 sites, received the HS services in far greater percentages than did families in the control group. This was the case for all HS services evaluated from home visits to parent groups. Intervention families also were more likely to have discussed or received information about age-appropriate topics and to have received information on community resources, home visits, developmental assessments, and books.

17.2.B. Patient-Centeredness

Healthy Steps successfully strengthened relationships between families and their pediatric practice, providing them with an additional source of support from HS Specialists, clinicians, and practice staff. Intervention families were significantly more likely to rely on someone at the practice for developmental advice and to be highly satisfied with the care they received.

17.2.C. Timeliness

Healthy Steps improved the timeliness of well child care and immunizations. Despite high baseline levels of well child care utilization and immunization among all children in the evaluation, intervention children were significantly more likely to receive their well child care and vaccinations on time.

17.2.D. Efficiency

Healthy Steps improved continued receipt of care at the same practice. This is significant in terms of efficiency (or avoiding waste) because continuity of care has been shown to reduce the risk of hospitalizations and emergency department use and to increase consumer satisfaction.

17.2.E. Equity

Healthy Steps delivered services equally to families regardless of family income, the age of the baby’s mother, or her prior experience with parenting. In doing so, the program achieved its goal of “universality.” Across the board, intervention families received HS services in far greater percentages than did their counterparts in the control group. Families of all income groups and levels of experience appreciated these services and found them helpful.

17.3. Enhanced Parenting Capabilities

Evaluation results regarding parenting outcomes can be considered generally consistent with findings from other preventive interventions directed at parents, in that significant effects tend to be observed in parenting outcomes and fewer effects are observed in child outcomes, particularly in the short term.

17.3.A. Parenting Practices During Infancy

Healthy Steps improved parenting practices during infancy in several areas related to sleep position, feeding, play and interactions. Intervention mothers were not as likely as control mothers to place their newborns on their stomachs to sleep, reducing their risk of sudden infant death syndrome (SIDS). They were more likely to use appropriate feeding practices related to introducing solid foods and water, thereby improving infant nutrition and lessening the risk of water intoxication. Intervention mothers also spent more time playing with their infants and sharing picture books with them.

17.3.B. Maternal Sensitivity to their Children's Behavior and Interests

Healthy Steps had favorable effects on the nature of mothers' interactions with their toddlers. In the embedded observation study, intervention mothers were more likely to match their behavior to their child's developmental level, interests, and capabilities when playing with their toddlers. Further, intervention mothers and their children were observed to show more sensitivity to each other's cues.

17.3.C. Maternal Discipline Strategies

Healthy Steps decreased use of harsh punishment methods. Differences were found in mothers' self-reported responses to their toddler's misbehaviors. Mothers who received HS services used harsher methods of punishment less often than mothers who were not in the program.

These included yelling, threatening, slapping on the hands, or spanking with their hand. They also were less likely to use severe physical discipline---to slap their toddlers in the face or spank them with a belt or other object.

17.3.D. Maternal Perceptions of Child Behavior

The program affected the mothers' reports of their child's behaviors. Mothers in the intervention group were more likely to report aggressive behaviors and sleep problems, although the level of these problems did not approach levels reported by parents of young children who have been referred for clinical services. A possible explanation for this finding is that HS children actually had more of these problems than children in the control group. However, it is more likely that mothers who participated in HS were more alert to their child's behavior and/or more comfortable discussing it with others.

17.3.E. Mother's Discussion of Sadness

Healthy Steps increased mothers' willingness to seek professional help for depressive symptoms and created additional opportunities for them to discuss their emotional state with their children's pediatric providers. Although no differences in the prevalence of depressive symptoms were noted, mothers in the HS program who had experienced sadness, reported depressive symptoms, or limited their activities because of feeling anxious or depressed were more likely to report that they had discussed feeling sad with someone in the pediatric practice.

17.4. Limitations of Program Effects

Findings from the HS evaluation indicate that the program had significant effects on the receipt of services, satisfaction with care and other outcomes specifically related to the effective delivery and utilization of pediatric care. Further, the evaluation found significant effects in parenting practices although little impact on child outcomes. Possible explanations for this pattern of findings are multiple and interrelated.

17.4.A. High Baseline Levels

The HS program was evaluated against a very high standard of performance. Many of the evaluation sites (including the comparison practices) already provided one or more of the HS components to families. During the evaluation, some comparison practices adopted national programs such as Reach Out and Read that also were incorporated in HS. Further, HS may have shown no significant effects on important indicators of parenting such as reading to toddlers or safety practices such as using car seats because baseline levels among the families were very high already.

17.4.B. Modest Program Intensity

Healthy Steps was a pediatric health care intervention and was less intensive than many early childhood interventions such as Early Head Start. The average family made nine well child visits and received no more than two home visits within their child's first two and a half years.

17.4.C. Multiplicity of Advice on Parenting

Parents receive more consistent advice about child health practices than they do about parenting and child development. HS messages on health topics (including age appropriate well child care, immunizations, and injury prevention) are largely consistent with messages heard from other sources. There is a wide range of values, beliefs, and messages about what it means to be a good parent, how to promote children's healthy development, about discipline and punishment, and about the nature of parent-child relationships. Moreover, although control families did not receive messages conveyed through the HS program, they undoubtedly received some of the same information from family, friends, and the media on child development issues as the intervention families.

17.4.D. Further Effects, Yet To Be Evaluated

Healthy Steps may have effects on participating families that will emerge from further analyses. These include the effects of maternal depression on parent and child outcomes. Maternal depression can influence both parent and child outcomes. Analyses are currently underway to assess whether HS modifies the patterns of pediatric visits and receipt of other pediatric services for mothers with and without depressive symptoms.

17.4.E. Follow Up of Healthy Steps Families to Identify Emergent Effects

Further program effects may emerge over time. The outcomes of HS were observed during the first two and a half years of life. There may be important effects such as how parents respond to their children's school performance that will appear in time as these children age into the school-age years, adolescence, and young adulthood. Longitudinal studies have shown that interventions in the early years are very important to future success in life, that socialization is at least as important as cognition for later life success, and that over a sufficiently long period of time, the interventions become cost-effective (Heckman, 1999; Urahn, 2001; Karoly et al., 1998).

17.5. Considerations for Pediatric Practice, Research and Policy

This final report of the National Healthy Steps Evaluation represents the first review of the data with a direct focus on program effects. It will take time and thinking by many experts to digest the findings and translate what was learned into actions appropriate to the current national, state, community, and professional contexts. We provide here some preliminary directions for generating discussions and actions.

17.5.A. Pediatric Practices and Health Service Organizations

Healthy Steps meant changing long established procedures. Participating practices faced many logistical and operational challenges. Future HS programs and practices can benefit from careful planning that involves key staff; strong consistent leadership that can assure the structural changes needed to accommodate HS; orientation and buy in at all levels of staff; and a well-developed on-going training and orientation program within the practice for new staff.

Future efforts need to ensure leadership (champions) at several levels within the host institution. Identifying and nurturing more than one individual leader or champion can promote stability and/or continuity should administrative transitions occur.

17.5.B. Health Plans and Payors

17.5.B.1. Parental Satisfaction and Marketing

Healthy Steps may be a strong "marketing" feature of pediatric practices in attracting young families and helping them to use services appropriately. The consistent, relationship-based advice and support on child development issues provided by HS was immensely popular with parents. Healthy Steps improved overall satisfaction with care in several dimensions. Mothers were exceptionally pleased with the HS Specialists, who reported receiving letters and phone calls from people who had been told about the program and wanted to participate. Healthy Steps may particularly appeal to health plans seeking to lower their costs through increasing the relative proportion of young healthier enrollees they cover. One group practice post evaluation has successfully increased the number of newborn patients through marketing the program and the services of the HS Specialists.

17.5.B.1. Managing Costs

Healthy Steps sites included in the national evaluation were given a predetermined budget of $200,000 per year to cover the compensation of two HS Specialists, fund staff training, materials, and other costs related to the intervention, and to enroll 200 families. Consequently, one would expect costs for the evaluation model to be approximately $1,000 per family. Not surprisingly, the study found that they were $933. This measure of cost, however, is an over-estimate of true costs in the "real world" case.

If post-evaluation experience is a guide, program costs can be cut in half or reduced even further without affecting services simply by increasing the HS Specialist's caseload. At sites that expanded the HS Specialist's caseload within the evaluation period, the cost per HS family became $682.

Several HS sites continued to enroll after the evaluation period ended and HS Specialists at these sites reported a capacity to serve families that far exceeded the expanded caseload identified above. In focus groups, the HS

Specialists reported that they could handle 2-1/2 times as many families as in the evaluation model. The cost of such a "mature" program would be $402 per family. (All of the above cost figures are in Year 2000 dollars.).

Further reductions in cost are likely attainable by altering the intensity of service delivery, further increasing the HS Specialist's caseload and/or decreasing physician time spent with children during well-child visits. Both original HS sites and practices newly adopting the program are experimenting with these modifications.

17.5.C. National Professional Standards and Policy

Renewed efforts are underway to implement the recommendations of *Bright Futures*, the *Future of Pediatric Education (FOPE II)* report, and other national initiatives in order to meet the challenge of providing optimal child health care in the 21st century. Indeed, the FOPE II report suggests that practices may rely on non-pediatrician child health professionals to play an increasing role in direct patient contact. Healthy Steps offers a model approach and set of tools (e.g., curriculum, residency training, etc.) for enhancing the care provided to young children and their families. The evaluation results provide evidence that physicians are not only willing to engage in partnerships with non-physicians, but appreciate the value they bring to the practice. Clinicians held very positive views of the care that HS Specialists provided, and HS Specialists assumed expanded roles in teaching residents at academic center sites about child development and family psychosocial issues.

17.5.D. Training of Pediatric Professionals.

Several of the Healthy Steps evaluation sites (national and affiliate) incorporated the training of pediatric residents and fellows into the implementation of the program. Indeed, post evaluation, a number of HS in residency training programs have been or are being established. Although not formally evaluated in this study, it is clear that HS provides the environment to advance the educational goals for pediatric training around child development and behavior that are articulated in *FOPE II.* Interaction with HS Specialists can provide pediatric residents with models for ways to provide support and to assess parents' needs for information and advice.

17.5.E. Research

The evaluation demonstrates that a rigorous evaluation can be carried out with a complex clinical intervention such as HS. This is not to say that the evaluation could not have been improved or modified to be more efficient or effective. Clinicians, policy-makers, and researchers should be encouraged by the feasibility of randomized assignment and the value of intention-to-treat analysis. These rigorous methods assure the credibility of positive findings. Although longitudinal designs are necessarily slow to carry out, they provide the best evidence.

In this evaluation, in retrospect, we would have benefited from good intermediate landmarks (at about 18-months of age) that would have anticipated some of the final findings. Earlier landmarks would have helped to promote interest in HS during the demonstration and to meet funders' needs for results. Because resources are not unlimited, there also are inherent trade-offs between sample size and the types and variety of data collection strategies that can be supported. The larger the sample, the more likely that surveys and other objective measures will be used; the smaller the sample, the more in-depth observation can be included. Future evaluations must carefully assess these trade-offs and anticipate the need for timely measures and access to evaluation results well prior to the conclusion of the demonstration grant cycle.

HS relied on multiple components to influence outcomes. We recognize that the measures used to assess these program effects were the best available at the time and under the constraints of the evaluation. Evaluations of these complex interventions will improve as new measurement tools are developed.

In addition, with knowledge gained from this evaluation and from other early childhood interventions, it may be useful to review the multiple components of Healthy Steps to strengthen the efficacy and intensity of the intervention. Specific modifications of the curriculum may address the child-related outcomes that did not appear to be influenced as the designers of HS had intended.

Further research needs to address the causal relationship between the intensity of the exposure to the intervention (dose) and outcomes (response). Modifications of HS should be evaluated in a framework that will test both their efficacy and effectiveness. The next versions of HS may be substantially different than the demonstration model evaluated.

17.5.F. Local Support for Funding HS Specialist Services

The major challenge to sustaining the existing HS programs and/or expanding HS to new sites is identifying funding support for HS Specialist services. Currently, efforts at increasing the caseload and modifying the components (and thereby the costs) of the program are being carried out in a variety of practices under many conditions. There will need to be a sustained effort to modify the program and continue to assess its costs and benefits so that the appropriate arguments can be brought to potential funders, that is, health insurance providers in the private and public sectors. In principle, substantial and substantive local constituent involvement is imperative in ensuring sustainability and widespread adoption.

17.5.G. National Advocacy of Healthy Steps As Early Childhood Initiative

The HS program was launched by CWF with the collaboration and financial assistance of more than 40 national and local philanthropies, national professional (and some advocacy) organizations, and the support of a broad coalition of child development and pediatric experts. These groups participated in several different advisory bodies, including the HS National Advisory Committee (NAC). If HS is to achieve its full potential impact on early childhood pediatric services, high-level national leadership must continue. Although not directly evaluated in this national study, it is clear that the NAC played a major role in reviewing and commenting on all aspects of the program and the evaluation. Margaret E. Mahoney's personal leadership of these efforts must be acknowledged. The ultimate impact of this 6-year evaluation of the national HS program will depend on the structure ongoing leadership takes. A new form of national HS partnership must emerge to address these challenges.

17.5.H. Incorporating Long-Term Effects In Policy Judgments about the Benefits of Healthy Steps

This evaluation identified some important effects of HS on parental discipline practices. Such changes in disciplining may have long-term consequences for children's behavior over the course of development into adolescence and later life. The evaluation team plans to follow (at least through age five) the HS cohort to measure these potential effects. There is precedence for anticipating such latent effects; they were observed with Head Start in relation to success in school, and a nurse home visiting program in relation to child abuse. It is most important that these potential, latent effects be brought to the attention of policy-makers now and in years hence.

The concept of "universality" was part of the original vision for HS. It should not be viewed as an effort to minimize the needs of low-income or other disadvantaged families: the evidence shows that these families were equally well served. Rather, universality is a strength of the HS program in that it links the needs, concerns and interests of all classes of diverse families. The universality of HS increases the likelihood of its broadscale adoption and sustainability.

Achieving reimbursement for health services that previously have not been considered a component of standard health care is a complex, politically challenging and lengthy process. Consequently, the short timeframe of the HS demonstration may underestimate the ultimate potential for HS sustainability. Failing philanthropic support, medical practices have few alternative sources of funds to pay the salary of a HS Specialist. The national partnership has pursued securing commercial and public insurance reimbursement payment streams. Given that health insurers and employers are seeking ways to reduce health outlays, the current period may be difficult for securing the reimbursement changes sought. This process, therefore, may entail several more years of work in order to come to fruition.

17.6. Conclusions

In conclusion, through adding developmental specialists, incorporating a team approach, and strengthening relationships, Healthy Steps successfully redesigned primary pediatric health care to refocus attention on preventive services, child development, and effective parenting practices. The Healthy Steps model has shown itself to have significant benefits for children, families, and pediatric care in the United States.

16. Sustainability

Sustainability

Healthy Steps was implemented as a time-limited demonstration program of one specific approach to improving pediatric practice nationally. An important factor in judging the overall success of the program is the extent to which the pediatric practices involved in the national evaluation have continued with the innovations introduced by Healthy Steps after the end of the initial period of funding.

The key elements of the Healthy Steps program model were the Healthy Steps Specialists and the services they provided. Approximately a year and a half after demonstration funding ended:

- eight of the 15 Healthy Steps programs continued to employ at least one Healthy Steps Specialist. Each of these eight practices offered five or more Healthy Steps services; four, however, had restricted the program to a targeted group of families;
- three sites no longer employed a HS Specialist, but had sustained limited Healthy Steps activities by either/both referring selected Healthy Steps services to other providers and/or adopting the Healthy Steps philosophy in practice routines;
- four sites had ceased Healthy Steps operations entirely.

At two of the seven sites that provided minimal or no Healthy Steps services, new Healthy Steps or Healthy Steps-like practices had emerged in different locations nearby in the host community.

The eight sustained programs shared some important characteristics. All eight programs reported having at least one new (non-original) source of financial support. Six programs reported positive changes in the practice environment and four had multiple leaders championing the program as well as local advisory committee support. Five had adapted their programs and taken action, early on, to sustain them. These efforts included both formal and informal "marketing" to community groups, academic institutions, and community coalitions, garnering transitional or "bridge" funds, and/or developing internal cost substitutions.

The national partnership—reflecting the combined efforts of The Commonwealth Fund, a team of pediatric experts from Boston University School of Medicine, the National Program Office (ICF Consulting), local philanthropies, and the National Advisory Committee and its Local Funders Network counterpart-- played important roles at the level of the individual Healthy Steps program demonstration sites by ensuring robust program implementation through training and operations support and by stimulating initial commitment of one or more community partners.

The national partnership's influence in diffusing the Healthy Steps concept and program is apparent in the volume and array of emerging Healthy Steps-like practices and processes. Five of the original nine affiliate sites continue to operate the program. In addition, these are fostering new programs in public health agencies, residency training programs, and neonatal intensive care units. Twenty-one new practices and one state initiative have adopted Healthy Steps; eight are offering Healthy Steps in residency training programs. All of this has been achieved in the greater context of health systems change, increasing fiscal pressures on both private sector medical institutions and public health service programs, and major cost containment efforts on the part of employers, health plans, and public grant and insurance programs.

16. SUSTAINABILITY

16.1. Introduction[16.1]

The Healthy Steps program can be seen as part of a larger national impetus to improve pediatric practice. Healthy Steps, as a demonstration program, represents one specific approach to enhancing the care provided to young children and their families.

The extent to which the pediatric practices involved in the 15-site national evaluation have continued with the innovations introduced by HS is an important factor in judging the overall success of the program. Another measure of its success might be found by examining the extent to which the concepts and specific program design features were adopted in locales and pediatric practices not participating in the national evaluation.

In designing the national evaluation of the Healthy Steps for Young Children Program, the Johns Hopkins University (JHU) evaluation team recognized several areas related to continuation and growth of the program that should be addressed. These questions focused on:

1) the potential for replication of the HS model by other pediatric providers;

2) the potential for institutionalizing HS into pediatric services within the participating providers; and

3) the potential for integrating HS in pediatric services on a national basis.

From early on in the national evaluation, the evaluation team incorporated concepts relevant to sustainability into data collection efforts aimed primarily at program process (implementation) and outcome measurement objectives. In addition, the Healthy Steps National Program Office (NPO) at ICF Consulting and The Commonwealth Fund

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[16.1] At Johns Hopkins Bloomberg School of Public Health, Hanne Harbison, M.H.S., and Sophia Lo, M.H.S., were instrumental in the assessment of sustainability. Hanne Harbison conducted the literature review identifying sustainability, institutionalization and related concepts in the context of Healthy Steps and co-authored, with Holly Grason, *National Evaluation Working Paper Series Volume 2, Number 4* of the same name. Sophia Lo patiently and with enviable dedication, organization, and skill reviewed hundreds of program and evaluation documents to abstract the data relevant to sustainability into a structured matrix for analysis.

(CWF) undertook major efforts to promote conditions for sustaining HS at the sites originally funded. They also encouraged the diffusion of HS nationally.

This chapter describes what was learned about sustainability of HS in the context of the national evaluation (question number two, above). To determine the extent to which HS was continued at the 15 participating sites, we outlined a continuum of post-evaluation program operations along which the continuation of program services could be measured. A structured telephone survey was then administered approximately 18 months after demonstration funding ended. In addition, we drew on a broad array of data sources (over 13 individual data sets) to examine a set of factors hypothesized to influence the likelihood of sustaining a demonstration program in communities. We also catalogued national level implementation supports. We highlight briefly here the nature, scope, and volume of national resources brought to bear on HS program design, implementation and diffusion.

Finally, the expansion of HS to other practices outside the national evaluation is described. These practices fell in two categories: “affiliate” and “new.” Affiliate sites implemented HS virtually identically to the national sites and participated in evaluation studies reported elsewhere.[16.2] New practices are practices that implemented HS beginning in 2000.

16.2. Sustaining Healthy Steps at the Site Level

16.2.A. Definitions and Concepts

We reviewed a substantial body of literature in the areas of sustainability of health programs, organizational change as it relates to clinical practice, and policy and program implementation to clarify the concepts of sustainability, institutionalization, and related ideas in the context of the HS program. A great deal of overlap exists in these areas and not all of the literature is relevant to the HS context (Harbison and Grason, 2001). As a result of our literature

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[16.2] Six of the nine affiliate sites participated in a JHU-designed and implemented evaluation. Two sites, in cooperation with JHU, implemented randomized controlled trials of variants of Healthy Steps, and a ninth site implemented Healthy Steps without a formal evaluation but did collect data on a randomized subset of the medical practice’s population to serve as a comparison group for the Healthy Steps population. For the Affiliate evaluation, see Chapter 13. The other three studies are in progress.

review and related deliberations, the evaluation team adopted the following definitions for the analysis:

- Sustainability occurs when a program or project continues after the original funding or support ends.
- Institutionalization occurs when the structures surrounding a change also change in order to support it.
- Diffusion is defined as the process by which an innovation is communicated through certain channels over time among members of a social system (Rogers, 1995).

Sustainability. There are two possible aspects of a program or project that can be sustained. These are the project benefits or the project activities. It was determined that our assessment would focus on maintenance of program services. In our analysis, we did not include information about the potential maintenance of client-specific "outcomes" or "benefits" resulting from the HS intervention. This was in large part because they had yet to be empirically determined at the time ratings of sustainability needed to be assigned.

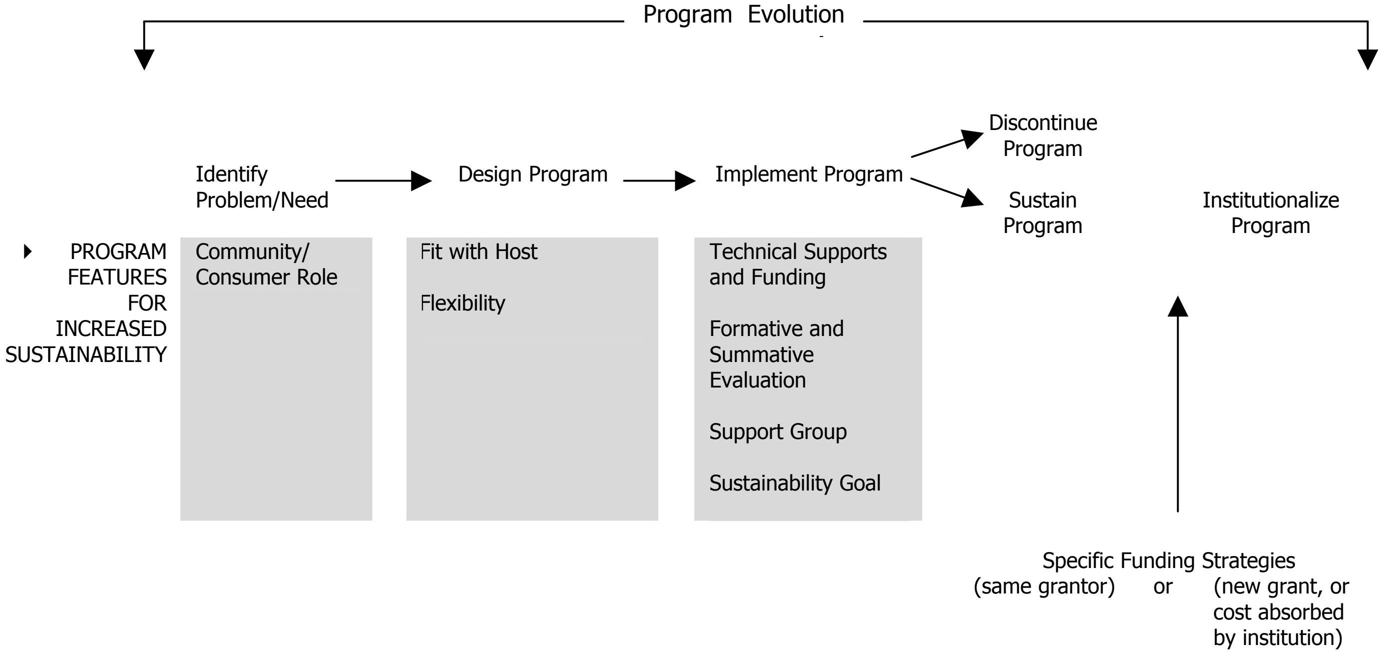
Institutionalization. Institutionalization reflects situations where the program or project becomes "part of legitimate and ongoing practice, infused with value and supported by other aspects of the system" (Goodman and Steckler, 1987/88). It is one form of sustaining an intervention; the primary alternative is continued reliance on an outside time-limited source of program funding. For the purposes of our evaluation logic model, institutionalization represents an advanced form of program sustainability.

Diffusion. We considered affiliate HS programs and new practices as reflecting the diffusion of the HS program. Sustainability and institutionalization were foci for our site level analysis; diffusion was determined to be more germane to the NPO's work to document and describe the national reach of HS.

We defined the outcome of a "sustained HS program" as a site that employed at least one HS Specialist and offered five or more of the services originally promoted for the HS intervention. Using a scoring system that rated the sustainability level of each site along a four-point continuum of 0-3, sites with a HS Specialist that universally offered five or more HS services were given a score of 3. A score of 2 indicated that sites offered 5 or more of the original HS services but only to targeted families. Sites that did not employ a HS Specialist but offered HS services through referrals were assigned a score of 1. Finally, sites without a HS Specialist and that did not offer any HS services were scored as a 0.

Based on the concepts described above and published studies related to sustainability, a logic model was developed to organize our assessment of the extent to which the HS model was sustained. We also assessed experiences at the 15 national evaluation sites relative to the design and implementation factors that influence program sustainability. **Figure 16.1** depicts the sequenced elements of program development, implementation, and continuation, and identifies the factors known to promote sustainability.

Figure 16.1. Program Development, Implementation and Continuation



Regardless of whether one looks at the national level or the site level, similar key factors have been identified in the literature as affecting the success of implementation, sustainability, institutionalization, and diffusion. First, there must be an identified **need** for the program or project being discussed. In most instances, it is preferable for the need to be identified by those in the community who will be receiving the services (Lafond, 1995; Minkovitz et al., 1998; Goodman and Steckler, 1990; Cassady et al., 1997). Second, the **host environment must be open** to such a program or project. The host environment includes the political, economic, and host organization environments (Minkovitz et al., 1998; Lafoned, 1995; Shediac-Rizkallah and Bone, 1998; Grason et al., 1999; Goodman and Steckler, 1990; Shediac and Dievler, 1993; Cassady et al., 1997; Elder et al., 1998; O'Loughlin et al., 1998; Jackson et al., 1994; Holder and Moore, 2000). The program or project that is being implemented or sustained should be **simple** and **flexible** and it should probably be **cost-effective (**Minkovitz et al., 1998; Lafond, 1995; Goodman and Steckler, 1987/88; Cassady et al., 1997; O'Loughlin et al., 1998; Jackson et al., 1994). Moreover, a person or small group that **champions** this program or project in its implementation is considered key (Astone et al., 1999; Elder et al., 1998). This type of leadership and initiative is necessary to foster both short and long term support for the program or project, both financial and otherwise. Finally, identification of and action regarding **sustainability as a specific program goal** have been found to enhance the likelihood of sustaining community-level health interventions (Holder and Moore, 2000; O'Loughlin et al., 1998; Shediac et al., 1990). In this conceptualization, successful implementation would include actions taken toward future sustainability.

16.2.B. Data Sources and Methods

Sustainability Scores. Sustainability questionnaires for each of the 15 national evaluation sites were administered over the telephone by a lead JHU team member at approximately 15 months after the end of the HS program at that particular site. The structured, closed-ended sustainability questionnaires examined the extent to which each site maintained HS services.

Sustainability Factors. In order to examine sustainability of the program at the site level in more detail, a matrix was developed that identified key areas and sub-factors that are conceptually and empirically related to sustainability. (**Table 16.1**) For the abstraction of data regarding these key areas and sub-factors at the site level, the data sources included site planning documents, site selection and monitoring visit reports (for years 1 and 2), baseline and 30-month site questionnaires, baseline and 30-month key informant interviews, provider surveys at baseline and 30-months, and NPO sustainability status and current operations reports (see Chapter 4 for further description of measures used to assess sustainability).

All of the data sources utilized, except for the site questionnaires and provider surveys, were subjective and/or primarily descriptive measures (i.e., questionnaires were in an open answer format). The data abstracted from these sources therefore had to be further reduced by coding the qualitative answers to develop variables for the analysis.

Team members reviewed the site data abstraction matrices and chose sustainability sub-factor items for analysis (**Table 16.**1). These items were chosen based on the

Table 16.1. Key Areas and Sub-Factors Conceptually and Empirically Related to Sustainability [a]

Key Areas and Sub-Factors	Items
	IDENTIFY PROBLEM/NEED
Identified Need & Buy-in	
* Prior Related Activities	* Links to community services prior to implementation of Healthy Steps
Demographic Profiles	
Community Needs	
Community Participation	
	PROGRAM DESIGN
Fit of Healthy Steps with Institution/Practice	
* Existing Services & Facilities	*Provision of various services at baseline and at 30 months
Commitment/Ability to implement HS	
* Barriers	*Healthy Steps Specialists' assessment of barriers to implementation at start-up and 30 months
Fit with practice	
Fit with patient needs	
* Perceived change in practice environment	*Average rating of practice environment at start-up and 30 months *Level of agreement among medical staff regarding the direction of change in practice brought about by HS
	IMPLEMENTATION
Program Implementation	
Program changes/adaptations	
Program outcomes (e.g., benefits of program to families, providers, practice)	
* Organizational environment/Politics	* Mean site stability score
* Supports to staff/Resources	* Healthy Steps Specialists' reported receipt of quality clinical and administrative support
Training Issues	
* Teamwork/Integration in the practice	* HS Specialists' report that various staff members communicated effectively
Program Champions/Leaders	
* Program champions	* Champions identified and categorized
* Clinician satisfaction	* Satisfaction of clinicians with Healthy Steps
* Local Advisory Committee	* Lead physician's awareness of a local advisory board
Sustainability Goals and Actions	
* Sustainability planning	* Sustainability actions (including funding strategies)

*Indicates domains and sub-factor items used in the analyses.

[a] See Table 4.14 in Chapter 4 for complete list of variables.

adequacy, reliability and strength of the abstracted data for each specific sub-factor. Items that did not adequately capture the sustainability sub-factor were removed from the individual matrices. The final domains and sub-factor items retained by the team are shown with an asterisk in **Table 16.1**.

The rating score for each site was compared with the sustainability data abstracted for that site in a sustainability factor table. The table included data for each site on the sustainability variables chosen by the team members and summarized in the table. Because the total sample of HS program sites was limited to 15 and thus was too small to make statistical comparisons, our analysis examined the patterns of factors relevant (as supported by theory and prior studies) to program sustainability

16.2.C. Findings

16.2.C.1. Program Continuation/Sustainability

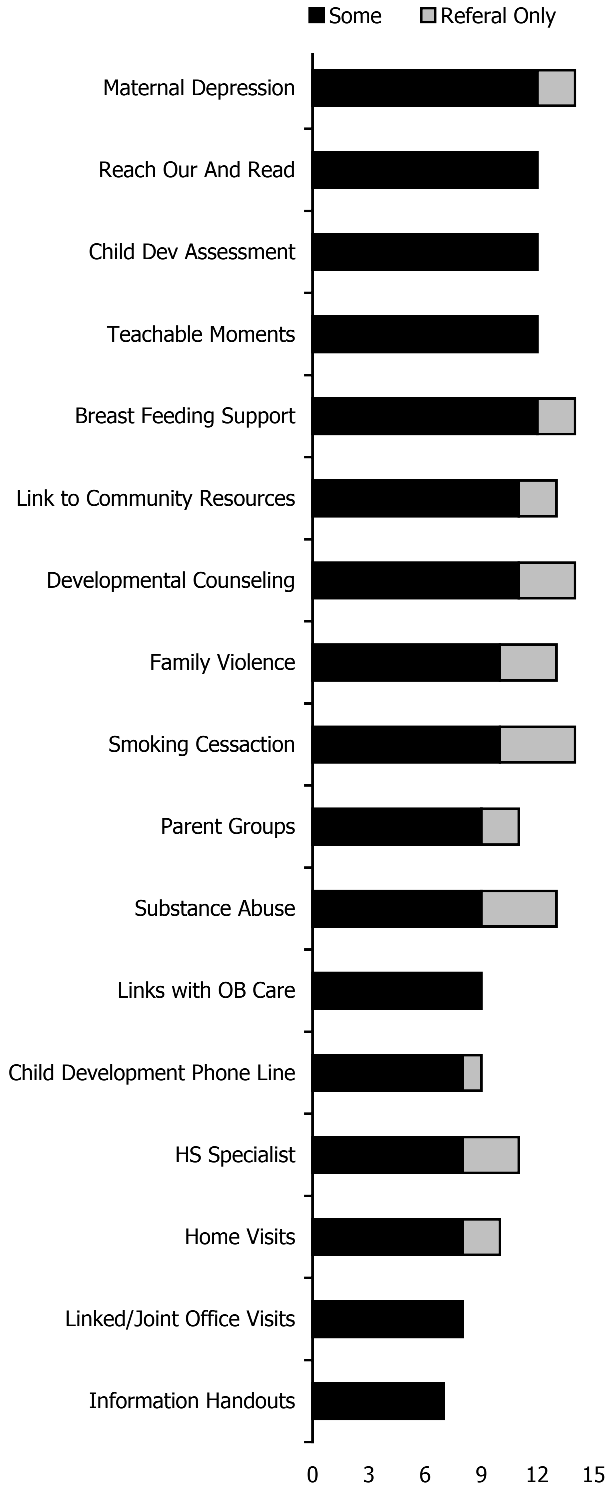
Overall, eight (8) of the 15 HS programs that were the subject of our analysis scored as "sustained" at 15 months following conclusion of their demonstration funding. Of these eight, four continued with a HS Specialist and offered five or more HS services to all families in the practice. The other four sustained programs continued to employ at least one HS Specialist, and offered five or more HS services to a targeted group of families in the practice. According to our continuum, three (3) programs had sustained limited HS activities in the form of either/both referral of selected component HS services to other providers (e.g., home visiting, developmental assessment, parent groups, screening for parenting risks (such as maternal depression, substance abuse) and/or reporting adopting HS philosophy in practice routines. We refer to this latter group as "minimally sustained." Four (4) program sites had ceased HS operations entirely. It should be noted that in two of the program sites, one rated "not sustained" and the other designated as "minimally sustained," new HS or HS-like practices had emerged in different practices or institutions nearby in the host community. These new practices therefore are included in the discussion of "diffusion."

Healthy Steps Sites		
●	4	SUSTAINED (All Families)
◙	4	SUSTAINED (Targeted)
◉	3	MINIMALLY SUSTAINED
○	4	NOT SUSTAINED

Programs varied a great deal with respect to the specific scope and mix of HS services they continued to provide. Almost all of the 11 programs that documented some level of continued operations had discontinued or adapted HS program components as originally conceived. As seen in the accompanying figure, the services that continued to be offered most frequently were:

- Assessment for maternal depression
- Reach Out and Read
- Child development assessments
- Teachable Moments
- Breastfeeding support
- Links to community resources.
- Developmental counseling

Number of Healthy Steps sites providing Healthy Steps Services 18 months post end of initial grant funding (N = 15)



16.2.C.2. Factors Associated with Extent of HS Program Continuation

Most of the HS programs sustained at the highest end of the continuum (Score of 3) show a greater number of individual positive factors in the categories examined. Nonetheless, a high degree of variability is observed with respect to findings across specific factors of interest.

16.2.C.2.A. Identify Problem/Need

Results of previous studies of sustainability indicate that local constituents should be involved in the identification of the need or "problem." They should also assist in the design of the program or intervention. This is an important piece of the process because it begins to establish community buy-in for the project.

The need for the HS program was not identified by any of the 15 practices themselves, rather, they were "hand selected" by the local philanthropic organization partnering with CWF. We hypothesized, however, that a measure of the extensiveness of site/practice relationships with external organizations providing services to pediatric populations might be observed at sites that were sustained.

Using data from the baseline site questionnaire, we selected 18 services representing health, education, counseling and other support services. If, prior to HS, the practice did not offer these services, we determined whether they referred families to an on-site or off-site service provider. We used the ratio of services referred "outside" the practice or organizational or institutional home (e.g., a hospital network, MCO, or university) to those referred "inside" as a measure of the practice's relationship with external organizations. Three of the sustained sites had ratios of 17/18 to 0. Two others had ratios of 17:2 and 16:1. It is important to note, however, that the pattern generally did not support our hypothesis. For example, sites that did not sustain HS had ratios of 17:2; 13:0; and 10:0.

16.2.C.2.B. Program Design

The literature related to sustainability, as well as to the diffusion of innovation, suggests that an intervention or program needs to be well-suited to the host organization's system, and/or must be flexible. This makes it more likely that adjustments in the model can be made to ensure congruence with pre-existing operational practices and the "culture" of the host organization. In terms of "fit with practice," most key informants said during interviews at program start-up that HS would fit with the general philosophy of the practice.

As there was little, if any, variation among key informants' responses in relation to philosophy, we measured the similarity between the scope of services made available and referral patterns of the practice as they reflect the HS philosophy. We hypothesized that the sites where practices reflected HS would offer more recommended services and if they did not or could not offer them, they would ensure that the child or family received them by referral. In general, the patterns of performance in this regard were inconclusive with respect to our hypothesis: Although three of eight highly sustained sites did show good congruence, so did two of the programs that were discontinued.

We also examined two other indicators of how easily a site incorporated HS into its pre-existing operations. These included: 1) barriers or challenges to implementing the program as reported by HS Specialists at both start-up and 30 months into the program; and 2) the level of agreement among staff that HS brought negative changes to the practice. We hypothesized that sites with reported barriers to implementation or where the staff felt HS caused negative changes to the practice would be less likely to sustain the program.

There was little variation in the number or nature of barriers reported by the HS Specialists. Nearly all mentioned some barriers. There also was no consistent pattern between the type of barrier (i.e., structural/logistic or organizational/relationship) and future sustainability. There was more variability among the sites in terms of the level of agreement among the clinicians (physicians and nurse practitioners) and nurses and clinical staff that HS brought negative changes to the practice. However, the pattern did not support our hypothesis. Two of the four sites that fully sustained the program had the two lowest scores reported. However, two sites that discontinued the program had the next two lowest scores on barriers.

We may attribute these findings to several things. First, all the sites participating in HS were hand selected by the local philanthropic organization partnering with CWF, in part because of their reputation as high quality pediatric practices. Sites also may have been able to overcome major barriers with the support received from the national partnership (e.g. technical assistance calls with BU, monitoring site visits from the NPO, etc.) and because the program was sufficiently flexible. Finally, as reported previously, providers universally expressed satisfaction with the program, appreciated the job that the HS Specialists did, and saw firsthand how families benefited from the program. Perhaps they were more willing to work to fit HS into the practice.

16.2.C.2.C. Implementation

Program Implementation. We know that the HS program model was implemented across sites with a significant degree of consistency, and with both a fairly uniform and "rich" level of technical and operational support. In fact, several sub-factors initially examined were eliminated because of the total absence of variation across the program sites. We ultimately hypothesized that program implementation features such as organizational stability (see Chapter 6) and internal environment would be associated with sustainability outcomes. The internal environment was characterized for our purposes as the quality of professional practice and/or administrative support provided to staff, effectiveness of communication within the practice, and perceived changes (positive or negative) in the practice environment. Our hypothesis in this regard is based on the assumption that supports, communication, and positive environment could be sufficiently strong to instill new — or — stronger support or leadership for HS. This, in turn, would lead to a greater number of and more effective actions taken to ensure program continuation.

Some patterns did emerge in this regard. Three of the four programs scoring 3 (highest) rated positive in two or more of the subfactors related to implementation of HS within the practice (e.g., organizational environment, teamwork, supports to staff; see **Table 16.1**). Exceptions, however, are seen with respect to one high-scoring site (few positive findings on these measures), and one of the sites minimally sustained, which scored well with respect to supports for the HS Specialist. Surprisingly, site stability did not appear to match with outcomes related to program sustainability; perhaps in many instances local program leadership and national operational support were sufficient to overcome potential negative impacts. Also unexpected was the fact that not all of the sustained sites reported positive changes in the practice environment (6 of 8).

Program Champions/Leaders (Support Group). Another factor considered was "support group." For the analysis of sustainability, support group included the creation of a functioning local advisory committee, clinician satisfaction, and leadership. Four of the eight sustained programs reported that there were three or more leaders, or "champions" for HS at their institution. All reported at least one "champion." With one exception, those programs minimally sustaining HS services had no, or fewer than three, total leaders identified. The dispersion of leadership in more than one arena of the program operations (e.g., executive management, clinician staff, external/foundation partner) is believed to enhance the strength and continuation of program implementation. Therefore, we examined the roles of those identified as champions. We found that the dispersion was highly correlated with total number of identified leaders. Scoring thus was based ultimately on the total number alone.

We also looked at the existence of a functioning Local Advisory Committee (LAC). Six of the eight sustained programs reported having a LAC. The two sustained HS programs without a LAC reported that they specifically chose not to convene one based on the political context of the professional community locally. That is, in such a situation, based on prior experience with other such groups, it was felt that a LAC for HS would be more disruptive than helpful. Two of the discontinued HS programs reported having a LAC.

Four of the seven HS programs that completely ceased operations or continued with minimal HS services had positive ratings on either "leadership" or "LAC" factors. However, none of these seven had positive ratings on both of the measures of support. In our analysis, satisfaction of clinicians did not appear to be related to the other two measures of support group.

Sustainability Goals and Actions. The scholarly work on sustainability emphasizes the role of developing a concerted plan early in the program design and implementation process to build partnerships, resources, and/or formulate other strategies for ensuring that the program continues past its initial demonstration or grant funding phase.

We rated high performance programs by the total number of sustainability actions reported in combination with whether the actions were undertaken early or late in the timeframe of the "original" (3 or 4 years) grant funding.

Examples of sustainability actions include: program adaptation (7); both formal and informal "marketing" to community groups including employers, local and state public health programs and insurers (i.e., Title V, Medicaid and S-CHIP), academic institutions, and community coalitions (7); garnering transitional or "bridge" funds (5); and/or developing internal cost substitution schemes (4).

Five of the eight sustained programs met the criterion described above, while only one of the programs that was not sustained met it. The "unsustained" site that met this criterion was a location where a new HS/HS-like program evolved in a nearby pediatric care site.

Specific Funding Strategies*.* It clearly is of great value to have the original funding institution provide financial support for program continuation. However, we considered having secured new sources of external funds as evidence of a program being in a stronger position with respect to sustainability. Thus, sites rated positively in this regard reported either having obtained funding support from a new grant or service reimbursement source (either public or private), funding through absorption of the costs of HS operations into the institution's budget, or both. All eight of the sustained programs reported having one or the other of these two (non-original) sources of financial support at the time the sustainability rating data were collected. Two programs garnered Medicaid funds and one sustained program reported all three sources of funds. Of particular interest are those HS program sites where the operational costs were absorbed by the practice or host institution.

16.3. Contributions to Sustainability and Diffusion at the National Level

To better understand the broader context for the implementation and sustainability objectives of the HS initiative, we catalogued implementation supports at the national level. In this section we provide a descriptive summary of the nature, scope, and volume of national resources brought to bear on HS program design, implementation and diffusion.

16.3.A. Data Sources and Methods

As was the case with analyses at the site level, data were abstracted from multiple sources in order to illustrate the various activities related to HS that occurred on the national level. The national chronology captured key activities that were funded by CWF during the period from 1995 to 2002, and which were performed by grantees of the Fund, MEM Associates, BU, the NPO, and JHU (See **Figure 16.2**). Several sources were used to abstract information about activities relating to background research; model development; initiatives and movements in children's health; partnership development; curriculum development and training; communication; evaluation; operations and management; and the diffusion of HS.

Please print Excel file *F16_Chronology* and insert here.

These sources included CWF Annual Reports; CWF reports to the President and Board of Directors; BU training grants and final reports to CWF; monitoring site visit reports for years 1 and 2; bibliographies documenting the various products that were produced from and for the program throughout the various years; the NPO diffusion status report; and various literature and websites related to children's initiatives. For the national chronology, the items were sorted by the general date the activity took place and organized into the specific categories described above.

16.3.B. Healthy Steps Partnership Contributions

Healthy Steps was part of, and contributed significantly to, a national effort to build and bolster systems of health and developmental care for children during their early years. In the case of HS, there was national recognition of the importance of early childhood development. This recognition coincided with and helped to propel the development of the HS model. The Commonwealth Fund further garnered community participation and funding by drawing on their extensive contacts to recruit local foundations, national philanthropies, and national professional groups, such as the American Academy of Pediatrics into the partnership. The program was designed, and training and technical assistance in program implementation were provided, through a partnership between CWF and the Boston University Department of Pediatrics. The Commonwealth Fund's efforts also included providing support to the demonstration programs by establishing a National Program Office (ICF Consulting) to help local program sites with start-up, operational management, and quality assurance, and by supporting the third party national evaluation. The Commonwealth Fund also formed and supported the work of a National Advisory Committee (NAC). The membership of the NAC represented experts in child health and development, research methodologists, and professional disciplinary and public policy opinion leaders nationally. The NAC's primary role was to provide substantive guidance to CWF and its HS partners throughout the lifespan of the initiative. A Local Funders Network was also established. Local funding contributions to the local HS operating sites totaled approximately $22 million, and the Local Funders Network convened routinely to generate ideas and actions to sustain program efforts.

Over the course of seven years, the national HS program spawned an impressive array of activity that promoted greater attention to child development and parenting support in the context of pediatric care. Approximately 25 studies and scholarly reviews were undertaken and companion demonstration programs (e.g., Assuring Better Child Health and Development (ABCD) Program) were implemented. A "Healthy Steps for Young Children" informational video was produced and widely disseminated, and a HS website was launched. The National Advisory Committee met 11 times during these years and the Local Funders Network met on 15 separate occasions. Eleven comprehensive and in-depth training institutes and 32 additional academic training sessions were presented. A multimedia training package was produced and distributed nationally. In addition, two special meetings were held that focused specifically on sustainability opportunities, challenges, and strategies (1996, 1999). Dissemination products completed between 1995 and 2002 included ten peer-reviewed papers, 63 practice publications, two book chapters, and one book. In addition to multiple news articles, TV/radio interviews, and press releases, fifty-five (55) national or regional presentations related to HS were given.

As noted above, the national partnership played a vital role by prompting the "buy in" of local philanthropic and health institutions at the level of the individual HS program demonstration sites. The national partnership also ensured robust program implementation through the provision of resources to support training and operations brought to bear through BU and the NPO. The partnership's influence in diffusing the HS concept and program also is clear, as evidenced by the volume and array of emerging HS-like practices and processes. All of this was achieved in the greater context of unprecedented health systems change, and in an environment of increasing fiscal pressures on both private sector medical institutions and public health service programs. These pressures resulted in major cost containment efforts on the part of public funding programs, employers, and health plans.

16.4. Sustainability Analysis Strengths and Limitations

Our findings are congruent with published models and empirical studies related to program sustainability, and are consistent with our expectations in many regards. The strengths of the study include the use of a structured, systematic approach with consistent rules for data collection sources and documentation practices. In addition, we drew on multiple perspectives and triangulated data wherever possible. Our measurement strategies were based on a logic model grounded in prior scientific work.

Nonetheless, our measurement of sustainability was constrained by the need to adapt queries to data collection instruments designed for other evaluation purposes. This constraint resulted from the overall respondent burden imposed by the HS evaluation on program participants at the sites.

Given the need to complete the evaluation of sustainability concurrently with all the other components of the national evaluation, effectiveness and cost data were not available within a timeframe to affect program actions related to sustainability. We therefore were unable to assess the potential interplay of program effectiveness and cost benefits with HS program sustainability.

The timeframe for completion of all components of the national evaluation also limited our assessment of program maintenance to the first 15-18 months after demonstration funding ended. It is generally recognized that most programs can manage to continue operating with carryover or transition funding for at least a year. Thus our assessment results may be skewed in a more positive direction than if the timeframe for the evaluation of sustainability had been extended to a two- or three-year period. On the other hand, securing reimbursement for health services that have not been previously considered a component of standard health care is a complex, politically challenging, and lengthy process. Therefore, the short timeframe for our study may underestimate the ultimate potential for HS sustainability. In the absence of philanthropic support, medical practices have few alternative sources of funds to pay the salary of a HS Specialist. The national partnership has pursued securing commercial and public insurance reimbursement payment streams for several years. Given that health insurers and employers are seeking ways to reduce health outlays, the current period may be particularly difficult for securing changes in reimbursement. This process, therefore, may entail several more years of work and major improvements in the overall U.S. economy in order to come to fruition.

Finally, our assessment of sustainability included only 15 of 24 operating HS sites. Had resources been sufficient to examine the additional group of nine affiliate programs, our understanding of the relative influence of implementation factors on program sustainability may have been enhanced.

16.5. Implications

The HS program partnership examined needs at the broader national level (e.g., through a survey of parents) and tapped into the intellectual professional environment that was "ripe" with respect to concerns about early childhood health and development. The Commonwealth Fund also garnered support through partnerships with local funders, hand selected sites/practices for participation that exhibited readiness for HS as well as a good likelihood of success, and designed and evolved the program in ways that were easily understood and were adaptable to different practice contexts and routines. The result was strong programming across the board during the three years of the demonstration. There was little variability in regard to community involvement in needs identification and program design. This may in some ways limit our understanding of sustainability through site/program comparison. We believe this finding is consistent with our proposition that the national partnership (see Chapter 2) initially "substituted" in this regard for community level roles.

This externally-directed approach, however, may have served to disadvantage HS programs in terms of sustainability by obscuring the absence of local initiative and broad-based community buy-in that would, in the end, be important to continuation of HS beyond the demonstration period. The existence of functional local advisory boards clearly appears to have attenuated the generally limited community participation found in the developmental stages of the HS demonstration programs.

Philanthropies such as CWF have limited resources that need to be distributed in ways that make it likely that the impact of those resources will be as broad and deep as possible. The Commonwealth Fund opted to support a 15-site three-year demonstration program and an evaluation addressing the demonstration period only. This three-year timeframe[16.3] may have affected program sustainability in several ways. For example, a longer period of program implementation funding would have allowed for the production of evaluation findings within a timeframe that was useful for influencing support groups and for "marketing" of HS in order to enhance fundraising efforts. Alternatively, a different evaluation design might have produced more timely findings that could be used to bolster arguments for program continuation.

Clearly, our strongest conclusions can be made relative to findings about the importance of local leadership and constituencies in the form of multiple champions and, in this case, local advisory committees. Undertaking concrete sustainability efforts early on in the life of a demonstration program, which we believe may be related to the above program implementation features, also is demonstrably important.

In future demonstration initiatives, philanthropies and public funders may wish to pursue several strategies to enhance the likelihood of continuation of their programs:

- Ensure substantial (broad) and substantive local constituent involvement. If community roles are not envisioned for the purposes of program initiation, then significant attention should be given to support groups such as local/program advisory committees as implementation gets underway;

- Work to guarantee leadership (champions) at several levels within the host institution. Identifying and nurturing more than one individual leader or champion can promote stability and/or continuity should administrative transitions occur;

[16.3] While development, implementation, and evaluation of the program required eight years to complete, children were enrolled in the demonstration for only the first three years of their lives. The Commonwealth Fund funded these activities for the full eight years. In addition, CWF, with the Agency for Health Care Research and Quality, is co-funding follow-up of the evaluation cohort when children reach 5 years of age.

- Require the development and implementation of concrete sustainability planning, and provide substantial technical assistance and tools for such efforts from the outset;

- Support program funding schemes and evaluation designs that make it possible for evaluation results to be available well-prior to the conclusion of the demonstration grant cycle.

16.6. Diffusion of Healthy Steps

The expansion of Healthy Steps to other practices outside of the national evaluation sites is noteworthy as an illustration of the program's flexibility and adaptability to different settings and service models. Here, based on information provided by the NPO, we briefly review the program's experience with "affiliate" sites and new practices.

16.6.A. Affiliate Sites

When the HS program began, the goal was to include 12-15 sites in a structured national evaluation. Even after 15 national evaluation sites were developed, however, nine additional sites were qualified and wished to participate. The affiliate sites, while implementing the same model of HS as the evaluation sites, often served different populations with different needs. For example, families being served by affiliate sites tended to be of lower income than those in practices participating in the national evaluation. Over half of affiliate families were Medicaid-enrolled, and 60 percent received WIC services.

In general, affiliate sites showed notable success with HS. For example, one site helped support the expansion to other localities in the greater metropolitan area in which it is located. Their efforts involved working with pregnant women at a county prison to reinforce good maternal health and child development. Another site helped to pioneer the integration of HS into residency training. One of the larger health systems initially implementing HS at selected practice sites decided to make the program a central focus of its pediatric offerings and to extend the approach to more than 200 practices. Ultimately, this organization plans to extend Healthy Steps to all of its pediatric residency training programs, its health care centers, and the day care centers it owns.

Other program adaptations evolving from affiliate HS sites include: establishing group well-child visits implemented by a physician-HS Specialist team; adding a pre-natal element; and expanding and modifying HS to serve families with babies in the neo-natal intensive care unit (NICU).

16.6.B. New Healthy Steps Practices

Beginning in 2000, the HS national program began allowing medical practices that were not part of the original evaluation or affiliate sites to implement HS. These practices illustrate the evolution of HS.

Currently, HS continues to operate in 22 of the 23 new practices that have implemented the program.[16.4] These efforts include an array of practice settings, residency training programs (8 sites), large health care systems (hospital networks and managed care organizations), deployment of public health nurses, and one statewide pediatric health initiative. The different types of settings combined with the different types of HS services being provided at each location demonstrate the ability of HS to be modified without losing the core elements of the approach and an organic evolution of the program.

Many of the new practices that have implemented HS designed adaptations consistent with the core tenets of the approach. And, some are now serving populations or operating in settings not initially conceived by the program's developers, such as 330-funded community health centers, federally qualified health center (FQHC) "look-alikes," and local public health agencies.

Healthy Steps training was incorporated into resident instruction and/or rotation in six of the initial 24 sites, and now also in eight new sites. The level of involvement that residents have in HS and the ways in which they learn about HS vary across programs. Some programs involve residents in co-managing the medical care of families in

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[16.4] One site ceased operations after its public sector sponsor decided to reallocate funding after less than one year of Healthy Steps operations.

continuity clinics, including providing developmental screens and case-based conferencing. [16.5]

Finally, HS also has been incorporated into one statewide initiative to improve pediatric care. One state is implementing a statewide plan to ensure that HS becomes widely known among pediatricians, family physicians, and other health clinicians. In addition to the goal of providing information on a useful intervention, a particular goal is to ensure that residents who have been trained in HS will find practice homes that are at least aware of the program when they begin private practice. To this end, a range of education and training services is being provided to health care professionals across the state.

In summary, the expansion of HS into additional practices and different service settings and the successful modification of the original evaluation model to suit demographic needs, budgetary constraints, institutional cultures, and other factors has been a significant development in the evolution and growth of the program. What was initially conceived as a 15-site demonstration project for pediatric medical offices now operates in 36 locations – including a variety of settings with a variety of implementation models – and is being considered for implementation by several more.

[16.5] For an overview of Healthy Steps in residency training, see www.healthysteps.org (Under Training and Materials).

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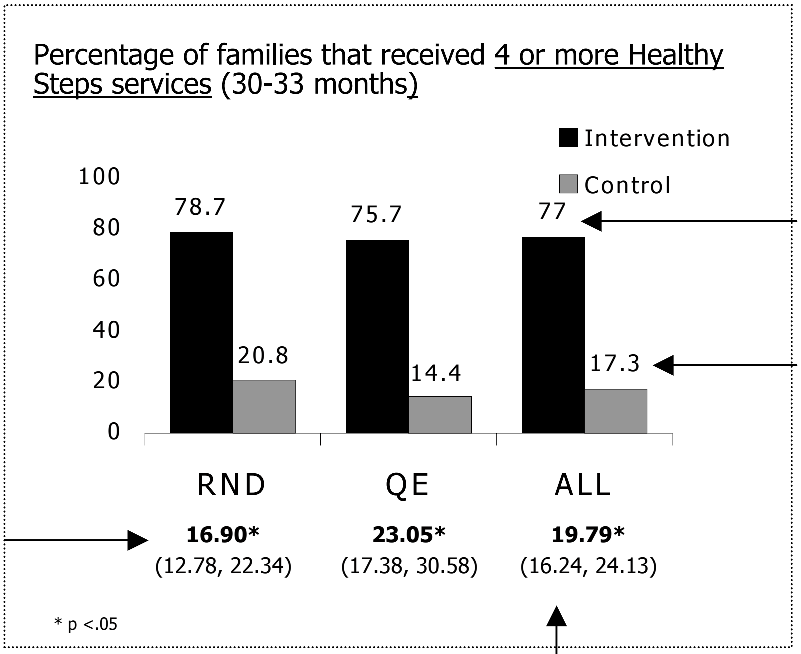
Guide to Interpreting Figures in Chapters 9 and 10.

Results in Chapters 9 and 10 are described in the text and displayed in figures found in the margins. The annotated figures below are representative of these figures and provide guidance in how to interpret them.

Bar Graphs. Bar graphs in the margins display pooled results for randomization (RND), quasi-experimental (QE), and all sites combined. These graphs also show the results of an analysis of the effects of Healthy Steps (HS).

Analyses of HS effects were adjusted for differences in baseline characteristics of families. The analyses also were adjusted for the fact that families within each site tend to be more similar to each other than they are to families at other sites. Results of these adjusted analyses are reported as odds ratios at the bottom of each bar graph. An example of a bar graph for the effect of HS on receipt of four or more HS services is presented and explained here.



Percentage of families that received 4 or more Healthy Steps services (30-33 months)

Regression results for dichotomous outcomes, adjusting for family baseline characteristics and site, are reported in terms of odds ratios. An odds ratio of *greater* than 1 indicates that subjects in the intervention group were *more* likely to report a given characteristic than were subjects in the control group; an odds ratio of *less* than 1 indicates that subjects in the intervention group were *less* likely to report a given characteristic than were subjects in the control group. An odds ratio of 1 indicates that there was no difference between intervention and control groups.

In this figure, intervention families at RND sites had 16.9 times the odds of receiving 4 or more HS services than control families. The corresponding figures were 23.05 times the odds at QE sites and 19.79 times the odds overall.

Percentage of intervention families who received 4 or more HS services.

Percentage of control families who received 4 or more HS services.

Ninety-five percent confidence intervals are estimated; when this interval does not include 1, it indicates a statistically significant difference between

Guide to Interpreting Figures in Chapters 9 and 10.

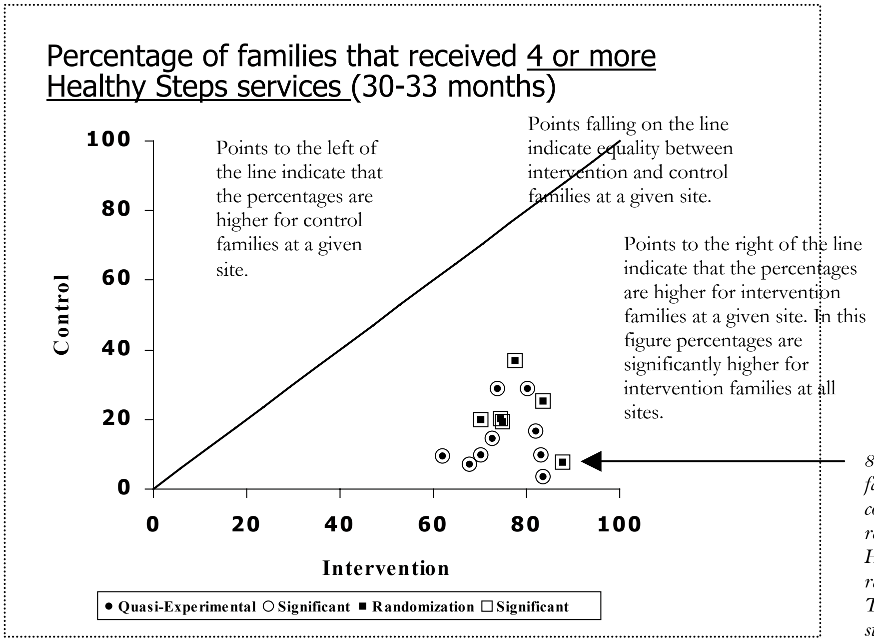
Scatterplots. Each bar graph is accompanied by a scatterplot showing the paired comparisons of intervention and control families by site for the same outcome.

On the horizontal axis, the percentages for the intervention families are displayed, while the percentages for the control families are depicted on the vertical axis.

Each point in the scatterplot represents the pairing of percentages for a particular site. The solid line serves as a reference to indicate equality between the intervention and control families at each site. The points to the right of this line indicate that the percentages are higher for the intervention families while the points to the left of the line indicate that the percentages are higher for the control families.

An outlined point indicates that there is a significant difference (at the 0.05 level) between control and intervention families at this site. The square points indicate RND sites and the round points, QE sites.

The example for 4 or more HS services is shown here for the scatterplot by site.



Percentage of families that received 4 or more Healthy Steps services (30-33 months)

Points to the left of the line indicate that the percentages are higher for control families at a given site.

Points falling on the line indicate equality between intervention and control families at a given site.

Points to the right of the line indicate that the percentages are higher for intervention families at a given site. In this figure percentages are significantly higher for intervention families at all sites.

88% of intervention families vs. 8% of control families received 4 or more HS services at this randomization site. This difference was statistically significant.

Figure 16.2. Healthy Steps Chronology

National Movements and Initiatives Impacting Child Health	▼BEEP ▼Zero to Three ▼Bright Futures for Children ▼Starting Points		▼NIH, Cost, Quality, and Child Outcomes Study	▼ACF Funds Early Head Start ▼Medical Home Concept Evolves ▼Healthy Child Care America Campaign	▼S-CHIP (Title XXI) ▼White House Conferences, Brain Development, Childcare ▼Developmental/ Behavioral Pediatric Training ▼Newsweek Issue: Your Child	▼Olds Study on Home Visiting		▼National Survey of Early Childhood Health ▼*From Neurons to Neighborhoods* (IOM) ▼Surgeon General's Report on *Children's Mental Health* released ▼Newsweek Issue: Your Child	▼First Lady's Summit on Early Childhood Cognitive Development	▼White House Early Childhood Education Initiative
	1980's and Early 1990's	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
CWF Funded Background Research*		National Survey of Parents with Children Birth-3yrs	♦Focus groups of pediatricians, parents ♦Models of Corporate Programs for Parents	National Study of the Changing Work Force	Identifying Projects to Improve Medicaid Financing of Developmental and Behavioral Services for Young Children	♦HEDIS Measures for Young Children ♦Private Health Insurance Coverage of HS Services	♦Medicaid EPSDT as a funding source ♦Quality Child Development Services through Medical MC Contracts ♦Review of Home Visiting Programs	Medicaid Parents' Experience with the Health care System		
Partnership Development			♦MEM and CWF begin outreach to national and local philanthropies ♦National Advisory Committee (NAC) in formation	♦MEM Associates HS support program ♦NAC meets twice a year ♦Local Funding network meets annually			LFN meets with Grantmakers in Health			
Model Development		Healthy Steps Program for Young Children Established			Developing Quality Assurance Programs for Children Birth-3yrs	ABCD Initiative		HS for Young Children in Childcare	♦Self Pay, Substitution, and marketing models ♦Child Development and Pediatric Care proposal for a new program	
Curriculum Development Training			Development of HS curriculum, training and parent materials	2 HS Institutes	4 HS Institutes	3 HS Institutes	♦2 HS Institutes ♦4 training manuals	2 training manuals	Child Development Curriculum for Pediatric Residency Programs	
Communication			♦2 publications ♦7 presentations	♦1 publication ♦8 presentations ♦HS Brochure ♦HS Newsletter Launched ♦HS internet services launched	♦19 publications ♦11 presentations	♦24 publications ♦14 presentations ♦HS Video ♦Multimedia Training Package	♦20 publications ♦17 presentations	♦19 publications ♦13 presentations	♦8 publications ♦13 presentations	
Operations and Management	q		ICF Consulting Administers the HS Program	♦Site visits to select 15 HS evaluation sites ♦Site visits to select HS affiliate sites	♦Slide/video presentation on implementing HS ♦Monitoring Site Visit #1	TA Evaluation and HDS practice development at affiliates	♦Sustainabiliy training workshop ♦Monitoring Site Visit #2	CWF funds sites to sustain, adapt and replicate HS		
Evaluation			Evaluation of the HS Program Designed	National evaluation of the HS Program Implemented	Evaluation of the affiliate sites of the HS Program	♦Embedded study of parent-child interaction and child development ♦Evaluation of alternative model sites: Denver, Seattle		Long term follow up of HS		
Diffusion								22 sites nationally evolving "HS type" services		
	1980's and Early 1990's	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**

* Selected Set