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Characteristics, Access, Utilization, Satisfaction, and Outcomes of Healthy Start Participants in Eight Sites

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Abstract To describe the characteristics, access, utilization, satisfaction, and outcomes of Healthy Start participants in eight selected sites, a survey of Healthy Start participants with infants ages 6–12-months-old at time of interview was conducted between October 2006 and January 2007. The response rate was 66% ($n = 646$), ranging from 37% in one site to >70% in seven sites. Healthy Start participants' outcomes were compared to two national benchmarks. Healthy Start participants reported that they were satisfied with the program (>90% on five measures). Level of unmet need was 6% or less for most services, except for dental appointments (11%), housing (13%), and child care (11%). Infants had significantly better access to medical care than did their mothers, with higher rates of insurance coverage, medical homes, and checkups, and fewer unmet needs for health care. Healthy Start participants' rates of ever breastfeeding (72%) and putting infants to sleep on their backs (70%) were at or near the Healthy People 2010 objectives, and considerably higher than rates among low-income mothers in the ECLS. The high rate of health education (>90%) may have contributed to these outcomes. Elimination of smoking among Healthy Start participants (46%) fell short of the Healthy People 2010 objective (99%). The low-birth weight (LBW) rate among Black Healthy Start participants (14%) was three times higher than the rate for Whites and Hispanics (5% each). Overall, the LBW rate in the eight sites (7.5%) was similar to the rate for low-income mothers in the ECLS, but both rates were above the Healthy People 2010 objective (5%). Challenges remain in reducing disparities in maternal and child health outcomes. Further attention to risk factors associated with LBW (especially smoking) may help close the gaps. The life course theory suggests that improved outcomes may require longer-term investments. Healthy Start's emerging focus on interconception care has the potential to address longer-term needs of participants.

Keywords Healthy start · Infant mortality · Disparities · Interconception care

Background

In 2004, the U.S. infant mortality rate was 6.78 infant deaths per 1,000 live births [1]. Although the U.S. infant mortality rate has declined over the past four decades [2], the United States ranks below most developed countries on this measure, and 38th among all countries [3]. The picture is even bleaker for infant mortality rates of non-Hispanic Blacks, American Indians, and selected Hispanic subgroups. Data for 2004 show that infants born to Black women were twice as likely to die in their first year as infants overall; infants born to American Indian and Puerto Rican women had infant mortality rates 25% and 15% above the national average, respectively [1]. In addition, women in these racial/ethnic subgroups have notably higher incidences than White women of the 4 leading causes of infant death (LBW/preterm birth, sudden infant

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death syndrome, maternal complications, and congenital malformations), as well as higher rates of perinatal risk factors [4].

The Institute of Medicine (IOM) proposes that the sources of racial/ethnic disparities in health are "complex, rooted in historic and contemporary inequities" [5]. The historical and social context in sources of racial/ethnic disparities can be seen at multiple levels. For example, individual-level factors include minorities' lower socioeconomic status and variation in patient knowledge, behavior, and attitudes toward health and health care. At the social and community level, racial/ethnic minorities are more likely to reside in poor neighborhoods and are disproportionately exposed to residential and environmental disease-producing factors [6, 7]. Disparities in access to medical care, and cultural and language barriers within health systems, are also sources of health disparities [5–7]. As a result, the IOM promotes a comprehensive, multilevel approach to eliminating disparities that targets patients, providers, and health care systems.

The Maternal and Child Health Bureau's (MCHB) Healthy Start program is the largest multilevel initiative to address racial and ethnic disparities in infant mortality. The goal of this federally sponsored, community-based program is to improve maternal and child health outcomes by providing culturally and linguistically competent services, including outreach, health education, and case management, and by enhancing local perinatal health systems through increased collaboration and planning [8]. The nine required program components include five service components (outreach, health education, case management, perinatal depression screening and referral, and interconception care) and four systems components (consortium, collaboration, local health system action plan, and sustainability plan). The integration of efforts to improve both services and systems is a unique feature of the Healthy Start program. Each local project is designed to facilitate access to needed services and fill gaps in services not otherwise available. Thus, the services offered by each project are tailored to local community needs and infrastructure. The theory of change underlying the program suggests that local community involvement will lead to improved services and systems that are tailored to the cultural and linguistic needs of the community. In turn, participants' use of health care and other services is expected to expand, which will then bring about improved perinatal health outcomes and, ultimately, eliminate racial and ethnic disparities in infant mortality.

Interconception care is becoming widely recognized as an important component to improve maternal and child health outcomes [9]. Specifically, interconception care takes place between pregnancies and addresses not only risks indicated by a previous adverse pregnancy outcome, but is also designed to provide preventive health care and encourage birth spacing of at least 2 years between pregnancies. Healthy Start is the first national program to focus systematically on interconception care.

Measuring the progress of Healthy Start programs toward reducing disparities in infant mortality is challenging for two reasons. First, many factors (such as environment, nutrition, and stress) influence perinatal health outcomes over the course of a woman's lifetime [4, 10]. As a result, reductions in infant mortality are not likely to be observable within a 1–2-year period. Second, it is not possible to attribute changes in outcomes directly to the Healthy Start program in the absence of a control or comparison group. Thus, alternative strategies were required to measure and interpret the outcomes of Healthy Start participants. To overcome these two challenges, we used (1) "evidence-based" measures of intermediate outcomes that are associated with reduced infant mortality to assess Healthy Start program performance over the short term and (2) national benchmarks, where possible, to help interpret Healthy Start participant outcomes. We conducted a comprehensive literature review of the risk and protective factors that are associated with racial/ethnic disparities in infant mortality to identify measures of effective prenatal, interconception, and infant care practices [4]. Among the factors found to be associated with improved infant outcomes were multivitamin use, smoking cessation, breastfeeding, infants put to sleep on their backs, and birth intervals of at least 2 years. These indicators, among others, were included in the analysis of Healthy Start participant outcomes.

To compensate for the absence of a control or comparison group, we developed two national benchmarks to place Healthy Start participant outcomes in perspective. First, we constructed a benchmark of low-income mothers based on a sample from the Early Childhood Longitudinal Study (ECLS), which provides a nationwide estimate for outcomes of interest. Second, we assessed Healthy Start participant outcomes in relation to Healthy People 2010 objectives [11]. Healthy People 2010 provides national targets for improving the health of all Americans, with specific objectives for maternal and child health. Even though this benchmark strategy helps interpret Healthy Start participant outcomes, it must be recognized that we cannot attribute any differences (positive or negative) to Healthy Start program impacts because we are unable to control for what might have happened in the absence of Healthy Start.

This paper is one component of the national evaluation of the Healthy Start program. The evaluation used both qualitative and quantitative methods to assess program implementation, outcomes, and lessons learned. The study used a participatory evaluation strategy that involved ongoing

collaboration with and input from the Healthy Start grantees as well as an advisory panel of experts in maternal and child health, evaluation methods, and health care disparities. This paper presents the results of a survey of Healthy Start participants in eight selected sites, which was designed to incorporate the consumer perspective into the evaluation. This paper addresses four questions: (1) What are the characteristics of Healthy Start participants at the eight sites (including their sociodemographic characteristics, health status, and risk factors)? (2) What services do Healthy Start participants receive and what is their level of access to and unmet need for services? (3) To what extent are participants satisfied with the Healthy Start program? (4) What are participants' perinatal health outcomes and how do they compare against a national benchmark? A companion paper presents the qualitative findings from site visits to these eight projects [12].

Although the analytic approach does not support conclusions related to the impact of Healthy Start, it does identify areas for improving health behaviors, service delivery, and participant outcomes. The remainder of this paper is organized as follows. First, we describe the data source and analytic methods. Next, we present the results related to demographic characteristics, health status and risk factors, access and utilization, satisfaction, and outcomes. Finally, we discuss the implications of these results for the Healthy Start program and for the continued improvement of perinatal outcomes more generally.

Methods

Data Collection

Site Selection

The participant survey was conducted in eight sites that were selected based on multiple criteria related to program implementation status and demographic variation [12]. To be considered eligible for selection, grantees had to have reported on the 2004 National Survey of Healthy Start Programs that they implemented all nine Healthy Start components required by HRSA, tracked referrals to providers within and outside of Healthy Start, and maintained electronic records. Of the 96 grantees, about one-fourth (27) were eligible to be selected (Fig. 1). The final sample was designed to reflect the four U.S. census regions, urban/rural areas, racial/ethnic diversity, and small/medium/large program size as determined by funding level and number of live births. The sample was also designed to include a site that was close to the Mexico border and a site that served a predominantly indigenous (American Indian) population. The eight sites were located in Fresno, California; Tallahassee, Florida; Des Moines, Iowa; East Baton Rouge, Louisiana; Worcester, Massachusetts; Las Cruces, New Mexico; Pittsburgh, Pennsylvania; and Lac du Flambeau, Wisconsin. This subset of grantees was not intended to be nationally representative of all Healthy Start grantees. Rather, the sites were selected because they had implemented all nine Healthy Start components, and they captured the sociodemographic diversity of Healthy Start programs.

Survey Administration

The participant survey was conducted via computer-assisted telephone interviewing (CATI) between October 2006 and January 2007. The survey was translated from English into Spanish, and trained interviewers conducted the survey in both languages. In addition, professional health interpreters were on call to translate the survey into eight other languages spoken by Healthy Start participants: Brazilian Portuguese, Hmong, Vietnamese, Creole, Mandarin, Mixteco, Ghanaian Twi, and Arabic. Altogether, 37 interviews were conducted in a language other than English or Spanish.

Interviewers made an average of seven calls before completing the interview, and respondents took an average of 30.2 min to complete the survey. Respondents were sent a $25 gift card upon completion of the survey to compensate them for their time spent completing the survey.

Sample Design and Response

Women were eligible to participate in the survey if they had an infant ages 6–12-months-old at the time of the interview.

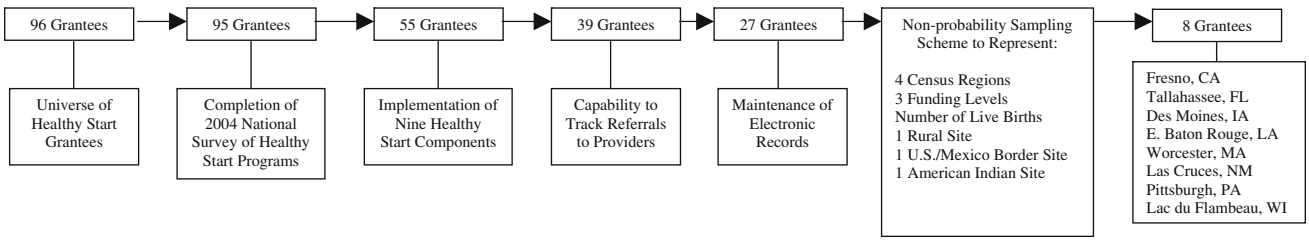

Fig. 1 Site selection

We used a 6–12-month age criterion to allow enough time to measure postpartum outcomes, but not so much time that women would have difficulty recalling their prenatal and delivery experiences. Each site provided a data file containing contact information for the universe of participants who gave birth between October 2005 and June 2006. In two of the eight sites, the grantees required consent from individual participants before releasing contact information for the survey. The initial sample included the universe of 1,056 eligible cases across the eight sites (Table 1). We excluded cases from two sites for which consent had not been obtained, resulting in a working sample of 821 cases across the eight sites. Of the 821 cases, 646 were completed, 48 were ineligible, and the remaining 127 did not complete the survey. The final response rate (including cases for which consent was not obtained) was 65.7%. Five of the eight sites had response rates above 80% and two sites had response rates between 73% and 75%. In the two sites requiring participant consent before releasing contact information, the response rates were 73.0% and 36.8%; the survey completion rates among those giving consent were 96.4% and 93.8%. Little is known about how non-respondents differ from respondents. Recent research has shown, however, that non-response does not necessarily induce bias in survey estimates [13].

Weights were computed using a weighting class adjustment for non-response to the collection of the consent form (in two sites) and non-response to the interview (in all eight sites). These weights are called consent-form-response-adjusted weights and interview-response-adjusted weights, respectively. In the two sites requiring consent, the consent-form-response-adjusted weight was the ratio of the number of all cases to the number of cases who returned the consent form within the weighting class. For the interview-response-adjusted weight, the interview-response adjustment factor was the ratio of the sum of consent-form-response-adjusted weights for all cases to the sum of consent-form-response-adjusted weights for respondents within the weighting class. The final interview-response-adjusted analysis weight was the product of the consent-form-response-adjusted weight and the interview-response adjustment factor. In the remaining six sites without a consent process, the interview-response-adjusted weights were computed using a weighting cell adjustment for non-response to the interview only. The interview-response adjustment factor was the ratio of the number of all cases to the number of cases that responded to the interview.

Questionnaire Content

The questionnaire contained 10 substantive sections: (1) participant background characteristics; (2) mother's current health status and stress; (3) receipt of health education services; (4) health insurance status and WIC participation; (5) access to postpartum care; (6) pregnancy history and current pregnancy status; (7) participation in the Healthy Start program (including satisfaction with Healthy Start services); (8) cigarette use and alcohol consumption before, during, and after pregnancy; (9) use of prenatal care and pregnancy outcomes; and (10) infant health status and access to care. To the extent possible, questions were drawn from several existing, well-established national surveys, including the ECLS, the National Survey on Drug Use and Health (NSDUH), and the National Survey of Early Childhood Health (NSECH). Definitions for the variables used in this study are provided in the following sections.

Sociodemographic Characteristics

Age was calculated by subtracting self-reported date of birth from the date the interview was conducted. Census categories were used for questions about race and ethnicity. Individuals of any race who reported they were of Hispanic origin (including Puerto Rican, Cuban, Mexican, Central or South American, or other Hispanic or Latina backgrounds) were classified as Hispanic. Other respondents were classified as White, Black, Asian/Pacific Islander, American Indian/Alaska Native, or multiracial. Participants reported the highest grade or level of school completed in six categories, which were collapsed into three categories for

Table 1 Survey participation from eight sites

	Site[a]								Total
	A	B	C	D	E	F	G	H	
Eligible participants	372	198	162	122	72	59	37	34	1,056
Working sample[b]	146	198	162	122	72	59	28	34	821
Completed survey	136	155	122	80	62	41	24	26	646
Response rate (%)	36.8	84.3	82.1	74.6	87.5	81.4	73.0	82.4	65.7
Completion rate (%)	93.8	84.3	82.1	74.6	87.5	81.4	96.4	82.4	84.5

[a] Site names are masked to protect confidentiality

[b] Sites A and G required individual consent before participants could be contacted for the survey. As a result, the working sample at these sites is not the universe of eligible participants

analysis (less than high school, high school degree or equivalent, or more than high school). Other sociodemographic variables included marital status (married, separated, divorced, widowed, or never married), employment status (full time, part time, or not working), and the main language spoken at home (English or other).

Health Status and Risk Factors

The prevalence of various health conditions (including depression/anxiety/emotional problems, hypertension, asthma, diabetes, high blood cholesterol, and heart disease) was elicited by asking participants whether a health care provider had ever told them they had the condition. Self-reported health status was measured using a 5-point categorical scale (excellent, very good, good, fair, poor). Other risk factors included cigarette use and alcohol consumption during the 3 months before pregnancy, the third trimester of pregnancy, and at the time of the interview.

Health Education, Service Utilization, and Access to Care

Participants were asked to report whether they received information from a doctor or other health care provider on 13 health education topics spanning the prenatal and interconception periods. The survey also included several questions related to access to care for women and infants, including their health insurance status, presence of a medical home (that is, one person they thought of as their personal doctor or nurse), whether they had a recent checkup (postpartum or well-baby), and whether they had any unmet health care needs. Following definitions used by the Census Bureau, women and infants were considered insured if they responded that they had one or more of the following types of coverage: Medicaid, SCHIP, private insurance, military health care, or other type of coverage. Consistent with Census Bureau definitions, those reporting being covered solely by the Indian Health Service were considered uninsured for this study [14].

Participants were considered as having an unmet need for a service if they needed the service but did not receive it. To measure unmet need, participants were first asked whether they received selected services; if they answered "no," they were asked if they needed the service but did not receive it. Because Healthy Start's role is to assure that participants receive needed services, we did not distinguish whether participants received the services from Healthy Start or another source.

Three measures of interconception care were included: (1) whether the participant (or her partner) is doing anything to keep from becoming pregnant, such as using birth control or a family planning method; (2) whether she was ever given advice about how long to wait before becoming pregnant again; and (3) whether she was currently (at the time of the interview) taking a multivitamin at least once a week.

Participant Satisfaction

Participants were asked to report whether they were "very satisfied," "somewhat satisfied," "somewhat dissatisfied," or "very dissatisfied" with five Healthy Start program dimensions: (1) their overall relationship with Healthy Start program staff, (2) how frequently they were able to meet with program staff, (3) the way program staff treated them, (4) the amount of time program staff spent with them, and (5) services that the program helped obtain for them and their families.

Perinatal Health Outcomes

Three prenatal outcomes were included in the analysis: (1) percentage of participants receiving prenatal care during the first trimester, (2) percentage eliminating smoking during pregnancy, and (3) percentage eliminating alcohol use during pregnancy. First-trimester prenatal care was measured by asking the participant whether she had received any prenatal care from a doctor, nurse, midwife, or some other health care worker and, if so, how many weeks or months pregnant she was when she went for her first prenatal visit. Elimination of smoking during pregnancy was counted if the participant reported smoking *any* cigarettes during the 3 months before pregnancy but reported not smoking at all during the last 3 months of pregnancy. We used a similar approach for measuring elimination of alcohol during pregnancy.

Two measures of birth outcomes were included: (1) whether the infant was LBW and (2) whether the infant had to stay longer in the hospital due to medical problems. The child's birth weight was self-reported in either pounds or kilograms; an infant was classified as LBW if he or she weighed less than 5.5 pounds or 2.5 kg at birth.

Three infant health outcomes were included: (1) whether the participant had ever breastfed or pumped milk for her child, (2) whether the child was usually put to sleep on his or her back as a newborn, and (3) whether the child had had a well-baby checkup. Participants were asked these three questions only if their child was living with them at the time of the interview. (Nine cases were excluded from this analysis because the child was not living with the participant at the time of the interview.)

Analytic Approach

Analyses were conducted using SAS version 9.1 and STATA 9 statistical software. All estimates were weighted to account for non-response. To test for differences

between subgroups of Healthy Start participants, we performed significance testing using Chi-square tests for categorical variables and *t* tests for continuous variables.

To place outcomes for the Healthy Start participants in the eight sites within a national context, we constructed a benchmark based on a sample of low-income mothers from the ECLS. The ECLS was selected for the benchmark for two reasons: (1) the sample size was sufficient to produce robust estimates for the subgroup of low-income mothers with infants ages 6–12-months at the time of interview; and (2) the survey asked detailed questions about mothers' health behaviors and practices in addition to infant health.

The ECLS includes a birth cohort of 14,000 children born in 2001. The first round of information was collected when children were approximately 9 months old. Most information was collected through CATI interviews with mothers, although certain key outcomes, namely LBW and first-trimester prenatal care, were obtained from birth certificates. It should be noted that measurement of outcomes in the ECLS differs from that based on the Healthy Start participant survey in two respects: (1) two ECLS outcomes (trimester prenatal care began and birth weight) were obtained from birth certificates rather than self-reported and (2) the ECLS cohort was born in 2001–2002 (vs. 2005–2006 for the Healthy Start birth cohort).

To make the ECLS benchmark more closely resemble the characteristics of Healthy Start participants in the eight sites, we restricted the ECLS to include respondents who were biological mothers, who had a child ages 6–12-months-old at the time of the interview, and who were living in families with incomes below 185% of the federal poverty level (FPL). This poverty threshold was chosen because 80% of Healthy Start participants nationally lived in families below 185% of the FPL (unpublished data from the MCHB Discretionary Grant Information System). Across the eight selected sites, about 90% were in families with incomes below 185% of the FPL. We were unable to identify women in the ECLS sample who participated in Healthy Start; however, we estimate that Healthy Start served about 0.5% of births in 2002.

We adjusted the ECLS perinatal outcome rates to be similar to the age and race/ethnicity distribution of the Healthy Start participants in the eight sites using the direct standardization method [15]. First, we created 25 cells reflecting age (five categories) and race/ethnicity (five categories) and determined the proportion of Healthy Start participants in each cell. Next, we multiplied this proportion by the ECLS rate within each cell, and, finally, we summed the products to determine the ECLS adjusted rate. Also, for selected measures, we assessed the experiences of the Healthy Start participants in the eight sites and the ECLS sample of low-income mothers in relation to Healthy People 2010 objectives [11]. We cannot determine the statistical significance of the differences between the Healthy Start and ECLS surveys given differences in the survey design and sampling frame. What we describe as similarities or differences are based on qualitative assessments of the data informed by confidence intervals that were derived for measures within each survey.

Results

Sociodemographic Characteristics

As shown in Table 2, 61% of Healthy Start participants in the eight sites were between the ages of 20 and 29, and more than two-thirds (70%) were Black or Hispanic. More than one-third (37%) mainly spoke a language other than English at home. The majority were never married (63%), and more than one-third (39%) had less than a high school education. Finally, 60% were not working at the time of the interview.

Compared to low-income mothers in the ECLS, Healthy Start participants in the eight sites were similar in terms of age, education, and employment status. Reflecting the Healthy Start program emphasis on reducing disparities, a larger percentage of Healthy Start participants in the eight sites reported being Black (34%), Asian/Pacific Islander (6%), and American Indian/Alaska Native (12%) compared to low-income mothers in the ECLS (22%, 2%, and 1%, respectively). Healthy Start participants in the eight sites were less likely to be married (26% vs. 48%) and more likely than low-income mothers in the ECLS to report they speak a language other than English at home (37% vs. 18%).

Health Status and Risk Factors

Healthy Start participants reported a mix of health conditions that may complicate their prenatal and interconception care, as well as affect infant health or parenting skills. About one-fourth (24%) had been told by a doctor or other health care provider that they experienced depression, anxiety, or an emotional problem (data not shown). Some Healthy Start participants had mental health issues that were not diagnosed but that limited their daily activities. For example, 44% reported that during the 4 weeks before the interview, they accomplished less than they would have liked because of feeling depressed or anxious, and 37% reported being limited at work or other activities because of feeling depressed or anxious.

Healthy Start participants also reported a mix of chronic medical conditions. The two most common were hypertension (19%) and asthma (18%), followed by diabetes (9%), high blood cholesterol (4%), and heart disease (1%).

Table 2 Sociodemographic characteristics of Healthy Start participants in eight sites

Characteristics	Healthy Start participants (eight sites)		Low-income mothers (ECLS)[a]	
	%	(95% CI)	%	(95% CI)
Mother's age				
<20	14.7	(11.7–17.6)	13.2	(12.1–14.4)
20–24	36.8	(32.7–40.9)	37.0	(34.9–39.1)
25–29	24.0	(20.4–27.6)	26.8	(25.0–28.6)
30–34	16.0	(13.0–19.1)	15.6	(14.3–16.8)
35+	8.5	(6.0–11.0)	7.4	(6.5–8.4)
Race/ethnicity				
White, not Hispanic	11.8	(9.2–14.5)	41.6	(36.6–46.5)
Black, not Hispanic	34.4	(30.5–38.2)	21.6	(19.4–23.9)
Hispanic	36.0	(31.7–40.3)	33.5	(29.3–37.6)
Asian/Pacific Islander, not Hispanic	5.6	(3.4–7.8)	2.4	(2.0–2.9)
American Indian/Alaska Native, not Hispanic	12.2	(9.8–14.5)	0.9	(0.7–1.1)
Marital status				
Married	26.3	(22.5–30.0)	48.3	(45.9–50.6)
Separated	6.2	(4.1–8.2)	3.5	(2.8–4.3)
Divorced	4.7	(2.9–6.5)	5.2	(4.0–6.3)
Widowed	0.1	(0.0–0.4)	0.4	(0.2–0.7)
Never married	62.7	(58.6–66.9)	42.6	(40.2–45.1)
Education				
<High school	38.7	(34.6–42.9)	45.7	(42.9–48.5)
High school degree or equivalent[b]	33.8	(29.8–37.9)	29.6	(27.4–31.9)
>High school	27.4	(23.7–31.1)	24.6	(22.5–26.8)
Employment status[c]				
Full time	20.4	(17.1–23.7)	24.9	(22.9–26.8)
Part time	20.0	(16.6–23.5)	17.2	(15.4–19.1)
Not employed	59.6	(55.5–63.7)	57.9	(55.6–60.3)
Primary language				
English	62.6	(58.3–67.0)	82.5	(80.0–85.1)
Other	37.4	(33.0–41.7)	17.5	(14.9–20.0)

Sources: Healthy Start participant survey, conducted by Mathematica Policy Research, Inc., 2006. Early Childhood Longitudinal Study (ECLS), US Department of Education, 2001–2002

Notes: The Healthy Start Participant Survey was conducted in 8 of 96 sites. These data are not intended to be representative of all Healthy Start program participants nationally. See text for details on criteria for selecting the eight sites. This table excludes those reporting they were multiracial due to very small sample sizes

[a] The ECLS benchmark includes respondents who were the child's biological mother, had incomes below 185% of the federal poverty level, and had infants ages 6–12-months-old at the time of the interview

[b] For ECLS, having a high school degree or equivalent includes respondents who said their highest level of education was vocational/technical school. The Healthy Start participant survey did not include vocational/technical school as a response option

[c] The Healthy Start Participant Survey categorized employment status as "full time," "part time," and "not working," while the comparable categories in the ECLS were defined as "working 35+ h/week," "working <35 h/week," and "not in labor force or looking for work"

One in 6 (17%) Healthy Start participants in the eight sites reported they were in fair or poor health at the time of the interview. This rate appears to be slightly higher than among low-income women nationally (ages 18–40 in households with less than 200% of poverty) based on the 2004 Medical Expenditure Panel Survey (10%).

Cigarette smoking and alcohol use are not only risk factors during pregnancy but may also affect infant health and well-being. Although Healthy Start participants in the eight sites reported declines in both cigarette smoking and alcohol use during pregnancy, consumption increased after pregnancy. For example, 34% reported smoking during the

3 months before pregnancy, 18% during the last 3 months of pregnancy, and 28% at the time of the interview. For alcohol consumption, 30% reported having at least 1 drink a week during the 3 months before pregnancy, whereas only 3% reported drinking during the last 3 months of pregnancy. However, 21% reported they had at least 1 drink a week at the time of the interview.

Health Education, Service Utilization, and Access to Care

Healthy Start programs offer case management services to help participants obtain needed services within their communities. They also provide health education to promote healthy behaviors and reduce risky behaviors. Health education is provided through both face-to-face encounters (either individual or group sessions) and/or through the distribution of materials [16]. Healthy Start is responsible for filling gaps by providing services not otherwise available in the community as well as facilitating access to services provided by other agencies (such as making appointments with health care providers or providing transportation to services). Thus, although not all of the services reported by participants were provided by Healthy Start, the sites were responsible for ensuring that women received needed services.

More than 80% of Healthy Start participants reported that they received health information concerning 13 selected topics since they became pregnant (Table 3). The three topics participants reported receiving most often were eating healthy foods (reported by 96%), how to put their child to sleep (96%), and how to breastfeed (93%). The three topics reported least often were drug use (reported by 88%), how to manage stress (86%), and how much weight to gain during pregnancy (81%).

Healthy Start participants received help in obtaining a wide range of health care and other services during and after pregnancy (Table 4). (It should be noted that some participants may not have needed help obtaining these services.) The most common services, received by at least half of the participants, were help making prenatal appointments (70%), finding a provider who spoke the same language (61%), making postpartum appointments (60%) and appointments for the child (59%), obtaining transportation (55%), and applying for health insurance (53%).

An important indicator of access to care is the level of unmet need, that is, the extent to which participants reported they needed but did not receive specific services. Unmet need was low for most of the health care services, with the exception of making dental appointments. Whereas 56% of Healthy Start participants in the eight sites reported they needed help with dental appointments, 45% reported they received help, and 11% reported they needed but did not receive help. High levels of unmet need were also reported for finding child care (11%) and obtaining housing (13%). These services are frequently in short supply within the eight communities because of the lack of dentists, licensed and affordable child care providers, and low-income housing options.

Most Healthy Start participants in the eight sites (91%) reported having a postpartum checkup after their child was born, and 83% reported using a birth control or family planning method (data not shown). Other interconception care practices were less frequent. For example, 63% of participants reported receiving advice about how long to wait before their next pregnancy, and 32% of participants reported taking a multivitamin at least once a week.

Infants had better access to care than their mothers in the eight Healthy Start sites (Fig. 2). At the time of the interview, 97% of the infants were insured compared to 87% of their mothers. In addition, infants were more likely than their mothers to have a medical home (90% vs. 81%), more likely to have no unmet health care needs (97% vs. 93%), and more likely to have received a well-baby/postpartum checkup (97% vs. 91%).

Table 3 Health education received by Healthy Start participants in eight sites

Topic	Percentage who reported receiving information
Eating healthy foods	96.0
What position to put child to sleep	95.7
How to breastfeed	92.6
Taking folic acid or vitamins during pregnancy	92.5
Choosing a family planning or birth control option	92.1
Smoking during pregnancy	91.3
Postpartum depression	90.7
Alcohol use during pregnancy	90.5
Parenting	89.6
Sexually transmitted diseases (STDs)	89.1
Drug use such as marijuana, cocaine, or crack during pregnancy	88.2
How to manage stress	85.8
How much weight to gain during pregnancy	80.8

Source: Healthy Start participant survey, conducted by Mathematica Policy Research, Inc., 2006

Note: The Healthy Start Participant Survey was conducted in 8 of 96 sites. These data are not intended to be representative of all Healthy Start program participants nationally. See text for details on criteria for selecting the eight sites

Table 4 Unmet need for selected prenatal and postpartum services among Healthy Start participants in eight sites

Service	Percentage reporting needing service	Percentage reporting receiving service	Percentage needing but not receiving service
Health care related services			
Making appointments for prenatal care	70.7	70.2	0.5
Finding a provider who spoke the same language	64.0	61.3	2.7
Making postpartum checkup appointments for self	63.0	59.8	3.1
Making checkup appointments for child	60.0	58.7	1.4
Making dental appointments for self	55.9	45.4	10.5
Help managing diseases	41.9	39.8	2.1
Getting help to quit smoking	28.2	27.1	1.2
Other services			
Obtaining transportation	61.5	55.4	6.1
Applying for health insurance	55.9	52.6	3.3
Obtaining food	55.1	49.3	5.8
Applying for public assistance	49.0	43.1	5.9
Finding child care	41.7	30.7	11.0
Obtaining housing	39.4	26.0	13.4
Getting help with a crisis	26.0	22.3	3.7

Source: Healthy Start participant survey, conducted by Mathematica Policy Research, Inc., 2006

Note: The Healthy Start participant survey was conducted in 8 of 96 sites. These data are not intended to be representative of all Healthy Start program participants nationally. See text for details on criteria for selecting the eight sites

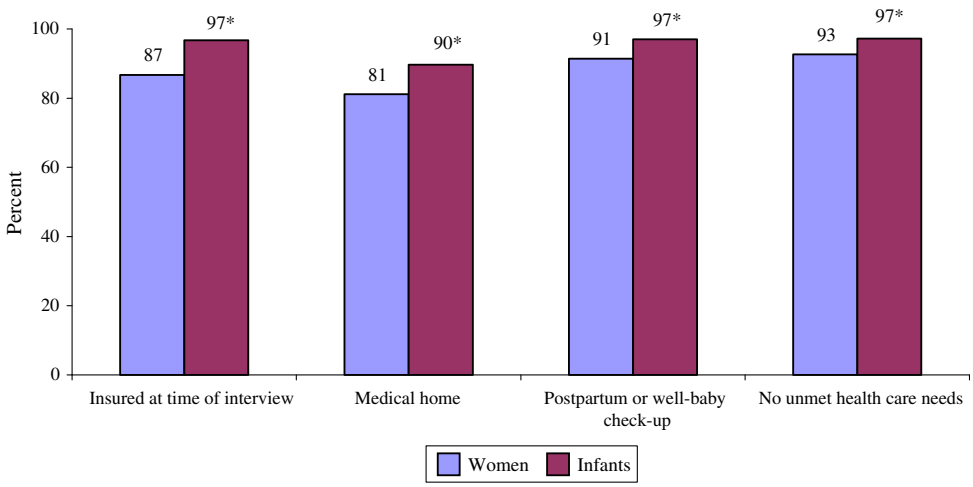

Fig. 2 Access to care among women and infants in the eight sites. *Source*: Healthy Start participant survey, conducted by Mathematica Policy Research, Inc., 2006. * Significantly different ($P < .01$)

Satisfaction

The vast majority of Healthy Start participants were satisfied with the services they received from Healthy Start and with their interactions with Healthy Start staff (Table 5). More than 90% reported they were either "very satisfied" or "somewhat satisfied" on all five measures. Healthy Start participants were most likely to report they were "very satisfied" with the way they were treated by staff (91%), and they were least likely to report they were "very satisfied" with the frequency of contact with the Healthy Start program (72%). These results suggest that participants would have liked more contact with Healthy Start staff because, in part, they were well treated by staff and valued the services they received. Given the participants' complex needs and the programs' limited resources, anecdotal evidence suggests that Healthy Start case managers were often stretched thin and were not able to spend as much time with each participant as they might have liked.

Another indicator of Healthy Start participants' high level of satisfaction with the program is that 97% would recommend the program to a friend or relative. When asked why they would recommend the program, participant responses reflected many dimensions. These perspectives reflect the "participants' voice" in the evaluation. For

Table 5 Satisfaction with Healthy Start program among Healthy Start participants in eight sites

Satisfaction measure	Percentage reporting being "very satisfied"	Percentage reporting being "somewhat satisfied"	Percentage reporting being "somewhat dissatisfied"	Percentage reporting being "very satisfied"
Overall relationship with program staff	83.9	12.5	2.4	1.2
Frequency of contact with program staff	71.9	23.9	3.4	0.8
The way participant was treated by program staff	90.6	6.9	1.8	0.7
Amount of time spent with program staff	78.3	17.9	2.6	1.3
Services that program helped get for participant and her family	78.2	14.8	4.9	2.0

Source: Healthy Start participant survey, conducted by Mathematica Policy Research, Inc., 2006

Notes: The Healthy Start participant survey was conducted in 8 of 96 sites. These data are not intended to be representative of all Healthy Start program participants nationally. See text for details on criteria for selecting the eight sites

example, some participants commented on their relationship with the staff: "they are very supportive and keep everything confidential," "because they treat you nice," and "they are very caring and help you with anything you need." Other participants appreciated the general support they received from the program: "it helps a lot of people in need and helps them have successful pregnancies," and "it's just helpful resources you would not know is out there." Others indicated that the program helped them with specific needs: "they help with transportation and doctors' visits," "they helped me quit smoking, find a good [doctor], and helped me through my pregnancy," and "they are very knowledgable about food issues, like when to feed." Involvement of other family members was also considered an asset: "they help couples out, they get them involved and do things," "because they…help you do things with your children."

Perinatal Health Outcomes

Most Healthy Start participants in the eight sites (86%) reported that they received prenatal care in the first trimester (Table 6), similar to the rate for low-income mothers in the ECLS. Moreover, both rates were within 4 points of the Healthy People 2010 objective of 90%.

Healthy Start participants in the eight sites were twice as likely to eliminate alcohol during pregnancy (89%) than to eliminate smoking (46%). Placing these results in a national context, we observe a similar pattern among low-income mothers in the ECLS (93% for alcohol and 53% for smoking). Of particular note is the gap toward achieving the Healthy People 2010 objective of 99% for the elimination of smoking during pregnancy both for Healthy Start and low-income mothers more generally.

The LBW rate was 7.5% for Healthy Start participants in the eight sites as well as for low-income mothers in the ECLS, 50% higher than the Healthy People 2010 objective of 5%. A related infant health outcome, the percentage of infants who had a longer hospital stay because of medical problems at birth, was also similar between the two groups (12% for Healthy Start participants and 13% for low-income mothers).

Additional analysis of LBW rates was performed by race/ethnicity (White, Black, and Hispanic) (Fig. 3). Among Healthy Start participants, Whites and Hispanics had LBW rates that met the Healthy People 2010 objective of 5%. The LBW rate for Blacks was nearly three times higher (14%). Racial/ethnic disparities were also observed among low-income mothers in the ECLS (11% of Black infants and 6% of White and Hispanic infants were LBW). We cannot determine from these data, however, what the rate among Healthy Start participants would have been in the absence of the Healthy Start program, given the program's outreach to high-risk women with multiple medical and social risk factors.

Healthy Start participants had strong outcomes on the three selected postpartum measures. Table 6 shows that 72% of Healthy Start participants reported ever breastfeeding their infants, and 70% put their infants to sleep on their backs, compared to 60% and 48%, respectively, of low-income mothers in the ECLS. Healthy Start participants in these eight sites achieved or nearly achieved the Healthy People 2010 objectives of 75% for breastfeeding and 70% for putting infants to sleep on their backs. Further analysis revealed large differences in these practices by race/ethnicity. Among Healthy Start participants, 90% of Hispanics reported ever breastfeeding their babies, compared to 61% of Blacks and 57% of Whites (Fig. 4). In contrast, 75% of Whites, 69% of Blacks, and 61% of Hispanics reported putting their infants to sleep on their backs. In nearly all

Table 6 Selected Healthy Start participant outcomes and benchmarks for comparison

Outcome measures	Healthy Start participants (eight sites)		Low-income mothers (ECLS)[a]		Healthy People 2010 objective (%)
	%	(95% CI)[b]	%[c]	(95% CI)[b]	
Prenatal behaviors					
Received prenatal care during 1st trimester	85.8	(83.0–88.6)	86.4	(82.9–89.9)	90
Eliminated smoking during pregnancy	46.2	(39.5–53.0)	53.2	(46.9–59.5)	99
Eliminated alcohol during pregnancy	89.3	(84.7–93.9)	93.3	(85.2–100.0)	100
Infant health outcomes					
Infants with low birth weight	7.5	(5.5–9.6)	7.5	(5.6–9.4)	5
Infants with a longer hospital stay because of medical problems at birth	11.9	(9.3–14.5)	12.8	(10.9–14.7)	n.a.
Postpartum behaviors					
Mothers who ever breastfed their infants	71.8	(68.2–75.4)	60.1	(57.3–62.9)	75
Mothers who put their infants to sleep on their backs	69.5	(65.5–73.5)	48.4	(45.7–51.1)	70
Well-baby visit	97.0	(95.5–98.5)	99.6	(95.8–100.0)	n.a.

Sources: Healthy Start participant survey, conducted by Mathematica Policy Research, Inc., 2006. Early Childhood Longitudinal Study (ECLS), US Department of Education, 2001–2002

Note: The Healthy Start participant survey was conducted in 8 of 96 sites. These data are not intended to be representative of all Healthy Start program participants nationally. See text for details on criteria for selecting the eight sites

n.a. not applicable

[a] The ECLS benchmark includes respondents who were the child's biological mother, had incomes below 185% of the federal poverty level, and had infants ages 6–12-months-old at the time of the interview

[b] Given the differences in sampling designs and sampling frames of the Healthy Start and ECLS surveys, these confidence intervals are meant to assist the reader in developing a qualitative assessment of differences rather than providing a true test of statistically significant differences between the populations

[c] ECLS rates were adjusted using the direct method of standardization to reflect the age and race/ethnicity distribution of the Healthy Start participants in the eight sites. Both datasets exclude those reporting they were multiracial due to very small sample sizes

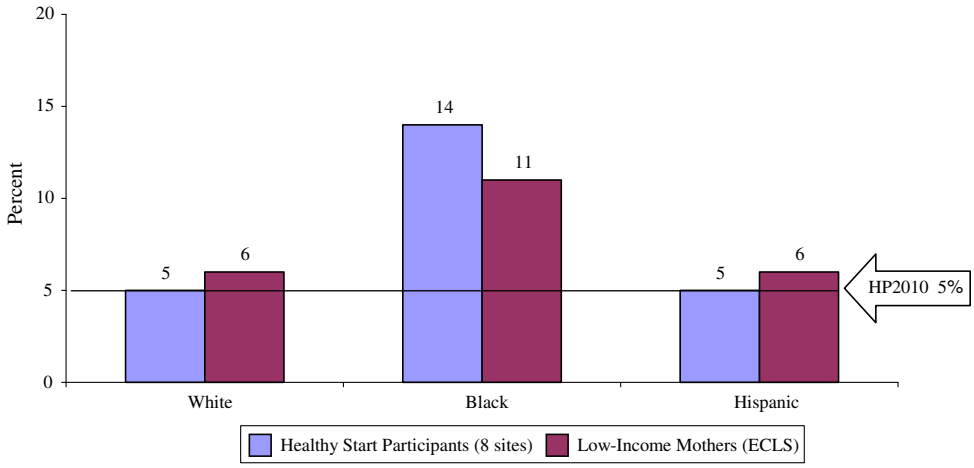

Fig. 3 Low birth weight by race/ethnicity. *Sources*: Healthy Start participant survey, conducted by Mathematica Policy Research, Inc., 2006. Early Childhood Longitudinal Study (ECLS), U.S. Department of Education, 2001–2002

race/ethnicity categories, Healthy Start participants had higher rates than low-income mothers in the ECLS (except for similar rates of breastfeeding among Whites).

The results for Hispanic Healthy Start participants varied according to whether English was their main language spoken at home (data not shown). Hispanic Healthy Start participants speaking English as their main language were 14% points less likely than those with another main language to have ever breastfed their infants (79% and 93%, respectively). The opposite pattern was found for putting babies to sleep on their backs, with a 25%-point difference between Hispanics speaking English as their main language and those with another main language (80% and 55%, respectively).

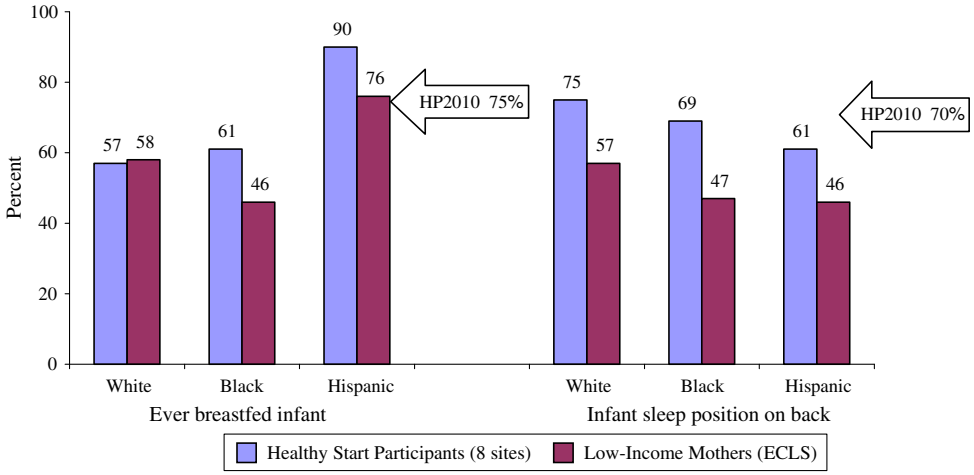

Fig. 4 Infant health outcomes by race/ethnicity. *Sources*: Healthy Start participant survey, conducted by Mathematica Policy Research, Inc., 2006. Early Childhood Longitudinal Study (ECLS), U.S. Department of Education, 2001–2002

Discussion

This study showed that Healthy Start participants in the eight selected sites received health information on a wide range of topics, got help accessing many needed services, and were very satisfied with the program. The level of unmet need was relatively low, except for dental appointments, housing, and child care. Healthy Start participants in the eight sites had perinatal outcomes that were similar to or better than two external benchmarks on several measures. In particular, rates of ever breastfeeding their infants and putting infants to sleep on their backs were at or near the Healthy People 2010 objectives, an important achievement given the high-risk profile of these participants. Although the causal influence of the Healthy Start program on these outcomes cannot be determined, the high rates of health education among Healthy Start participants (more than 90% for both breastfeeding and putting babies to sleep on their backs) may have contributed to these positive outcomes.

Several caveats affect the interpretation and generalizability of our results. A limitation of this study was that the evaluation design did not allow us to identify causal relationships between the services provided by the Healthy Start program and the perinatal outcomes among participants. The two national benchmarks were meant to provide a national context for understanding the perinatal outcomes of the Healthy Start participants in eight sites and were not meant to describe the effectiveness of the Healthy Start program. This approach does not control for the multitude of risk factors (medical, economic, cultural, and social) that may be associated with perinatal health outcomes. Moreover, this approach does not allow us to infer what the outcomes would have been in the absence of Healthy Start.

Furthermore, these results cannot be generalized to all 96 Healthy Start sites because the eight survey sites were not randomly selected. To represent the diversity of the Healthy Start program, the evaluation included a site located near the Mexico border and a site serving indigenous populations. In addition, selected sites were required to have implemented all nine Healthy Start program components, as well as data systems to track referrals and maintain electronic records. Thus, the selected sites were intended to depict the Healthy Start program when it is fully implemented. Finally, even though this survey achieved a high response rate across seven of the eight sites, the effects of non-response on the results are unknown. Moreover, small caseloads in each of the sites precluded separate analysis of Healthy Start participants in selected subgroups, notably Asian/Pacific Islanders and American Indians/Alaska Natives.

A decade ago, an evaluation of the 15 original Healthy Start sites compared the outcomes of Healthy Start participants to those of other women in the same geographic area. The study found that Healthy Start participants in the 15 sites were significantly more likely than other women to receive enhanced prenatal care services and they were more likely to be using birth control at the time of the interview [17]. Unlike the previous evaluation, the current study did not include a comparison group within the same geographic area, and instead, relied on national benchmarks for comparison purposes. Nevertheless, a comparison of service use and health behaviors reported by participants in the original 15 sites versus the current 8 sites suggests that Healthy Start participants in the current study had higher rates of interconception services, such as postpartum care and well baby visits, and higher rates of healthy behaviors, such as breastfeeding and elimination of alcohol use during pregnancy. Moreover, self-reported

birth control use was higher among those in the current 8-site study than the original 15-site study (83% versus 52%). Levels of participant satisfaction were consistently high during both phases [18]. These results should be interpreted with caution, however, because they do not control for differences in participant or program characteristics, nor do they account for secular trends over the past decade.

As the Healthy Start program enters its fourth phase, this study has implications for program improvements in the future. First, interconception care is an emerging focus of the Healthy Start program and the evidence from this study is mixed. Although most women reported they had a postpartum visit and had chosen a birth control or family planning option, fewer women recalled receiving advice on how long to wait before becoming pregnant again, and fewer still were taking a multivitamin at least weekly. Recent recommendations for improving preconception care [9] and forthcoming recommendations for improving interconception care may help shape future program initiatives in this area.

A second implication relates to the need for increased emphasis on smoking cessation during pregnancy, although this need is not unique to Healthy Start. Among Healthy Start participants in the eight sites (as well as low-income mothers in the ECLS), a large difference was found between the percentage of women eliminating smoking during pregnancy and the Healthy People 2010 objective. Given the association between smoking during pregnancy and adverse perinatal outcomes [19], further efforts to eliminate smoking during pregnancy may be warranted.

This study also has implications for supporting Healthy Start programs in meeting the multifaceted needs of participants. Even though unmet need for health-related services was low (with the exception of dental appointments), unmet need for housing, child care, public assistance, food assistance, and transportation services was reported by 6–13% of the Healthy Start participants in the eight sites. (These rates reflect unmet needs during late 2007 and early 2008.) The level of unmet need for the diverse array of services underscores the wide range of community-based supports needed by high-risk women, as well as the importance of collaboration between Healthy Start and its community partners, through such mechanisms as a consortium and local health system action plan. Although the Healthy Start program is designed to address multiple social determinants of health, such as safe housing, these wide-ranging needs cannot always be met by programs with limited budgets and scope. With the recent trend in national housing policy toward the use of housing vouchers (and away from the production of new housing) [20], Healthy Start program staff noted that severe housing shortages and waiting lists pose a barrier to obtaining housing for participants. This study suggests that the provision of technical assistance and best practices in facilitating access to non-health-related services would support Healthy Start programs' wide-ranging efforts to reduce disparities in maternal and child health outcomes.

Finally, this study has implications for expanding postpartum health care coverage for women on par with children's health coverage. This study found that infants had better access to health care than their mothers in the eight selected communities, with higher rates of insurance coverage, medical homes, and checkups and lower rates of unmet health care needs. These findings are noteworthy not only because access to care is important to women's postpartum health status, but also because it may affect their ability to care for their children and may even contribute to the health of future children. One clear implication of this study is that insurance coverage gaps exist for women during the postpartum period. Expanded Medicaid coverage for pregnant women typically ends 60 days postpartum, leading to significantly higher uninsured rates for mothers compared to their infants. Continuing Medicaid coverage through the interconception period may help reduce differences in health care access and, ultimately, improve perinatal health outcomes.

In summary, this study has demonstrated that outcomes of Healthy Start participants in eight sites compare favorably to national benchmarks. Noteworthy achievements include the high rates of breastfeeding and adherence to the "back-to-sleep" recommendations among participants. Nevertheless, these results suggest that challenges remain in reducing disparities in perinatal health outcomes. Further attention to risk factors that may be associated with LBW, such as smoking, weight gain during pregnancy, and stress, may help close the gaps. However, the life course theory of health development suggests that improved maternal and child health outcomes may require longer-term investments [10]. Healthy Start's emerging focus on interconception care has the potential to address the longer-term needs of participants.

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