# COMPARISON OF PRIMIPAROUS AND MULTIPAROUS MOTHERS:
## Healthy Families Program Participation, Outcomes, Challenges, and Adaptations
## FY 1999 – FY 2010

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# COMPARISON OF PRIMIPAROUS AND MULTIPAROUS MOTHERS:

## Healthy Families Program Participation and Outcomes
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**EXECUTIVE SUMMARY**

This study was conducted to compare the participation and outcomes of multiparous mothers (those with previous children) in Healthy Families (HF) home-visitation programs in Virginia to those of primiparous (first-time) mothers in the same programs. The purpose of these comparisons was to examine the longstanding assumption that multiparous mothers do not do as well as primiparous mothers in home visiting programs. Targeting services based on this untested hypothesis denies services to more than 60% of the American families who deliver each year, based solely on the fact that they have previous children. The first phase of the study was a quantitative analysis of participation and outcomes, and the second phase was qualitative interviewing of the HF programs' managers.

A review of recent studies and meta-analyses, combined with the experience of the co-principal investigators suggested that, although it has been assumed that first-time mothers will benefit more from early home-visitation than will mothers with previous children, very little research has tested this hypothesis.

Studies of the Nurse Family Partnership (NFP), which serves first-time mothers exclusively, have contributed to the assumption that these mothers benefit most from home-visiting. NFP, however, has never been empirically tested with multiparous mothers.

Perhaps the most authoritative meta-analysis conducted to date was the 2003 National Review of the Effectiveness of Early Childhood Home Visitation for Preventing Violence conducted by the Task Force on Community Preventive Services (Hahn, et al., 2003). The Task Force identified 22 studies (representing 27 interventions) that evaluated effects of early childhood home visitation on child maltreatment. Compared with

controls, the home visitation programs had median effect sizes of approximately 40% in reducing child abuse and neglect. That review did not suggest that home visitation be provided only to primiparous mothers.

The recent HomVEE review, although not a meta-analysis, conducted a broad search of home visiting models and identified seven programs (Early Head-Start Home Visiting, Family Check-Up, Healthy Families America, Healthy Steps, Home Instruction of Parents of Preschool Youngsters, Nurse Family Partnership, and Parents as Teachers) that received high or moderate ratings of effectiveness. The HomVEE did not examine parity (Paulsell, Avellar, Martin, & Grosso, 2010).

Results attained by home-visitation programs in Virginia during the past 20 years have also challenged the assumption that multiparous mothers do not benefit from home visiting. First, in the six-year evaluation of the Hampton Healthy Start (HHS) program (Galano & Huntington, 1999), any differences between the primiparous and multiparous mothers were smaller than those between the intervention and the control group. The HHS evaluation included randomized assignment to intervention and control groups. Overall, the results of the HHS evaluation indicated that, although there were significant differences between the intervention and control groups on measures of infant health, parent-child interaction, and the home environment, the mothers' parity was never a factor that effected the outcome. In other words, primiparous and multiparous mothers, and their children, received similar benefits from participation in the intervention. Second, in the past ten years of Healthy Families Virginia evaluations, participants, regardless of parity, attained high levels of success in the program, measured by children's immunization completion rates, developmentally appropriate home environments, and closely-spaced subsequent pregnancies.

The data for this Pew-funded study were collected from Healthy Families participants and their children. Data from participants served between July 1, 1999 and June 30, 2010 provided the basis for these analyses. The relationships between client demographics (race, employment, education, parity, and level of risk), program participation (length of service, number of home visits, and service intensity), and program outcomes (immunization completion, the home environment, and subsequent births) were examined. Multiple regression analysis was used to examine the relationships among these variables.

The analyses for this study were conducted in five stages: 1) comparability of sites serving only primiparous participants (primiparous-only sites) and sites serving both primiparous and multiparous families (multiparous-serving sites), 2) comparability among the multiparous-serving sites, 3) comparability of primiparous and multiparous mothers, 4) the relationships among parity, demographics, and participation, and 5) the relationships among parity, demographics, participation, and outcomes.

Parity was related to level of risk and the risk profile for mothers. Multiparous mothers had higher levels of risk at enrollment (assessed using the KEMPE Family Stress Checklist). Multiparous mothers had higher risk scores on history of abuse, substance abuse, mental health, criminal history, CPS involvement, coping skills, stressors and concerns, and punitive discipline. Multiparous and primiparous mothers did not differ on their potential for violence, perception of the infant, and child unwanted items. Multiparous mothers had lower risk scores on expectations of the child.

Parity was not related to the participation variables (length of service, number of home visits, and intensity). Participation variables were, however, related to participants' risk scores, age, race, employment, and education to varying degrees.

Overall, the results of this study support a conclusion that multiparous mothers participate similarly and have similar outcomes to primiparous mothers in the Healthy Families home visitation program. Although they were older and at higher risk than the primiparous participants, the multiparous participants participated similarly to primiparous mothers. In addition, the multiparous and primiparous mothers had similar patterns of outcomes. This study examined three outcome indicators (one of which was assessed at two separate times), and none had a significant relationship with parity. In fact, on immunizations, both groups far surpassed the Virginia general population rates. For the HOME, the regression indicated that parity was not a significant predictor of scores on either the first or last HOMEs. This was supported by the finding that mothers' HOME scores did not differ between primiparous and multiparous mothers and that there was a significant increase for all mothers' scores between the two HOME administrations.

The results also indicated that the outcomes were more strongly and consistently predicted by a combination of participation and demographic variables. The most frequent and strongest predictors of participant outcomes were length of service and risk scores. The next most frequent was Black participants compared to Hispanic. This combination of results; no predictive ability for parity, comparable scores for primiparous and multiparous participants on all measures, and stronger prediction of outcomes by participation and demographic variables, suggests that it is neither appropriate nor useful to use parity as a variable to exclude mothers from participation in Healthy Families home visitation services.

Following the quantitative analysis phase, the authors convened a meeting with the Heathy Families program managers so that they could provide feedback for other

service providers.  Using an open-ended interviewing methodology, the meeting explored the managers' experiences serving multiparous participants, the rationale for serving them, and accommodations or adaptations that the programs had made to engage and retain multiparous participants. Managers cautioned that multiparous families should not be treated as a unitary bloc. As with other families, the key to success was tailoring services to an individual family's needs.

Sites had originally decided to serve multiparous families for a variety of reasons, from the fiscal to the philosophical. Some sites depended on the larger family sizes to help them financially via Medicaid Case Management billing. Most of the sites expressed that it was not a consideration to serve only primiparous families as it would severely limit their ability to provide services to many high-risk families in their communities.

Overall, this study provided new insight into home visiting services for multiparous families. Despite the assumption that they would not benefit from home visiting programs to the extent seen in primiparous families, and despite the fact that programs that serve them face additional challenges to meet their more complicated needs, this study demonstrated that multiparous families can participate similarly to primiparous families and can achieve similar outcomes. With further funding, HFV could enable communities to serve both multiparous and primiparous mothers so that a randomized experiment could be conducted.

The results of this study suggest several areas of future research. One direction might be to further examine the multiparous mothers' mental health and risk status. In addition, further analysis using tools such as Hierarchical Linear Modeling could examine program and community level variable that contribute to participation and outcomes.

**COMPARISON OF PRIMIPAROUS AND MULTIPAROUS MOTHERS:**

**Healthy Families Program Participation and Outcomes**

## INTRODUCTION

This study was conducted to compare the participation and outcomes of multiparous mothers (those with previous children) in Healthy Families (HF) home-visitation programs in Virginia to those of primiparous (first-time) mothers in the same programs. The purpose of these comparisons was to examine the longstanding assumption that multiparous mothers do not benefit from home visiting to the extent that primiparous mothers do. Targeting services based on this untested hypothesis would unfairly deny services to approximately 60% of American families each year. The first phase of the study was a quantitative analysis of participation and outcomes, and the second phase was qualitative interviewing of the HF programs' managers.

A review of recent studies and meta-analyses, combined with evaluation results from Healthy Families programs suggested that although it has been assumed that first-time mothers would benefit more from early home-visitation than would mothers with previous children, very little empirical research has tested this hypothesis.

### A Brief Review of the Existing Home Visiting Literature and Meta-Analyses

A complete review of the literature on home visitation as applied to child abuse and neglect prevention was beyond the scope of this project. This section presents evidence from recent reviews and meta-analyses, examines the evidence for primiparous

mothers deriving more benefits from home visiting, and illustrates the lack of definitive findings in this area.

An early review of the research literature in the prevention of child abuse and neglect (CAN)(Helfer, 1982) found very few articles which focused on both research and prevention. Nonetheless, based on the early work of C. Henry Kempe and colleagues, (Kempe, 1976; Gray & Kaplan, 1980), one of Helfer's recommendations was to provide "a home health visitor to all new parents for one to two years after the birth of their firstborn child." This recommendation was consistent with the British model of providing services to all new parents following the birth of their child, and extended the time-frame of that model to one to two years.

The field of home-visiting is indebted to the pioneering research of Dr. David Olds documenting the long-term benefits of early home-visitation. Dr. Olds developed the Nurse Family Partnership (NFP) in which nurses deliver home-visitation services to first-time, prenatally, enrolled mothers. Dr Olds has conducted some of the most rigorous research with highly diverse populations (Caucasians, African Americans, and Latino women) and demonstrated strong program effects in child development and school-readiness, family economic self-sufficiency, child health, linkages and referrals, improved positive parenting practices, and reductions in juvenile delinquency, family violence, and crime (Olds, et al. 1997).

Studies of the Nurse Family Partnership, which serves first-time mothers exclusively, have contributed to the assumption that these mothers benefit most from home-visiting. In one of the earliest descriptions of the program (Olds, 1981), however, Dr. Olds described the reason for prenatal services to first-time mothers as one of optimal

timing. He wrote, "If assistance is offered before the birth of the first child, when all families have questions and special needs, parents are less defensive," and presumably more amenable to the services of the home visitor. In a personal communication, John Holmberg (2009) wrote, "The NFP program has never been tested with multiparous women."

Perhaps the most authoritative meta-analysis conducted to date was the 2003 National Review of the Effectiveness of Early Childhood Home Visitation for Preventing Violence conducted by the Task Force on Community Preventive Services (Hahn, et al., 2003). The Task Force identified 22 studies (representing 27 interventions) that evaluated effects of early childhood home visitation on child maltreatment. Compared with controls, the home visitation programs had median effect size of approximately 40% in reducing child abuse and neglect. On the basis of this strong evidence of effectiveness, the task force recommended early childhood home visitation be implemented nationally for prevention of childhood abuse and neglect. The review examined home visiting effectiveness as a function of type of service deliverer and program duration, but did not examine effects of maternal parity, nor did the authors suggest that home visitation be provided only for primiparous mothers.

Reynolds, Mathieson, & Topitzes (2009) reviewed 15 studies of 14 programs for children aged birth to 5 years for evidence of effectiveness reducing CAN. The authors recognized that it was not appropriate to assess programs' effectiveness based entirely on measurement of only one outcome and stated that many of the evaluations they included demonstrated positive effects on other, presumably protective, factors. No mention was made of any comparisons in any of the studies between first-time and repeat mothers, and

this factor is not addressed in Reynolds, et al.'s review. Thus, even in this narrowly focused review, limited only to CAN reports, no comparative benefits of home-visitation for first-time mothers were examined.

Two other meta-analyses (Geeraert, Noortgate, Grietens, & Onghena, 2004; Sweet & Appelbaum, 2004) found widespread positive effects for CAN prevention programs, including home-visitation programs and specifically HFA-model programs. These effects included child, parent, and family functioning, parent-child interaction, and reductions in CAN and effects for specific populations (universal, environmental risk, low birth weight, teen mothers, and low-income families). Because a large number of programs represented in the Geeraert, et al. meta-analysis were HFA-model programs, the effects were tested separately for these programs and the results did not differ from the non-HFA programs. Again, there were no tests in these studies of separate effectiveness of programs that exclusively targeted first-time parents compared to those that did not.

The recent Home Visiting Evidence of Effectiveness (HomVEE) review of home visitation was an important contribution to the scientific information about home visiting (Paulsell, Avellar, Martin, & Grosso, 2010). The HomVEE, although not a meta-analysis, conducted a broad search of home visiting models and identified seven programs that received high or moderate ratings. The seven models identified were Early Head-Start Home Visiting, Family Check-Up, Healthy Families America, Healthy Steps, Home Instruction of Parents of Preschool Youngsters, Nurse Family Partnership, and Parents as Teachers. The Nurse Family Partnership was the only program to earn the top-tier

designation because it had impacts in seven domains that were replicated and lasted at least one year post-completion.

Healthy Families America also had favorable impacts in seven domains, five of which were replicated. The impacts in all seven domains were sustained for at least one year after program inception. There was at least one unfavorable or ambiguous finding, and research did not indicate that the impacts lasted one year post-program completion. The HomVEE identified gaps in existing research such as conducting research with military families, but did not examine parity.

Two recent studies specifically examined the effectiveness of Healthy Families New York (HFNY) services for a sub-group of first-time mothers (Dumont, Mitchell-Herzfeld, Green, et al., 2008: Dumont, Mitchell-Herzfeld, Kirkland, et al., 2008). In the first study, a randomly assigned no-treatment control group was compared to a "prevention sub-group" consisting of first-time mothers who were under 19 years old and enrolled at a gestational age of 30 weeks or earlier and a "non-prevention group" that consisted of all other mothers. In a second HFNY study, the same groupings were examined one year later. The pregnant women who enrolled in HFNY before the gestational age of 30 weeks were half as likely to deliver low birth-weight babies. The children were less likely to require special education services, repeat a grade, or to have below average vocabulary. At 7 years of age the children were less likely to be involved in confirmed cases of abuse or neglect and less likely to require foster care. These results reflected very positively for HFNY's effectiveness. Nevertheless, because the comparison group included both multiparous and older primiparous mothers, it did not

constitute a test of the relative impact of the HFNY program on primiparous versus multiparous mothers.

In summary, after almost 30 years of research studies, reviews, and meta-analyses of home visitation-based child abuse and neglect prevention, little research has specifically focused on the effectiveness of this mode of program delivery for multiparous mothers. The co-PIs had considerable experience with this question, based on their own experience evaluating and examining services and outcomes in Hampton, Virginia.

**Research and Evaluation Results from Healthy Families Programs in Virginia**

Results attained by HF programs in Virginia during the past 20 years led the authors of this study to question the assumption that multiparous mothers do not benefit from home visiting. First, the six-year evaluation of the Hampton Healthy Start program (Galano & Huntington, 1999), specifically examined differences between primiparous and multiparous mothers in a randomized, control-group trial (RCT). Second, HFV programs have served both primiparous and multiparous mothers and have shown similar results for both groups. These results are detailed in the following sections.

**Hampton Healthy Start Evaluation**

The Hampton Healthy Start (HHS) program is one of the earliest established Healthy Families-model programs in Virginia, and one of the earliest programs to be credentialed by HFA for demonstrating fidelity to the HFA standards. Hampton, Virginia, had a commitment to providing services to all families in the city, and that

commitment translated into serving both primiparous and multiparous mothers. For that reason, the evaluation study, conducted between 1992 and 1999, was able to examine the relative outcomes of multiparous and primiparous mothers.

The HHS evaluation included randomized assignment to intervention and control groups. The design of the study allowed examination of differences between intervention and control groups, first-time and repeat mothers, and employed multiple measurement points. These differences, or effects, were always initially examined using a 2 Group (intervention vs. control) x 2 Parity (1st time vs. repeat mothers) x 3 Time (initial vs. 1 year vs. 2 year) Analysis of Variance (ANOVA) using repeated measures across time.

Two major areas that were analyzed were child health and parent/child interaction. In the first area, the evaluation examined pregnancy risk factors and delivery complications. The analyses of pregnancy risk factors and delivery complications indicated that the control group had more risk factors and a higher level of delivery complications than the HS intervention group and that within the groups primiparous and multiparous mothers did not differ.

In the area of parent/child interaction the evaluation examined both the NCAST Feeding and Teaching Scales and the Home Observation for Monitoring the Environment (HOME). Analyses of these instruments indicated that, while there were significant changes favoring the intervention group on both, the primiparous and multiparous mothers within the intervention and control groups did not differ from each other. Statistically this was represented in the "groups by parity by time" analysis: there were no significant effects or interactions for the parity factor.

Overall, the results of the Hampton Healthy Start evaluation indicated that, although there were significant differences between the intervention and control groups on measures of infant health, parent-child interaction, and the home environment, the mothers' parity was never a factor that affected the outcome. In other words, primiparous and multiparous mothers, and their children, received similar benefits from participation in the intervention. These results confirmed for Hampton the decision to serve all mothers, regardless of parity.

**Healthy Families Virginia Evaluation Results**

The Healthy Families Virginia (HFV) evaluation, conducted over the last 12 years, has consistently demonstrated that the 38 HFV programs provide services that support the health and well being of the families and children of the Commonwealth. The evaluation is not a RCT. Funding sources and communities will not support randomized assignment for evaluation purposes. The evaluation is based on comparison with statewide and national standards and criteria set by the results of previous studies. It is understood that this methodology cannot provide conclusive evidence of the effectiveness of HFV services, but several other studies have demonstrated effectiveness, as supported by the HomVEE analysis (Paulsell, et al. 2010)

Although the population served by HFV is at very high risk, consisting largely of low-education, teen, unemployed or underemployed mothers, the outcomes for participants have been very good. Eighty-nine percent of children received appropriate prenatal care and 90% were full birth weight. Ninety-eight percent of children were connected to a medical care provider within two months of birth and 89% of children

received 100% of expected immunizations (bettering the state general population rate of 70%). Ninety-two percent of children were screened for developmental delays and 90% of those who had suspected delays were referred for and received further developmental assessment and services, when warranted. Ninety-six percent of participating mothers either had no subsequent births while in the program (92%), or had subsequent births more than 24 months after the birth of the target child (4%).

In 2009, the Healthy Families Virginia Evaluation Committee (consisting of program managers, HFV Technical Assistance/Quality Assurance staff, and the program evaluators) decided to go beyond the annual evaluation reports and examine the aggregated database of Virginia's Healthy Families sites for patterns of participation and outcomes that could assist the programs in further improving services to families and children. At that time, analysis of the database for a 5-year period, FY 2004-2008 indicated that multiparous mothers stayed in the program longer than primiparous mothers and received a higher average number of visits during their participation.

Thus, the results of HHS and HFV evaluations, combined with a survey of recent reviews and meta-analyses strongly supported the conclusion that further examination of the similarities and differences between primiparous and multiparous mothers' participation and outcomes was warranted. This study was designed to begin that examination.

**METHOD**

This project was a retrospective analysis of 10 years of data collected from programs in the Healthy Families Virginia (HFV) statewide initiative which serve both primiparous and multiparous mothers. Twenty-five sites in Virginia use the Program Information Management System (PIMS). Eighteen serve primiparous families only and seven serve both primiparous and multiparous families. These 25 programs represent 66% of the 38 HFV programs, include two of HFV's largest sites, and serve approximately 80% of the families served by HFV each year.

**Participants**

Healthy Families programs have served families in Virginia since 1991 when Healthy Families Fairfax adopted the Hawaii Healthy Start model to support Hispanic families. Hampton Healthy Start, the second and largest Virginia program, opened their doors in 1992. Based on the most recent five-year HFV evaluation report (Galano & Huntington, 2011), these families were:

- Average age - 21.5
- Less than high school education - 43%
- Unmarried - 86%
- Race - Black 49%, White 26%, Hispanic 22%, Asian/Pacific Islander or Multiracial 3%
- No health insurance at enrollment - 22%
- English not primary language - 20%
- Mother's age < 20 - 16%
- Over 50% report a childhood history of abuse or neglect

Additionally, approximately 23% of parents served across the past 10 years have enrolled after having one or more previous children.

**Data Collection - Program Information Management System (PIMS) data**

The HFV sites included in this study used the PIMS data system developed by Healthy Families America (HFA) specifically for Healthy Families programs. Data collected in PIMS included recruitment (screening, assessment, and intake), demographics (age, race, education, etc.), participation (monthly contacts, home visits, home visitor and service level assignment and changes, and termination information), and outcomes (immunizations, subsequent births, developmental screening and referral for delays, parent child interaction, and the developmental appropriateness of the home environment).

**Data Types For Analysis**

Three categories of data were analyzed for this study: demographic, participation, and outcome.

**Demographics**: The PIMS Assessment Form was used to collect participant demographics (parity, race/ethnicity, age, education and current school status, and employment). These variables were analyzed to examine the comparability of the primiparous and multiparous participants, and as covariates when examining the relationship of parity, participation, and outcomes.

Additionally, the Kempe Family Stress Assessment (KFSA) (Kempe, 1997) was used to assess risk in the determination of eligibility for services. The KFSA assesses parents' risk for child maltreatment and/or caregiving difficulties. It is a 10-item rating scale that is completed after a thorough psychosocial interview with a trained professional (Korfmacher, 1999). Items on the KFSA assess parents on a number of

domains, such as psychiatric and criminal history, childhood history of abuse and neglect, emotional functioning, attitudes towards and perception of children, discipline of children, and level of stress in the parent's life and parent's coping skills and resources (Korfmacher, 1999). Each of the ten items is scored 0 (no risk), 5 (moderate risk), or 10 (high risk). This study compared the total KFSA Score and each of the 10 subscale scores between primiparous and multiparous mothers as the indicator of the groups relative risk levels.

**Participation**: HFV uses the Monthly Contact Log to collect information on the services and activities that the mothers received or participated in each month. It was used to calculate the number of completed home visits received by each participant. Primiparous and multiparous mothers were compared on the number of home visits received during participation. Length of service was calculated as the period in months from the participants first home visit to their last home visit. The intensity of participation was calculated as ratio of number of home visits to length of service, or average number of visits per month.

**Outcomes:** This study examined the comparability of the primiparous and multiparous participant on three important outcomes: immunizations, the developmental support provided by the home environment, and the rates of subsequent birth to participating mothers.

HFV used the Immunization Form to collect the date each child received each immunization in the 15 immunization series recommended by the American Academy of Pediatrics (AAP) and tracked nationally by the Centers for Disease Control and

Prevention (CDC&P). For this study the percentage of immunizations completed for each child was compared between primiparous and multiparous participants. .

The Home Observation for Measurement of the Environment (HOME) (Caldwell & Bradley, 1984) - The HOME is a standardized instrument that has been widely researched, and assesses six aspects of the child's home environment that are known to foster cognitive development. The percentage of mothers who did not have a subsequent birth or had a subsequent birth with an interval of 24 months or greater between births was compared between the primiparous and multiparous participant groups.

**Analysis**

The overall analysis strategy employed multiple regression to examine the relationship of parity with participation and outcome variables, while holding constant the effects of the other demographic variables. Because parity is an individual level variable, and because the purpose of the study was to examine the assumption that parity was related to participation and outcomes, this strategy was chosen rather than Hierarchical Linear Modeling (HLM). HLM would have been appropriate if the objective of the study was to examine the relationships of numerous program level and individual level variables with participation and outcome in order to model the important contributing variables. For this more narrowly focused study, the simpler multiple regression model was more appropriate, holding constant the effects of the other variables to examine the contribution of parity.

The analyses for this study were conducted in five stages: Comparability of sites serving only primiparous participants (primiparous-only sites) and sites that serve both

primiparous and multiparous participants (multiparous-serving sites), comparability among the multiparous-serving sites, comparability of primiparous and multiparous mothers, relationship of parity and demographics to participation, and relationship of parity, demographics, and participation to outcomes.

1. The analysis plan proposed for this study specified that primiparous and multiparous mothers would be compared using data from all 25 PIMS-using HFV sites. Only seven of the sites serve have more than ten percent multiparous participants in their service populations. An early question thus arose, whether other differences might exist between the primiparous-only sites as a group and the multiparous-serving sites as a group that might confound the analyses of differences based on participant parity, by either obscuring real effects or causing effects to appear where there were actually none. Differences between the site types were therefore examined to determine the feasibility of using all 25 sites.

2. Another question that arose early in the investigation was whether differences among the seven multiparous-serving sites might also confound the results of the analyses. To examine this question, differences among the multiparous-serving sites on demographic and participation variables were examined.

3. The comparability of the primiparous and multiparous mothers was examined to ensure that the results of subsequent analyses were not influenced by characteristics such as risk status, age, or other demographics such as education, employment, or

race/ethnicity. Age and risk status were analyzed by t-tests of the differences between the means of the primiparous and multiparous mothers. Analysis of the multilevel, categorical variables – education, employment, and race/ethnicity – were examined by chi-square analyses. Differences between the primiparous and multiparous mothers necessitated that the variables on which they differed be used as covariates in the further analyses.

4. The primiparous and multiparous mothers' participation was examined using number of months in the program (Length of Service), number of home visits received (Number of Home Visits), and the ratio of Number of Home Visits to Length of Services (Ratio). The later is an indication of intensity, with higher Ratio indicating more home visits per month. Participation variables were analyzed as dependent variables in multiple regression analyses using as predictors Parity and the demographic variables (age, risk, education, employment, and race/ethnicity) on which primiparous and multiparous mothers were found to have varied in the third stage of analyses.

5. The following outcomes were examined: Percentage of immunizations completed, families HOME scores, and subsequent birth rates while in the program. Outcome variables were analyzed as dependent variables in multiple regression analyses, using as predictors the demographic and participation variables on which primiparous and multiparous mothers were found to have varied in the third and fourth stages of analyses (age, risk, education, employment, and race/ethnicity) .

For this study, the assumption that multiparous mothers would not do as well as primiparous mothers would be supported by a pattern of effects in which parity was related to participation (length or intensity of service) and to immunizations, HOME scores, and subsequent birth rates. Also, to support the assumption, the pattern of effects would indicate that primiparous participants would have better records of participation and higher outcome scores..

Finally, because the data set for this study was large, and because a large number of analyses would be conducted, the researchers decided to use a more stringent significance level than the traditional .05 cutoff. For all statistical tests in this study, the significance level had to exceed $p < .01$ to attain significance.

## RESULTS

### Differences between primiparous-only and multiparous-serving sites

For the first step, examination of differences between the primiparous-only and the multiparous-serving sites, the sample was 7,758 mothers, all of whom had at least one home visit from a Healthy Famlies Virginia Family Support Worker. Table 1 represents their demographic characteristics broken down by primiparous-only versus multiparous-serving sites. For both types of sites, the mothers were predominantly Black, low-education, not in school, and unemployed. Note that even at the sites that serve primiparous mothers only there were a small number of multiparous participants. The distribution of primiparous and multiparous participants was obviously significantly related to Site Type, since that was the defining characteristic.

## Table 1. Demographic Breakdown: All Sites

| | Site Type | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Primip. Only** | | **Multiparous** | | | | |
| | **Mean** | **S.D.** | **Mean** | **S.D.** | **$\underline{t}$** | **df** | **$\underline{p}$ <** |
| **Maternal Age** | 21.3 | 16.6 | 23.6 | 8.0 | 7.4 | 4386.8 | .00 |
| **Risk Score** | 39.6 | 13.4 | 41.4 | 14.2 | 5.7 | 7163.5 | .00 |
| **Parity** | **N** | **%** | **N** | **%** | **$\underline{X^2}$** | **df** | **$\underline{p}$ <** |
|    Primiparous | 3079 | 95.8 | 2963 | 65.2 | 1022.8 | 1 | .00 |
|    Multiparous | 135 | 4.2 | 1581 | 34.8 | | | |
| **Race** | | | | | | | |
|    Black | 1361 | 42.3 | 2341 | 51.5 | 249.6 | 2 | .00 |
|    White | 1171 | 36.4 | 924 | 20.3 | | | |
|    Hispanic/Other | 682 | 21.2 | 1279 | 28.1 | | | |
| **Employment** | | | | | | | |
|    Employed Full Time | 444 | 13.8 | 782 | 17.2 | 48.6 | 2 | .00 |
|    Irregular or Part-Time | 372 | 11.6 | 703 | 15.5 | | | |
|    Unemployed | 2398 | 74.6 | 3059 | 67.3 | | | |
| **Education** | | | | | | | |
|    Less than High School | 1666 | 51.8 | 2046 | 45.0 | 78.4 | 2 | .00 |
|    HS Diploma or GED | 1039 | 32.3 | 1413 | 31.1 | | | |
|    More than High | 509 | 15.8 | 1085 | 23.9 | | | |

### The Relationship of Site Type to Demographic Factors

The first analyses examined similarity of the primiparous-only (PO) sites and the multiparous-serving (MS) sites on the demographic variables; age, risk status, race, education, school status and employment. The first two variables, Mother's Age and Risk Status (FSC score), were analyzed using t-tests of the difference between the primiparous-only and multiparous-serving sites. The other demographic variables, race, employment, education, and school status were examined using chi-square tests of

independence. Table 1 represents the results of these analyses. The mean age of the mothers at multiparous-serving sites was significantly higher, and they had higher average risk scores, than the mothers at primiparous-only serving sites.

The first chi-square analysis examined Site Type with Race. For the purpose of this analysis, the categories of Asian/Pacific Islander, American Indian/Alaskan Native, and Multiracial, which together accounted for less than three percent of cases, were collapsed with Hispanic into "Hispanic/Other." The chi-square analysis indicated that there was a significant relationship between Race and Site Type ($X^2$ (2) = 249.6, $\underline{p}$ < .001). Examination of Table 1 indicates that mothers at primiparous-only sites were more likely to be White than Black or Hispanic/Other, while mothers at the multiparous-serving sites were more likely to be Black or Hispanic/Other than White.

The second chi-square examined the breakdown of Employment by Site Type. Mothers were classified as employed full-time, irregular employment (which included part-time and intermittent employment), and unemployed. The chi-square analysis indicated that there was a significant relationship between Employment and Site Type ($X^2$ (2) = 48.6, $\underline{p}$ < .001). Examination of the table indicates that while the largest proportion of participants at both the primiparous-only and multiparous-serving sites were unemployed, a higher proportion of participants at primiparous-only sites were unemployed (74.6%) compared to the participants at multiparous-serving sites (68.5%) and the participants at the multiparous-serving sites were more likely to have either full-time employment or part-time/irregular employment (17.2% and 15.5%, respectively) than mothers at primiparous-only sites (13.8 and 11.6%, respectively).

The third chi-square examined the breakdown of Education by Site Type. The analysis indicated a significant relationship between Education and Site Type ($X^2$ (2) = 78.4, $\underline{p}$ < .001). Examination of Table 1 indicates that while the largest proportion of participants in both groups had not completed high school at intake to the program, more of the participants at the multiparous-serving sites had higher than a high school diploma (23.9%) compared to the participants at the primiparous-only sites (15.8%) and a greater proportion of the participants at the primiparous-only sites had less than a high school diploma (51.8%) compared to the participants at the multiparous-serving sites (45.0%).

These results indicate that within the Healthy Families Virginia sites, whether sites served only primiparous mothers or serve both primiparous and multiparous mothers was systematically related to other characteristics of the program participants which therefore are confounded with Site Type. There are numerous other factors that also differ between the program sites, such as rural, suburban, or urban location, and program size that also are probably related to the demographic factors. For example, two of the largest programs in the Commonwealth serve both multiparous and primiparous participants. Both of these programs are located in more urban environments and both serve predominantly minority populations: one mostly Black and the other mostly Hispanic participants. The finding that Site Type is confounded with participants' age, risk status, race, employment, and education suggests that using only the participants from multiparous-serving sites would eliminate potential confounds that would otherwise obfuscate the relationships between parity, service participation, and outcomes.

**The Relationship of Site Type and Demographic Factors to Program Participation**

Because of the interrelationships found between Site Type and the demographic variables, a subsequent set of analyses were conducted using these demographic variables in the examination of the relationship between Site Type and participation in the Healthy Families program, as measured by Length of Service, Number of Home Visits, and Ratio. Also, because of the complex interrelationships of Site Type and the demographic variables, it was decided that multiple regression analysis was the best way to examine these relationships and the contribution of each variable in relation to the others when used to predict participation in HFV.

The variables used as predictors were Mothers' Age at Enrollment (Age), Mother's Risk Score (Risk), Race, Employment, and Education. Age and Risk Score were continuous variables and Parity was naturally dichotomous: first time mother or mothers with previous children. The other variables were categorical and had three categories each. It was therefore necessary to transform them into binomial variables for the regression analysis. Race was transformed into two binomial contrast variables: White vs. Non-White and Black vs. Hispanic/Other. Employment was transformed into Employed (including full-time, part-time, and irregularly employed) vs. Unemployed, and education was transformed into Less Than High School vs. High School or Higher. To examine the covariation of these variables, all variables were entered into the regression equations concurrently.

To examine whether differences between primiparous-only and multiparous-serving sites had a significant relationship with the participation variables, a dummy code labeled "Site Type" was constructed. Participants at the primiparous-only sites were

labeled with a "0" and participants at the multiparous-serving sites were labeled with a "1." Significant beta coefficients for Site Type would indicate that there were differences between the primiparous-only and multiparous-serving sites that were related to the participation variables.

**Length of Service**

The first of these regression analyses examined the relationships between Site Type and Length of Service.

**Table 2. Regression Analysis - Parity and Demographics as Predictors of Length of Service**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | |
|---|---|---|---|---|---|
| 1 | .100 | .010 | .009 | 17.92 | |

| Model | Unstandardized Coefficients | | Standardized Coefficients | $t$ | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| Constant | 20.16 | 1.54 | | 13.12 | .001 |
| Age | .01 | .02 | .01 | .59 | .555 |
| Risk Score | -.06 | .02 | -.05 | -3.54 | .001 |
| In School | 1.16 | .58 | .03 | 2.01 | .044 |
| Black v. Hispanic | .07 | .31 | .00 | .22 | .831 |
| White v. Other | -.01 | .18 | -.00 | -.04 | .965 |
| Employed v. Not | .02 | .05 | .00 | .30 | .763 |
| Education | -.09 | .05 | -.02 | -1.62 | .104 |
| Site Type | 3.04 | .48 | .08 | 6.4 | .001 |

The results for Length of Service are represented in Table 2. The regression analysis for Length of Service indicated that the variables significantly predicted participants' Length of Service ($R^2_{adj.}$ = .010, $\underline{F}$ ($\underline{df}$ 8, 6033) = 7.56, $\underline{p}$ < .001). There are two important points. First, while the $R^2$ was significant, the amount of variability in Length of Service that was predicted was less than 1%. Second, the variables that significantly predicted Length of Service, in order of their predictive strength, were Site Type and Risk Score. None of the other variables contributed significantly to the prediction of Length of Service. The beta coefficients indicated the direction of the effects. Participants at sites that served both primiparous and multiparous mothers had longer Length of Service than those at sites serving only primiparous mothers. Participants with higher risk scores at assessment had shorter Length of Service than those with lower risk scores. This result, along with the previous findings of Site Type related demographic differences, continues to demonstrate systematic differences between the primiparous-only and multiparous-serving sites.

**Number of Home Visits**

Next, Site Type was examined as a predictor of the Number of Home Visits received (Table 3).

**Table 3. Regression Analysis - Site Type and Demographics as Predictors of Total Home Visits**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | |
|---|---|---|---|---|---|
| 1 | .135 | .018 | .017 | 33.893 | |

| Model | Unstandardized Coefficients | | Standardized Coefficients | $t$ | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| Constant | 35.43 | 2.90 | | 12.20 | .001 |
| Age | .02 | .03 | .01 | .49 | .626 |
| Risk Score | -.04 | .03 | -.02 | -1.152 | .249 |
| In School | 1.18 | 1.09 | .02 | 1.08 | .280 |
| Black v. Hispanic | 1.29 | .58 | .03 | 2.21 | .027 |
| White v. Other | .63 | .34 | .02 | 1.86 | .062 |
| Employed v. Not | -.05 | .10 | .01 | .53 | .597 |
| Education | -.12 | .10 | -.02 | -1.21 | .226 |
| Site Type | 9.42 | .89 | .13 | 10.57 | .001 |

The regression analysis indicated that the demographic variables significantly predicted participants' ratio ($R^2_{adj.}$ = .017, $\underline{F}$ (8, 6033) = 14.08, $\underline{p}$ < .001). Again, the $R^2$, though statistically significant, was small, accounting for less than 2% of the variance. In this analysis, only Site Type significantly predicted Number of Home Visits. None of the other variables contributed significantly to the prediction of Number of Home Visits. The beta coefficient indicated that participants at sites that served both primiparous and multiparous mothers received more home visits than those at sites serving only primiparous mothers. This result, along with the previous findings of Site Type related demographic and Length of Services differences, continues to demonstrate systematic differences between the primiparous-only and multiparous-serving sites.

**Ratio of Home Visits to Length of Service**

The third analysis examined Site Type as a predictor of the Ratio. The Ratio is indicative of the intensity of participation since it is equivalent to the number of home visits per month of participation.

**Table 4. Regression Analysis - Site Type and Demographics as Predictors of Ratio of Length of Service to Total Home Visits**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | |
|---|---|---|---|---|---|
| 1 | .096 | .009 | .008 | 1.37 | |

| Model | Unstandardized Coefficients | | Standardized Coefficients | $t$ | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| Constant | 1.82 | .12 | | 15.53 | .001 |
| Age | -.00 | .00 | -01 | -.72 | .473 |
| Risk Score | .00 | .00 | .03 | 2.55 | .011 |
| In School | -.03 | .04 | -.01 | -.63 | .537 |
| Black v. Hispanic | .01 | .02 | .00 | .38 | .703 |
| White v. Other | .02 | .01 | .02 | 1.85 | .065 |
| Employed v. Not | .01 | .00 | .03 | 2.23 | .026 |
| Education | .01 | .00 | .05 | 3.52 | .001 |
| Site Type | .20 | .04 | .07 | 5.40 | .001 |

The regression analysis for Ratio (Table 4.) indicated that the variables significantly predicted the Ratio ($R^2_{adj.}$ = .008, $\underline{F}$ ($\underline{df}$ 8, 6033) = 6.96, $\underline{p}$ < .001). As in the previous analyses, the $R^2$, though statistically significant, indicated that the predictive

variables only accounted for less than 1% of the variability in the dependent variable. The variables that significantly predicted the ratio, in order of predictive strength were: Site Type, Education, and Risk Score. The beta coefficients indicated that participants at sites that served both primiparous and multiparous mothers had higher ratios than those at sites serving only primiparous participants, participants with higher levels of education had higher ratios than those with lower education, participants with higher risk scores had higher ratios than participants with lower risk scores. These results are consistent with the previous findings of Site Type related demographic, Length of Service, and Number of Home Visit differences, demonstrating systematic differences between the primiparous-only and multiparous-serving sites.

In summary, Site Type was the strongest, most consistent, predictor of all three participation variables. Risk contributed to the prediction of Length of Service and the Ratio. Race (within the White vs. Others comparison), contributed to the prediction of Number of Home Visits, and Education and employment contributed to the prediction of the Ratio. These results, along with the findings reported previously that the demographics were also related to Site Type, suggest that analysis of the effects of parity should be based on participants from the seven multiparous-serving sites, rather than the entire data set of 25 PIMS-using sites to eliminate sources of variance related to systematic differences between the site types. This conclusion is particularly warranted because the purpose of this study is to examine Parity as a predictive factor and control for the effects of other variables.

**Between-Site Differences Within the Seven Multiparous-Servings Sites**

The next step of the analyses examined differences among the seven multiparous-serving sites. These analyses were conducted to examine whether between-sites differences might affect the outcomes of the analyses of parity with participation and outcomes. This section presents the results of the analysis of between-sites differences on demographic characteristics and participation.

**Table 5. Race by Site**

| Site ID | Mother's Race | | | Total |
| --- | --- | --- | --- | --- |
| | **Black** | **White** | **Hispanic, Asian, Other** | |
| **VA001** | 1596 | 628 | 117 | 2341 |
| **VA008** | 59 | 81 | 89 | 229 |
| **VA010** | 181 | 104 | 1055 | 1340 |
| **VA016** | 49 | 27 | 1 | 77 |
| **VA020** | 346 | 14 | 9 | 369 |
| **VA023** | 63 | 69 | 5 | 137 |
| **VA040** | 47 | 1 | 3 | 51 |
| **Total** | 2341 | 924 | 1279 | 4554 |

The differences among the sites in their racial composition are represented in Table 5. The sites range from a relatively even distribution of Black, White, and Hispanic participants (VA008) to sites that are almost exclusively Black (VA020 and VA040) and

one site that is predominantly Hispanic (VA010). Chi-square analysis indicated that the between-sites differences were statistically significant ($X^2$ (12) = 2801.6, $\underline{p}$ < .001).

**Table 6. Employment by Site**

| Site ID | Mother's Employment | | | Total |
| --- | --- | --- | --- | --- |
| | **Full Time** | **Part Time or Irregular** | **Unemployed** | **Total** |
| **VA001** | 497 | 335 | 1509 | 2341 |
| **VA008** | 38 | 29 | 162 | 229 |
| **VA010** | 175 | 278 | 887 | 1340 |
| **VA016** | 6 | 11 | 60 | 77 |
| **VA020** | 49 | 30 | 290 | 369 |
| **VA023** | 8 | 16 | 113 | 137 |
| **VA040** | 9 | 4 | 38 | 51 |
| **Total** | 782 | 703 | 3059 | 4554 |

Table 6 represents the distribution of full-time employed, part-time or irregularly employed, and unemployed participants at the seven sites. As evidenced in the between Site Types analyses, most participants at all sites were unemployed. Among the, on average, 30% working participants, the ratio of full-time to part-time/irregular employment status varied among the sites. The lowest percentage of full-time employment was 5.8% at VA023 and the highest was 21.2% at VA001. Overall, VA001 had the highest combined level of full-time and part-time irregular employed participants and VA023 had the lowest. The analysis indicated that these between-sites differences were statistically significant ($X^2$ (12) = 113.3, $\underline{p}$ < .001).

**Table 7. Education by Site**

| Site ID | Education | | | Total |
|---|---|---|---|---|
| | **Less than HS** | **HS/GED** | **More than HS** | |
| **VA001** | 730 | 888 | 723 | 2341 |
| **VA008** | 145 | 62 | 22 | 229 |
| **VA010** | 877 | 225 | 238 | 1340 |
| **VA016** | 36 | 31 | 10 | 77 |
| **VA020** | 177 | 129 | 63 | 369 |
| **VA023** | 62 | 62 | 13 | 137 |
| **VA040** | 19 | 16 | 16 | 51 |
| **Total** | 2046 | 1431 | 1085 | 4554 |

The differences between the sites in the distribution of Education – coded as less than high school, high school diploma or GED, and more than high school (some college, associates degree, bachelor's degree, or more than college) – are represented in Table 7. Across the sites, approximately 50% of participants have less than high school education. The remaining 50% are split between having a high school diploma or GED and having more than high school, which includes some college, an associates degree, a college diploma, or some graduate work. VA001 had the highest combined proportion of high school diploma/GED and more than high school educated participants and VA010 had the lowest. Chi square analysis indicated that the between sites differences were statistically significant ($X^2$ (12) = 492.2, $\underline{p}$ < .001).

The combined results of examining the race, education, and employment data indicated that the sites have a varied profile on these important demographic characteristics. Therefore, the analyses of the relationship of parity with participation and outcomes needed to control for these differences in order to avoid confounding effects of systematic differences between the sites.

In addition to examining between-sites differences on these demographic variables, the proportion of participants who were multiparous mothers at each of the seven sites was analyzed (Table 8).

**Table 8. Percentage in Parity Groups by Site**

| Site ID | Parity | | Total |
| | Primiparous | Multiparous | |
|---|---|---|---|
| **VA001** | 1346 | 995 | 2341 |
| **VA008** | 160 | 69 | 229 |
| **VA010** | 1095 | 245 | 1340 |
| **VA016** | 46 | 31 | 77 |
| **VA020** | 221 | 148 | 369 |
| **VA023** | 69 | 68 | 137 |
| **VA040** | 26 | 25 | 51 |
| **Total** | 2963 | 1581 | 4554 |

The sites differed in the proportion of multiparous participants relative to primiparous participants served, ranging from 18.3% to 49.6%. The analysis indicated

that the between-sites differences were statistically significant ($X^2$ (12) = 248.0, $\underline{p}$ < .001). This result indicate that in addition to variability in the other demographic characteristics, the proportion of multiparous participants varied among the sites.

These analyses supported the investigators concerns that confounding differences between and among sites might affect the conclusions about the relationship of parity, participation, and outcomes. Demographic differences among the multiparous-serving sites suggested that between-site differences should be controlled for in the regression analysis of these data. To control for these differences, dummy codes were used for the sites in the regression analyses to control statistically for these between sites differences. This procedure will be discussed further in the regression analysis section.

**Relationships among parity, demographics, participation, and outcomes**

Having validated the appropriateness of using only the data from the seven multiparous-serving sites, the analyses of primary interest in this study were performed. First, the comparability of the primiparous and multiparous mothers' demographics and participation was examined. Second the relationship of parity and demographics to participation was analyzed. Finally, the relationships of parity, demographics, and participation, were analyzed together as predictors of the participants outcomes.

The sample examined in this phase was 4,544 mothers, all of whom had at least one home visit from a Healthy Famlies Virginia Family Support Worker. Table 9 presents the breakdown of their demographic characteristics. The mothers were predominantly Black, low-education, not in school, and unemployed.

**Table 9. Demographic Breakdown: Multiparous-Serving Sites**

| | Primiparous | | Multiparous | | | | |
|---|---|---|---|---|---|---|---|
| | **Mean** | **S.D.** | **Mean** | **S.D.** | **t** | **df** | **p <** |
| **Maternal Age** | 22.0 | 8.6 | 26.8 | 8.6 | 22.8 | 4308.8 | .001 |
| **Risk Score** | 40.3 | 13.8 | 43.4 | 14.8 | 8.34 | 3040.6 | .001 |
| **Race** | | | | | $\underline{X^2}$ | **df** | **p <** |
| Black | 1427 | 48.2 | 914 | 57.8 | 249. | 2 | .001 |
| White | 575 | 19.4 | 349 | 22.1 | | | |
| Hispanic/Other | 962 | 32.4 | 318 | 20.1 | | | |
| **Employment** | | | | | | | |
| Employed Full Time | 474 | 16.0 | 308 | 17.2 | 26.5 | 2 | .001 |
| Irregular or Part-Time | 513 | 17.3 | 190 | 15.5 | | | |
| Unemployed | 1976 | 66.7 | 1083 | 67.3 | | | |
| **Education** | | | | | | | |
| Less than High School | 1486 | 50.2 | 560 | 35.4 | 93.1 | 2 | .001 |
| HS Diploma or GED | 816 | 27.5 | 597 | 37.8 | | | |
| More than High School | 661 | 22.3 | 424 | 26.8 | | | |

**The Relationship of Parity with Demographic Factors**

The first analyses examined the comparability of the primiparous mothers and multiparous mothers on the demographic variables of Age, Risk Score, Race, Education, and Employment. The first two variables, Mother's Age and Risk Status (FSC score), were analyzed using t-tests of the difference between the primiparous mothers and multiparous mothers groups (Table 9). Multiparous mothers were significantly older and had higher risk scores than primiparous mothers.

Race, Education, and Employment were examined using chi-square tests of independence. The first analysis examined Parity with Race. The chi-square analysis indicated that there was a significant relationship between Race and Parity ($X^2$ (2) = 77.8, $\underline{p}$ < .001). Examination of Table 9 indicates that Black mothers were more likely to be multiparous, Hispanic/Other mothers were more likely to be primiparous, and white mothers were more evenly divided between the parity groups.

The second analysis examined Parity with Employment. The chi-square analysis indicated that there was a significant relationship between Parity and Employment ($X^2$ (2) = 26.5, $\underline{p}$ < .001). Examination of Table 9 indicates that while the largest proportion of both the primiparous and multiparous mothers' groups were unemployed and while this proportion was similar across the groups (66.7% and 68.5%, respectively), the multiparous mothers were more likely to be employed full-time and less likely to be employed irregularly.

The third analysis examined Parity with Education. The chi-square analysis indicated that there was a significant relationship between Parity and Education ($X^2$ (2) = 93.1, $\underline{p}$ < .001). Examination of Table 9 indicates that while the largest proportion of the

Primiparous mothers group had not completed high school at intake to the program, the largest proportion of the multiparous mothers had their high school diploma or had completed their GED while the largest proportion of the Primiparous mothers group had less than a high school diploma. The proportion of the multiparous mothers that had completed high school, had a GED, or had more than high school education was greater than among the Primiparous mothers group.

These results indicate that the participants' parity was not independent of other demographic factors. Parity has a complex relationship with a participant's age, risk status, race, employment, and education. Multiparous mothers were more likely to be older, have higher risk scores, be Black, and have completed high school than were primiparous mothers. In the minority of participants who were employed, multiparous mothers' employment was more likely to be full-time than part-time or intermittent. Thus, while the multiparous mothers were older, better educated, and had more stability among those employed, the measure used to assess risk put them at slightly higher risk. It is important to note that it is likely that these other demographic variables are also related to each other in complex, multifaceted ways.

**The Relationship of Parity and Demographic Factors with Program Participation**

Because of the interrelationships of maternal parity and the demographic factors, it was necessary to use these demographic variables in the examination of the relationship between mothers' parity and participation in the Healthy Families program, as measured by Length of Service, Number of Home Visits, and the Ratio. Also, because of the complex interrelationships of parity and the demographic variables, it was decided that multiple regression analysis was the best way to examine these relationships, and the contribution of each variable in relation to the others when used to predict participation in HFV.

The variables used as predictors were Parity, Age, Risk Score, Race, Employment, and Education. To examine the covariation of these variables, all variables were entered into the regression equations concurrently.

The seven multiparous-serving sites varied on a number of dimensions. They are spread across Virginia, located in urban and rural settings, and serve different numbers of participants. Previous analyses indicated that they also differed on their racial/ethnic mixes and the employment, education, and school status of their participants. Some of these between-sites differences, both at the program and the participant levels, might be confounded with the question of primary interest for this study: how are parity and other demographics related to participation and outcomes? For example, if one site had both more multiparous mothers and a higher rate of immunizations, the higher immunization rate might appear to be related to parity, when in fact it was attributable to that site's influence on the regression. To remove that source of confounding from the analysis, dummy codes were created to add the sites to the analysis of the relationships between

parity and other demographic variables and the participation and outcome variables, thus holding the influence of between-site differences constant.

### Length of Service

The first analysis examined the relationships between these predictor variables and the participation variables (Length of Service, Number of Home Visits, Ratio). The results are represented in Table 10. The regression analysis for Length of Service indicated that the variables significantly predicted participants Length of Service ($R^2_{adj.}$ = .024, $F$ ($df$ 14, 4529) = 9.04, $p$ < .001). There are two important points. First, while the $R^2$ was significant, the amount of variability in Length of Service that was predicted was less than 3%. Second, the variables that significantly predicted Length of Service, in order of their predictive strength were Black vs. Hispanic, Risk Score, and Education. Parity, White vs. Other, Age, School Status, and Employment did not contribute significantly to the prediction of Length of Service. The beta coefficients indicate the direction of the effects: Black mothers had shorter Length of Service than Hispanic mothers, and mothers with higher risk scores had shorter Length of Service than those with lower risk scores. Mothers who had completed high school or more education had shorter Length of Service than mothers with less than high school education.

**Table 10. Regression Analysis - Parity and Demographics as Predictors of Length of Service**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | |
|---|---|---|---|---|---|
| 1 | .165 | .027 | .024 | 19.15 | |

| Model | Unstandardized Coefficients | | Standardized Coefficients | $t$ | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| Constant | 26.79 | 1.37 | | 9.24 | .001 |
| Parity | -.12 | .53 | .00 | -.18 | .858 |
| Age | .09 | .02 | .04 | 2.22 | .026 |
| Risk Score | -.08 | .02 | -.06 | -3.94 | .001 |
| In School | .31 | .55 | .01 | .39 | .694 |
| Black v. Hispanic | -2.22 | .28 | -.10 | -4.37 | .001 |
| White v. Other | -.33 | .16 | -.02 | -1.24 | .214 |
| Employed v. Not | -.15 | .05 | -.04 | -2.35 | .019 |
| Education | -.18 | .05 | -.05 | -2.75 | .006 |

**Number of Home Visits**

The next analysis examined parity and demographics as predictors of the Number of Home Visits received (Table 11). The regression analysis indicated that the demographic variables significantly predicted participants Ratio ($R^2_{adj.}$ = .077, $F$ (14, 4529) = 28.02, $p$ < .001). Again, the $R^2$, though statistically significant, was small, accounting for only 8% of the variance. In this analysis, Age at Enrollment, Risk Score, Black vs. Hispanic, and Education significantly predicted Number of Home Visits. Parity, In-School Status, White vs. Other, and Employment did not contribute significantly to the prediction of Number of Home Visits. The beta coefficients indicated that Black participants had lower Number of Home Visits than Hispanic, older participants had higher Number of Home Visits than younger participants, participants

with higher Risk Scores had fewer home visits than those with lower Risk Scores, and higher Education participants had lower Number of Home Visits than lower Education participants.

**Table 11. Regression Analysis - Parity and Demographics as Predictors of Total Home Visits**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | |
|---|---|---|---|---|---|
| 1 | .282 | .080 | .077 | 35.32 | |

| Model | Unstandardized Coefficients | | Standardized Coefficients | $t$ | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| Constant | 51.24 | 5.35 | | 9.58 | .001 |
| Parity | -.63 | 1.22 | .01 | -.52 | .604 |
| Age | .22 | .07 | .05 | 3.13 | .002 |
| Risk Score | -.11 | .04 | -.04 | -2.90 | .004 |
| In School | -.44 | 1.44 | -.00 | -.31 | .760 |
| Black v. Hispanic | -4.66 | .94 | -.11 | -4.98 | .001 |
| White v. Other | -.23 | .49 | .01 | -.48 | .633 |
| Employed v. Not | -.16 | .12 | -.02 | -1.36 | .173 |
| Education | -.48 | .12 | -.06 | -3.94 | .001 |

**Ratio of Home Visits to Length of Service**

The third analysis examined parity and demographics as predictors of the Ratio (Table 12). The analysis indicated that the variables significantly predicted the participants' Ratio ($R^2_{adj.}$ = .060, $F$ ($df$ 14, 4529) = 21.6, $p$ < .001). As in the previous analyses, the $R^2$, though statistically significant, indicated that the predictive variables only accounted for 6% of the variability in the dependent variable. The only variable that

significantly predicted Ratio was Employment. The beta coefficients indicated that employed participants had lower average Ratios. Parity, Risk Score, Age at Enrollment, Education, and White vs. Other, and Black vs. Hispanic did not contribute significantly to the prediction of Ratio.

**Table 12. Regression Analysis - Parity and Demographics as Predictors of Ratio**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | |
|---|---|---|---|---|---|
| 1 | .250 | .063 | .060 | 1.27 | |

| Model | Unstandardized Coefficients | | Standardized Coefficients | $t$ | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| Constant | 1.58 | .19 | | 8.24 | .001 |
| Parity | .00 | .04 | .00 | .11 | .914 |
| Age | .01 | .00 | .04 | 2.32 | .020 |
| Risk Score | .00 | .00 | .01 | .44 | .661 |
| In School | -.03 | .05 | -.01 | -.55 | .580 |
| Black v. Hispanic | -.04 | .03 | -.03 | -1.17 | .242 |
| White v. Other | .01 | .02 | .01 | .43 | .670 |
| Employed v. Not | -.01 | .00 | -.05 | 3.47 | .001 |
| Education | .01 | .00 | .02 | 1.27 | .204 |

In summary, the Length of Service and Number of Home Visits were both predicted by participants Risk, Race (within the Black vs. Hispanic comparison), and Education. Higher risk participants had both shorter Length of Services and lower average Number of Home Visits than participants with lower Risk Scores. Black participants had both shorter Length of Service and lower average Number of Home Visits than Hispanic

participants. Age added significantly to the prediction of Number of Home Visits. Ratio was only predicted by Employment, with employed participants having a lower Ratio than unemployed participants. Parity was not a significant predictor of any of the participation variables.

### The Relationship of Parity and Demographic Factors to Program Outcomes

The previous analyses indicated complex interrelationships between demographic and participation variables, and demonstrated that, though maternal parity was related to the demographic variables, the demographics more strongly predicted participation. This section provides results of the analyses of these variables as they were related to Healthy Families participants' outcomes. The outcomes examined were the percentage of immunizations completed, the participants' scores on the HOME, and the rate of subsequent births for primiparous and multiparous participants.

### The Relationship of Parity and Demographic Factors to Immunization Completion

The first analyses of outcomes examined the percentage of immunizations received by participating children. The HFV data system, the Program Information Management System (PIMS), collects information on the dates that individual immunizations are received for each participating child. HFV tracks the completion of 16 immunizations that the American Academy of Pediatrics (AAP) recommends children receive before age five. HFV's objective is that 80% of participating children will receive 100% of their expected immunizations. For this report, all children who were older than

one month of age were included. This protocol resulted in a smaller sample size of 2,975 children.

These children averaged 86% completion of their expected immunizations and 70% of the children had 100% of their expected immunizations based on their age. This completion rate compares favorably to the Virginia general population rate of 70% of children with full immunizations and very favorably to the Virginia Department of Health 2009 rate of 56.7%.

To examine the hypothesis that primiparous mothers do better than multiparous mothers, the percentage of completed immunizations was compared between the groups. The t-test demonstrated that the primiparous mothers (85.8%) and multiparous mothers (86.4%) groups did not differ significantly ($\underline{t}$ (2014.8) = -.57, $\underline{p}$ = .57), failing to support this hypothesis.

Next, the relationships between parity, participation variables (Length of Service, Number of Home Visits, and Ratio), demographics (Age, Risk Score, Race, Education, and Employment), and the percentage of immunizations received by participating children were examined (Table 13). The regression analysis indicated that the variables significantly predicted the percentage of immunizations received by participating children ($R^2_{adj.}$ = .122, $\underline{F}$ ($\underline{df}$ 17, 2943) = 25.12, $\underline{p}$ < .001).

**Table 13. Regression Analysis - Demographics, Participation, Parity as Predictors of Immunizations**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | |
|---|---|---|---|---|---|
| 1 | .356 | .127 | .122 | 26.75 | |

| Model | Unstandardized Coefficients | | Standardized Coefficients | $t$ | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| Constant | 60.81 | 4.75 | | 12.87 | .001 |
| Parity | -1.42 | 1.17 | -.02 | -1.22 | .223 |
| Age | .10 | .06 | .03 | 1.81 | .070 |
| Risk Score | -.09 | .04 | -.04 | -2.43 | .015 |
| LOS | .31 | .06 | .22 | 4.92 | .001 |
| #HV | .08 | .03 | .12 | 2.71 | .007 |
| Ratio | 4.21 | .59 | .17 | 7.08 | .001 |
| In School | 2.83 | 1.41 | .04 | 2.01 | .045 |
| Black v. Hispanic | -1.72 | .84 | -.06 | -2.06 | .040 |
| White v. Other | -1.08 | .48 | .04 | -2.23 | .026 |
| Employed v. Not | .13 | .11 | .02 | 1.20 | .229 |
| Education | -.09 | .11 | -.02 | -.82 | .414 |

It is important to make two points here. First, while significant, the regression predicted only slightly more than 12 percent of the variability in immunization completion. Second, not all variables contributed to the prediction. In order of strength, Length of Service, Ratio[1], and Number of Home Visits significantly predicted immunization completion. Parity, Risk Score, Black v. Hispanic, White v. Other,

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[1] The investigators were concerned that using Ratio in the regression equation would be a confound because of it's correlation with Length of Service and Number of Home Visits. This and the following regression analyses were conducted both with and without Ratio included to examine its effect. In each case it added a small, but statistically significant amount to the overall prediction. For that reason, Ratio was included in each of the reported results.

Mother's Age, In-School status, Employment, and Education were not significant predictors.

In terms of the direction of effects for the significant variables, participants with higher average participation (Length of Service, Number of Home Visits, and Ratio) had higher levels of immunizations compared to those with lower participation levels. In summary, participant characteristics, including Parity, were not related to the percentage of expected immunizations that participants' children received. In addition, the immunization rates did not differ between the parity groups.

**The Relationship of Parity and Demographic Factors to HOME Scores.**

The second outcome that was examined was the parents' scores on the HOME. HFV schedules up to seven data collection points for the home from two months after birth to five years of age. The HOME has been in use at HFV sites since FY 2002, however, it has been most consistently applied since 2006. Because the data analyses were restricted to the sites which served both primiparous and multiparous mothers, and because a participant had to have a least two HOME assessments to be included in the analyses, the sample for this set of analyses was somewhat smaller than for immunizations. Table 14 represents the HOME scores for 879 participants.

Repeated measures ANOVA was used to test the effect of parity across time on these scores. The results indicated that First HOME scores were significantly lower than Last HOME scores ($\underline{F}$ ($\underline{df}$ 1, 877) = 348.81, $\underline{p}$ < .001), multiparous mothers' scores did not differ from primiparous mothers ($\underline{F}$ ($\underline{df}$ 1, 877) = 3.71, $\underline{p}$ = .054), and there was no interaction between time and parity ($\underline{F}$ ($\underline{df}$ 1, 877) = .657, $\underline{p}$ = .418). Tests of simple

effects indicated that multiparous mothers' scores did not differ significantly from primiparous mothers at either First Home or Last HOME (Table 14).

**Table 14. Comparison of Primiparous and Multiparous Mothers on First and Last HOME**

|  |  | Mean | S.D. | $\underline{t}$ | $\underline{df}$ | $\underline{p}<$ |
|---|---|---|---|---|---|---|
| **First HOME** | PM | 35.8 | 6.5 | -2.03 | 877 | .042 |
|  | MM | 36.8 | 7.5 |  |  |  |
| **Last HOME** | PM | 40.3 | 6.3 | -1.32 | 877 | 1.88 |
|  | MM | 40.9 | 7.1 |  |  |  |

To examine more thoroughly the relationship between parity and HOME scores, regression analysis was conducted using the demographics and participation variables previously examined as predictors of immunizations. Table 15 presents the result of the analysis of these variables as predictors of the First HOME score. There was a small but significant $R^2$ ($R^2_{adj.}$ = .175, $\underline{F}$ ($\underline{df}$ 17, 855) = 11.91, $\underline{p}$ < .001).

The results of this analysis indicated that the participation variables were the strongest predictors of First HOME scores. In addition to the participation variables, White Vs. All Others significantly predicted a small amount of First HOME scores' variance. Together, the variables predicted approximately 18% of the variability in the First HOME score. In order of strength of prediction, the variables were: Length of Service, Number of Home Visits, Ratio, and White vs. All Other.

**Table 15. Regression Analysis - Demographics, Participation, Parity as Predictors of First HOME**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | |
|---|---|---|---|---|---|
| 1 | .438 | .192 | .175 | 6.23 | |

| Model | Unstandardized Coefficients | | Standardized Coefficients | $t$ | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| Constant | 33.90 | 3.36 | | 10.09 | .001 |
| Parity | .16 | .51 | .01 | .32 | .748 |
| LOS | .84 | .03 | .44 | 6.37 | .001 |
| #HV | -.04 | .01 | -.21 | -3.20 | .001 |
| Ratio | .84 | .22 | .17 | 3.83 | .001 |
| Age | .07 | .04 | .07 | 1.75 | .080 |
| Risk Score | -.02 | .02 | -.05 | -1.45 | .146 |
| In School | -.09 | .59 | -.00 | -.15 | .882 |
| Black v. Hispanic | .15 | .40 | -.02 | -.38 | .706 |
| White v. Other | .53 | .19 | .09 | 2.72 | .007 |
| Employed v. Not | -.03 | .05 | -.02 | -.66 | .507 |
| Education | .12 | .05 | .09 | 2.46 | .014 |

The direction of effects for the significant variables were as follows: participants with longer Length of Service and higher Ratios had higher First HOME scores than participants with shorter Length of Service and lower Ratios. Participants with higher Number of Home Visits had lower First HOME scores. Further, White participants had higher scores than either Black or Hispanic participants. Parity was not a significant predictor of First HOME scores.

The relationships of parity, the demographic and participation variables, and scores on the Last HOME administered were also examined. The results of this analysis are represented in Table 16. Again, there was a significant $R^2$ ($R^2_{adj.}$ = .286, $\underline{F}$ ($\underline{df}$ 17, 855) = 21.55, $\underline{p}$ < .001).

**Table 16. Regression Analysis - Demographics, Participation, Parity as Predictors of Last HOME**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | |
|---|---|---|---|---|---|
| 1 | .548 | .300 | .286 | 5.54 | |

| Model | Unstandardized Coefficients | | Standardized Coefficients | $\underline{t}$ | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| Constant | 31.74 | 2.99 | | 10.62 | .001 |
| Parity | -.10 | .46 | -.01 | -.22 | .827 |
| LOS | .21 | .02 | .57 | 8.83 | .001 |
| #HV | -.04 | .01 | -.19 | -3.07 | .002 |
| Ratio | .83 | .20 | .18 | 4.21 | .001 |
| Age | .08 | .04 | .07 | 2.13 | .034 |
| Risk Score | -.03 | .01 | -.07 | -2.29 | .023 |
| In School | -.61 | .52 | -.04 | -1.17 | .243 |
| Black v. Hispanic | -.68 | .35 | -.09 | -1.94 | .053 |
| White v. Other | .36 | .17 | .07 | 2.08 | .037 |
| Employed v. Not | -.06 | .04 | -.04 | -1.32 | .187 |
| Education | .14 | .05 | .11 | 3.15 | .002 |

The results of this analysis provide a similar pattern to the analysis of the First HOME. The participation variables were the strongest predictors of Last HOME scores.

In addition to the participation variables, Education significantly predicted Last HOME scores (replacing White Vs. All Others as a predictor). Together, the variables predicted approximately 29% of the variability in the Last HOME score, a moderately strong relationship. In order of strength of prediction, the variables were: Length of Service, Number of Home Visits, Ratio, and Education.

The direction of effects for the significant variables were similar to the prediction of First HOME scores and were as follows: participants with longer Length of Service and higher Ratios had higher Last HOME scores than participants with shorter Length of Service and lower Ratios. Participants with higher Number of Home Visits had lower First HOME scores. Finally, participants with at least high school education had higher scores than those participants with less than high school education.

Because the negative relationship between Number of Home Visits and First and Last HOME scores was unexpected, an additional pair of analyses examined the single-variable correlations between Number of Home Visits and each of the HOME scores. These analyses indicated that when taken alone, Number of Home Visits positively and significantly predicted both First and Last HOME scores ($r = .254$ and $.368$ respectively, both $\underline{p} < .001$) indicating a complex relationship between the participation variables and the First and Last HOME scores.

Parity was not a significant predictor of Last HOME scores. This result supported the result of the repeated-measures ANOVA and tests of simple effects that multiparous participants' scores did not differ from primiparous participants' scores at either First or Last HOME.

An additional analysis was performed to examine the portion of the variance in Last HOME scores that was predicted by the mothers' scores on the First HOME. This analysis was conducted because, on a validated, standardized instrument, there should be a strong correlation between an individual's score on the instrument taken at two separate times, even if there has been an intervention between assessments. That correlation might also be associated with other factors, such as age and education, and that relationship should be controlled for when examining prediction of participants' later scores. When the participants' scores on their First HOME were included as predictors in the multiple regression analysis, The $R^2$ was again significant ($R^2_{adj.} = .404$, $\underline{F}$ ($\underline{df}$ 18, 854) = 33.87, $\underline{p} < .001$) and 12 percentage points higher (Table 17).

The results of this analysis differ somewhat from the previous analysis of these predictors with participants' Last HOME scores. The strongest predictor of participants' Last HOME scores was their First HOME score. This can be seen in the increase in the overall $R^2$ and would be expected because the HOME is a validated research and clinical instrument that has been in use for many years. The only other significant predictors were the Length of Service and Ratio. Number of Home Visits and Education, which predicted Last HOME score in the previous analysis, were no longer significant predictors.

**Table 17. Regression Analysis - Demographics, Participation, Parity, and First HOME as Predictors of Last HOME**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | |
|---|---|---|---|---|---|
| 1 | .645 | .417 | .404 | 5.06 | |

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| Constant | 19.43 | 2.89 | | 6.72 | .001 |
| Parity | -1.60 | .42 | -.01 | -.38 | .702 |
| LOS | .15 | .02 | .40 | 6.67 | .001 |
| #HV | -.02 | .01 | -.11 | -1.92 | .055 |
| Ratio | .52 | .18 | .11 | 2.89 | .004 |
| Age | .05 | .03 | .05 | 1.54 | .124 |
| Risk Score | -.03 | .01 | -.05 | -1.85 | .065 |
| In School | -.58 | .48 | -.04 | -1.21 | .226 |
| Black v. Hispanic | -.74 | .32 | -.09 | -2.29 | .022 |
| White v. Other | .17 | .16 | .03 | 1.06 | .288 |
| Employed v. Not | -.04 | .04 | -.03 | -1.15 | .250 |
| Education | .10 | .04 | .08 | 2.34 | .019 |
| First HOME Score | .36 | .03 | .38 | 13.06 | .001 |

In summary, mothers' demographic and participation characteristics were moderately related to scores on both the First and Last HOME with the participation variables together having the strongest relationship. Different demographic variables, White Vs. All Others and Education, were related to First HOME and Last HOME scores, respectively. When First HOME scores were added to the analysis, Length of Service and Ratio predicted a larger proportion of the variance in Last HOME scores, and

the demographic variables no longer contributed significantly to the prediction. Important findings included: the strongest predictor of both scores, other than First HOME as a predictor variable, was Length of Service. First HOME score was a significant predictor of Last HOME score when included in the independent variables. Parity was not a significant predictor of either First HOME or Last HOME scores. This was supported by the results of the ANOVA which indicated participants scores increased over time, but that multiparous mothers HOME scores did not differ from primiparous mothers' scores at either the First or Last HOME.

### Subsequent Births

The final analysis performed for this study examined subsequent birth rates for 4,535 primiparous and multiparous mothers. Table 18 shows the relative rates of subsequent births for these groups. Chi square analysis indicated that there was not a significant relationship between parity and rates of subsequent births ($X^2$ (1) = 2.57, $\underline{p}$ > .15), demonstrating that primiparous and multiparous mothers did not differ on their subsequent birth rates. Additionally, the low rate of subsequent births within 24 months found in this high-risk population is an important achievement. While this analysis is not a definitive test of the Healthy Families program's effectiveness, the authors would be remiss if they did not note the accomplishment of limiting subsequent births in a high-risk, low education population to fewer than seven percent.

**Table 18. Subsequent Births for Primiparous and Multiparous Mothers**

|  | Primiparous Mothers | | Multiparous Mothers | |
|---|---|---|---|---|
|  | N | % | N | % |
| No Subs Births | 2604 | 93.2 | 1406 | 94.4 |
| Subsequent Births | 191 | 6.8 | 334 | 5.6 |

## DISCUSSION

Proponents of targeting prevention to specific subpopulations argue that scarce public resources should be targeted where they can achieve the best results. This approach raises the question, which interventions targeted to which populations will achieve what outcomes? Answers to such questions require rigorous research and difficult cost-benefit analyses. Such analyses have not been conducted and there are still many research questions to be addressed to inform decisions about targeting interventions. Because of the assumption that mothers with previous children will do more poorly than first-time mothers in home visitation programs, and because that assumption has guided the delivery of services for a number of years without being systematically tested, parity was chosen as the primary predictor for this study.

The study examined the participation and outcomes of primiparous and multiparous mothers served by the Healthy Families Home Visitation Program using data from Hampton Healthy Start and six other programs in the Healthy Families Virginia Statewide Initiative. An important finding is that multiparous mothers were older and at higher risk; however, they and their children generally participated similarly and had similar outcomes to the primiparous mothers, and they did so across a range of

process/implementation variables as well as program outcomes. The process variables included measures of engagement and retention, which are directly related to the implementation of the model as intended (model fidelity). In addition, several child and maternal outcomes, including immunizations, a measure of the developmental appropriateness of the home environment, and repeat births, were examined.

The first analyses for this project examined differences between the sites that served only primiparous families and those that served both primiparous and multiparous families. These analyses established the necessity of using only participants from the seven multiparous serving sites for this study to remove a potential source of program-level variance which could obscure or obfuscate the potential effects of parity on participation and outcomes.

The second analyses examined differences between the seven multiparous serving sites and indicated that site level differences among them should be controlled statistically by including site dummy codes in the regression analyses.

The third analyses examined the relationship between parity and the primiparous and multiparous mothers' demographic characteristics and uncovered complex relationships between parity, maternal age, risk status, race, employment, education, and school status.

The mothers who entered the program with previous children were, on average, older than the first-time mothers entering the program. While not unexpected, it is important because numerous assumptions have been made about the experiences and preconceptions that multiparous mothers bring to participation prevention programs. However, it does not necessarily follow that age and experiences will have a negative

impact on their interest in, or ability to participate in and benefit from, a home-visitation program.

### Were Risk Profiles Different for Primiparous and Multiparous Mothers?

Understanding the similarities and differences between the primiparous and multiparous mothers at the time of enrollment was critical to this study. HFV used the Kempe Family Stress Assessment (KFSA) at enrollment to evaluate risk and protective factors and to tailor a family's initial Individual Family Service Plan (IFSP).

Comparison of primiparous and multiparous mothers revealed that, in general, the multiparous mothers were at higher risk.. Examining these results, it is understandable that prevention programs might conclude that it would be more profitable to invest scarce resources in younger first-time mothers with fewer previously accrued risks. This conclusion probably motivated offering the program "before the birth of the first child, when all families have questions and special needs," and "parents are less defensive" (Olds, 1980). Whether this is a useful or valid basis on which to target families was explored further by examining the relationship of parity to other demographics, the relation of parity and other demographics to program participation, and the relation of these variables to program outcomes.

### Were Demographic Profiles Different?

Examination of the demographic variables of race, employment, education, and school status further demonstrated that parity was complexly related to other characteristics of the HFV participants. Multiparous mothers were more likely to be

Black and have more than a high school education than were primiparous mothers. The employment results were complicated by the fact that similarly high proportions of primiparous and multiparous mothers were unemployed. Within those who were not unemployed however, the multiparous mothers were more likely to have full-time jobs than to have part-time or irregular employment. The employment and education results were most likely related to the fact that the multiparous mothers were older than the primiparous mothers.

In summary, the multiparous mothers were more likely to be Black, older, better educated, and, when employed, to have more stable employment than the primiparous mothers. The risk assessment, however, indicated that they were at somewhat higher risk, attributable to higher reported levels of stressors and concerns, a greater history of neglect and abuse in their own childhood, and poorer coping skills. These results begin to illustrate the difficulty that is encountered when decisions are made to target specific sub-populations and exclude others. The characteristics that might be chosen as discriminators, such as parity, might also be related to other characteristics, such as race and risk, causing programs to exclude potential participants for whom the program might be beneficial. In other words, had these programs chosen to exclude multiparous mothers, they would also have excluded a larger proportion of Black mothers with high levels of assessed risk. When examined in this light, programs might be selecting people who are easier to work with, but not necessarily those who most need services or would benefit the most from the program.

This point is particularly important given the findings reported in the National Human Services Assembly brief, "Home Visiting: Strengthening Families by Promoting

Parenting Success" (Family Strengthening Policy Center, 2007). A cost-benefit analysis comparing low-risk to high-risk families indicated that the benefits were only slightly greater than the costs for low-risk families, while for high-risk families the savings were $5.7 for every $1 spent.

## Were Parity and Other Participant Characteristics Related to Participation?

The complex relationships of parity, risk, and participant demographics dictated that these variables be examined in relation to variables reflecting the program's ability to engage and retain participants: Length of Service, Number of Home Visits, and the Ratio. Simple examination of the participation variables with parity was precluded by the interrelationship of the variables.

The results indicated that Parity was not a significant predictor of any of the three participation variables and that Race, Risk Score, and Age were the strongest, though still relatively small, predictors (Table 19). Although Parity was related to both Age and Risk Score in the initial chi-square analyses, the regression analysis indicated that after accounting for the effects of Age and Risk on Length of Service, there was not an independent contribution of Parity related to participation.

Education had a negative relationship with participation, as did Employment. Both of these results supports the observation that is often made by home visiting programs; that it is harder to provide services to participants who are working or in school. It is also possible that these mothers might feel they have more options for support and assistance with their new baby than mothers who are less educated and unemployed. .

**Table 19. Summary of Beta Coefficients for Regression Analyses of Participation and Outcomes**

| | | Parity | Age | Risk | LOS | #HV | Ratio | In School | Bl. v Hisp | Wh. v Other | Emp | Ed | Last | Site # |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | |
| **PARTICIPATION MEASURES** | | | | | | | | | | | | | | |
| **LOS** | Beta | | | -.06* | | | | | -.10 | | | -.05 | | 1, 4 |
| **#HV** | Beta | | .05 | -.04 | | | | | -.11 | | | -.02 | | |
| **Ratio** | Beta | . | | | | | | | | | -.05 | | | 1 |
| **OUTCOME MEASURES** | | | | | | | | | | | | | | |
| **Imm** | Beta | | | | .22 | .12 | .17 | | | | | | | 2 |
| **1st HOME** | Beta | | | | .44 | -.21 | .17 | | | .09 | | | | |
| **LAST HOME** | Beta | | | | .57 | -.19 | .18 | | | | | .11 | | |
| **1st-Last HOME** | Beta | | | | .40 | | .11 | | | | | | .38 | |

* All p values less than .01.

Examining these results a little further reveals an important finding. The demographic analysis indicated that Parity was related to Race, Risk, and Education. Specifically, Black participants were more likely to be multiparous than were White or Hispanic participants, and multiparous participants had higher risk scores and higher levels of education than premiparous participants. These characteristics were all negatively related to participation, with shorter length of service, fewer home visits, and lower ratios of home visits to length of service. It is quite possible that these characteristics could contribute to an impression that multiparous participants do not do as well, while it is actually other factors that cause the association.

In summary, these results do not support the common assumption, or hypotheses, that Parity is a strong predictor of program participation. Because of the higher risk scores of the multiparous mothers, shorter periods of participation with fewer home visits might have been predicted. In fact, the assumption that multiparous mothers would not benefit as much from services seems to be predicated on just that prediction. However, the effect of parity on service participation proved to be less important than the effects of other variables, suggesting that excluding mothers from participation based on parity oversimplifies the issue.

## Were Parity, Demographic Characteristics and Program Participation Related to Participant Outcomes?

While the previous results did not support the hypothesis that parity was related to participation in the Healthy Families programs, it does not necessarily follow that multiparous and primiparous participants have similar outcomes. In fact, if multiparous

mothers participated similarly, but had poorer outcomes, the argument that they should

not be served would be strengthened because they would constitute a greater drain on

limited resources. The analysis of parity, demographics, and participation variables with

outcome variables examined this issue further.

Three outcome measures used in the HFV evaluation were examined for this

study; immunization completion, HOME Scale scores, and subsequent birth rates. Two

findings stand out from these analyses. First, parity was not a significant predictor of

these participant outcomes, and second, the most consistent predictors of outcomes were

the participation variables (Length of Service, Number of Home Visits, and Ratio). Race

and Education contributed at some points, but not others. (See Table 19).

Immunization rates were predicted by Length of Service, Ratio, and Number of

Home Visits, in order of the strength of the relationship. Overall, the variables predicted

12% of the variability in immunization rates. Parity did not contribute to the prediction.

Also, analysis of the mean difference in immunization rates for primiparous compared to

multiparous mothers indicated that the rates did not differ.

HOME scores for both the first and last administered HOME Scales did not differ

between multiparous and primiparous mothers. The mean scores for both groups,

analyzed using repeated-measures ANOVA, increased between the first and last

administered HOME. The finding of no significant interaction for Parity across the Time

factor indicated that the difference between the group scores was maintained across time.

While an increase in HOME scores over time suggests an improvement related to

program participation, without a control group, this result alone does not support a

differential effect of the program. On the other hand, it also does not support the

assumption that multiparous mothers will have more negative outcomes because they are more difficult to serve or have previously established bad habits.

The First and Last HOME scores were predicted most strongly by a combination of participation variables. Length of Service and Ratio positively predicted both First and Last HOME scores. White vs. All Others predicted First HOME scores and Education predicted Last HOME scores. When the participants' First HOME score was added to the other variables predicting Last HOME scores, the First HOME scores were the strongest predictor of their Last HOME scores. Education and Number of Home Visits, which predicted Last HOME scores when the First HOME score was not included in the analysis, were no longer significant predictors when First HOME score was added. Thus, using First HOME scores, Length of Service, and Ratio as predictors explained Last HOME scores most thoroughly and efficiently.

Critically for the hypotheses tested by this study, Parity was not a significant predictor in these analyses. These results supported the findings of the repeated-measures ANOVA and tests of simple effects: multiparous participants' scores did not differ from primiparous participants' scores at either First or Last HOME.

One further result requires discussion. Participants with higher Number of Home Visits had lower First HOME and Last HOME scores, negative relationships which appear counterintuitive. The usual expectation is that more home visits should be associated with higher HOME scores. Several factors should be kept in mind when considering the meaning of these results. First, the meaning of this result cannot be understood by itself, but must be considered along with the results of Length of Service and Ratio, because of the relationships between these variables. When the effect of

Length of Service and Ratio on First HOME and Last HOME scores are held constant, there remains a component of the variance in HOME scores that is negatively related to Number of Home Visits. This is illustrated by the single-variable correlations between Number of Home Visits and First and Last HOME scores which were positive and significant.

It is also important to remember that the correlational nature of regression analysis does not support conclusions of causality, so this does not mean that longer, more intensive services cause higher HOME scores or that more home visits cause lower HOME scores. This is evident, given that the First HOME is one of the variables, and it it not likely to have been influenced by HF services[2]. The relationship with participation is an indication that those participants whose homes provide appropriate developmental stimulation were also more likely to participate longer and more intensively in the home visiting services. Finally, however, it is important to recall that the overall prediction of the variability in both First and Last HOME scores was small to moderate and that the included variables, though statistically significant, do not go very far in predicting First HOME scores.

Primiparous and multiparous mothers did not differ on the rate of subsequent births within less than a 24-month interval after the initial birth. The overall subsequent births rate , 5.7%, is admirable in this high-risk population, and the difference between the primiparous and multiparous mothers of only 0.3% attests to the success of the Healthy Families program with these participants, regardless of mother's parity.

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[2] Healthy Families home-visitation services can begin prenatally and the first administration of the HOME could occur up to two months postnatally, so there could be some effect on the First HOME scores, however it is expected that it would be small.

Overall, the results of this study failed to find convincing evidence of the hypothesis that multiparous mothers do not do as well as primiparous mothers in the HFV home visitation program. Although they were older and at higher risk than the primiparous participants, the multiparous mothers participated similarly to the primiparous mothers. In addition, the multiparous and primiparous mothers had similar patterns of outcomes. This study examined three outcome indicators, one of them assessed at two separate times, and none of the indicators had a significant relationship with parity.

Researchers are trained that it is not possible, or at least advisable, to design a study to test a null hypothesis. Finding no significant differences between groups is not considered evidence that there's not, in reality, a difference. It is possible that the conditions tested were not conducive to demonstrating the differences, or that the size of the groups relative to the size of the effects did not provide enough statistical power to demonstrate differences between the groups.

There are two important points to be made about the rationale for conducting the study this way. First, the assumption that primiparous mothers will do better than multiparous mothers, or that multiparous mothers will not benefit from home visitation is itself, as shown, a hypothesis, or set of hypotheses, which have never been adequately tested. If there were numerous studies demonstrating robust significant effects with multiparous mothers failing to participate or attain proposed outcomes, a study that showed no differences would carry very little weight against that evidence. If there were even one strong, multifaceted, study, this conclusion would pertain. The literature review, however, has demonstrated a paucity of evidence testing this hypothesis. For that

reason, a study finding no association of parity with several measures of participation and outcomes would call into question the common assumption.

Second, the data that has been collected for the HFV evaluation is sufficient to provide statistical power to identify even small associations between demographic, participation, and outcome variables. Seven sites, serving over four thousand participants across the past ten years provided the data for this study.

That a sample of this size provides sufficient power to identify even small associations between variables is supported by the fact that there were systematic patterns of statistically significant relationships between numerous variables at all three levels of analysis; demographics, participation, and outcomes. These relationships were small, only explaining a small percentage of the variance, but at no time did parity emerge as a significant predictor of participation or outcomes.

The results also indicated that the outcomes were more consistently predicted by a combination of participation and demographic variables. The most frequent and strongest predictors of participant outcomes were the participation variables: Length of Service and service intensity, represented by Ratio, the number of home visits to length of service. The combination of results, no predictive ability for parity, comparable scores for primiparous and multiparous participants on all measures, and stronger prediction of outcomes by participation and demographic variables suggests that it is neither appropriate nor useful to use parity as a variable to exclude families from participation in Healthy Families home visitation services.

One potential criticism of the methodology is that by setting the significance level at $p < .01$, the authors might have biased the study toward finding no effects for parity.

Reexamining the results in this light, only one analysis reached even marginal significance: the analysis of HOME score differences between parity groups. Using a repeated measures ANOVA the difference between primiparous and multiparous participants was marginally significant at $p < .054$. Examining the simple effects in the ANOVA indicated that the effect was attributable to slightly higher First HOME scores for the **multiparous participants** ($p = .042$); significant at the .05 level.

The authors acknowledge that this study is not definitive. A stronger demonstration requires a prospective randomized control trial, with multiparous and primiparous mothers assigned to both intervention and control groups. Those data were not available for this study, but before the field assumes that multiparous mothers don't do as well in home visitation services, it would be worth constructing the strongest possible test of that assumption

**Implications for the Field and Future Research Potential**

The most important implication for the study is that the field of home visiting should reexamine whether services should be limited to first-time mothers and their families. More than sixty percent of births each year are to women who have previous children. These women have additional stresses and potentially more need for services that can help them cope with the demands of their children and learn to nurture them and care for them more effectively. Given the monetary and human costs of not preventing adverse childhood experiences, it is incumbent on the field to reexamine any assumption that causes such a large proportion of families to be relegated to the sidelines.

The results of this study suggest several areas of future research. One direction might be to further examine the multiparous mothers' mental health and risk status. Multiparous mothers were found to be older, at higher risk, and specifically to have higher scores on the "Mental Health, Substance Abuse, and Domestic Violence" item of the KFSC. Healthy Families Virginia recently began a pilot project screening participants for depression using the Edinburgh Perinatal Depression Scale (EDPS). These data could be used to examine potential differences between the primiparous and multiparous participants, and possible effects of these differences on their participation and outcomes. In addition, recent research by Ammerman et al. (2009) has examined intervention for depressed participants in a home-visitation context and has shown significant improvements in depressive symptoms. HFV can contribute to this research in the future by examining differential effectiveness of the intervention for primiparous compared to multiparous participants.

**SERVING MULTIPAROUS FAMILIES: A QUALITATIVE EXAMINATION**

Because HFV programs have a substantial history of serving multiparous families, and because the first phase of this project, the qualitative study, indicated that multiparous mothers had similar participation and outcomes to primiparous mothers, the investigators brought together the Program Managers from the seven multiparous-serving sites to discuss the findings of this report. A qualitative examination of those discussions became the second phase of this project. The results of that examination are discussed in the following section.

Child abuse prevention efforts have grown substantially over the past 30 years. This growth in prevention activities and funding has occurred in response to almost three decades of research documenting that home visiting can reduce the incidence and prevalence of child maltreatment and a host of associated health, social, educational, and criminal justice problems. Investments by many states and philanthropic organizations initially supported this growth. In recent years, however, this support has plateaued, and even been curtailed, because of budget cuts occurring in response to the recent economic downturn. A combination of new federal funding opportunities (i.e. $1.5B provided by the Affordable Care Act) and national leadership by organizations such as The Pew Center on the States have created opportunities for states to consider new or expanded efforts in home visiting. As always, in the face of new opportunities, the critical question should be, "What populations should be targeted?"

This qualitative portion extended those findings by bringing together the Program Managers of the seven HFV sites whose data were used in the first phase of the project.

The meeting was convened to further explore those sites' reasons for choosing to serve both primiparous and multiparous families, their experiences with serving those families, and the accommodations that their programs had made to improve services. Finally, the investigators wanted to identify any recommendations or caveats the Managers might have for programs considering broadening their services to multiparous families.

METHOD

In-person interviews were conducted on September 19-20, 2011, with senior program staff from each site, a TA/QA staff member from Prevent Child Abuse Virginia (PCAV) and the Executive Director of PCAV. The researchers used a semi-structured, open-ended interview protocol to elicit the site managers' responses on the questions of interest: how and why sites began to serve multiparous mothers, strategies used to match FSWs with participants, strategies used to foster engagement and retention, staff perceptions of successes, and obstacles to serving multiparous mothers. The researchers also asked for specific ideas on how Program Managers would present the opportunity to serve multiparous mothers to other Program Managers and what lessons they have learned that they would want to share with other sites considering making their target population more inclusive of multiparous mothers. Each day's discussion began with opening statements by the facilitators about the purpose of the meeting. The researchers created an agenda and a set of questions that were mailed to the participants in advance

so they could be prepared and gather any information or site data that might be useful for this study. [3]

Both facilitators participated in each day's meetings and exchanges, and both took handwritten notes. One facilitator took primary responsibility for initially typing up field notes, which were then reviewed by the second facilitator who added additional material for completeness and accuracy. Any differences in notes were discussed by the two facilitators and the two jointly prepared the final summary and conclusions.

## RESULTS

### Selection of the Service Population

The first question that was discussed with the Program Managers was, "What were the reasons/circumstances that led to your program's decision to serve multiparous mothers?" This question elicited more varied responses than the researchers had anticipated, including funding issues and pragmatic decisions based on the sites' service areas and capacities.

Along with the Director of HFV, the Program Managers discussed the process through which communities develop a Healthy Families program. This process includes creating an advisory board to examine the need for and feasibility of implementing a HF program in the locality. Assessment of community needs and resources follows, and

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[3] The authors would like to say something about the Program Managers' position. The responsibilities of the Program Managers are numerous, require a wide range of skills, many challenging tasks such as supervision of staff, meeting financial goals during tough economic times, grantsmanship, and preparing a wide range of reports to various funders and PCAV. These circumstances can produce high levels of turnover. We are fortunate to have Program Managers have been in positions in leadership for some time. Moreover, PCAV's Executive Director has served in the agency's leadership role for over 20 years.

ultimately the determination that a community will proceed. The implementation of HF

in Virginia has allowed individual communities the choice of which local organization

would provide the infrastructure for the program. For that reason, in the various localities

in VA there are a variety of organizations which house HF programs. Some are based in

local offices of the Virginia Department of Health (VDH), some in community services

boards (CSBs), the mental and behavioral health provider for the Commonwealth, and

many are in local, private, non-profit human services agencies.

One of the largest programs in the Commonwealth began its initiative as a

collaboration between the city Health Department and the Department of Social Services.

The initial recruitment was performed in the Health Department maternity clinic, and the

program's capacity allowed it to recruit from the entire population using the maternity

clinic's services; primiparous and multiparous births. As the program was able to expand

to the wider population of births in the city's hospitals, they also continued to serve both

groups.

Another large program in the state serves a large contingent of Hispanic

immigrants. To serve the largest possible number of those in need, they consider the

Hispanic population "first-time" mothers if it's their first US birth, resulting in many

multiparous mothers being enrolled.

Several of the smaller programs indicated that serving only first-time mothers was

never considered as it would miss a large portion of the at-risk population in the

community. Based either on their risk-assessment for the community, or on their overall

philosophy of prevention, they began the program with that focus and have continued to

hold it. The Executive Director of HFV made the point that many of the primiparous-

only sites are those that started somewhat later in the initiative's history, began with somewhat more limited resources, and adopted the assumption that services would be less effective with multiparous families.

One of the programs that serves multiparous families expressed a unique position. This particular site is at one of Virginia's Community Services Boards, the community mental health providers associated with the VA Department of Behavioral Health and Developmental Services. Because of that affiliation, this site is able to bill for Medicaid case-management services. Serving multiparous families allows them to serve, and thus bill for, more family members. In fact, this program would not be able to survive without this financial strategy.

**Specific Challenges**

The next question posed by the evaluators was, "Are there specific challenges that are more pronounced for multiparous mothers and for the Family Support Workers who serve them?" The quote of the day, in answer to this question, was, *"**All** of the things that are challenging and stressful about parenting are made more so by having multiple children."* This observation was repeated by the Program Managers and emerged as a key finding of the qualitative process.

HF programs assist families in connecting to services available in the communities they serve. Services include WIC, health care providers for well-baby visits and immunizations, and other services that families are eligible for or which are needed to improve family functioning. Often, connection to those services, at least initially, necessitates transportation and that is provided by the Family Support Worker. Even this

activity is complicated by the family having previous children. When serving a primiparous mother, the FSW can pick up the mother and child and transport them to their appointment. With additional children, and especially with young children, additional car seats are required, complicating the transportation. Having another child or children at the appointment presents additional complications and distractions for both the mother and the FSW. This issue cuts across programs of all types; large and small, urban and rural.

Childcare was also a recurrent problem. Far too few childcare services were available and when available were often beyond the means of the families, costing as much as they were making at their jobs. Of course, childcare would also help with the transportation issue, because if childcare was available FSWs would not have to transport all children to the appointment for one child.

There was considerable consensus that multiparity increases the stress of the economic conditions that confront the families served by HF, and that there were a myriad of factors related to poverty and homelessness that were impacting these families. Homelessness affects the HF service population disproportionately, but is often under-reported because the families "couch surf" with friends and stay as they can with relatives. Homelessness and other financial problems are exacerbated for multiparous mothers if the children have separate birth fathers. It is often more difficult for the mothers to get support for children from multiple different fathers.

**Program Adaptations**

The next question that was asked of the Program Directors was, "Has your program had to make any specific adaptations to serve multiparous families?" This was a question that specifically addressed one of the points in the Pew Center on the States request for proposals that led to this research project.

There was a consensus among the managers that the multiparous mothers were different and more complex in many ways. One manager, however, made the point that "multiparous families are not a unified bloc." Some are "set in their ways" while others are more eager and open to any assistance that they can get to help with their challenges and problems. Thus, as is the case with all other families in HF, flexibility of services is critical. The overarching philosophy of HF is that services are tailored to the needs of every family served through the Individualized Family Services Plan (IFSP) process, and this supports the needs of both primiparous and multiparous families.

The most often referred to program adaptation was "matching;" that is, making sure that FSW characteristics were suited to the participants' needs. Again, although this is routine with all participating families as part of the HF model, it took specific forms with multiparous families. Generally, multiparous mothers were matched with the more experienced FSWs because their experience helps them to cope with the added complications that serving the multiparous families entailed. Some FSWs also believed deeply that it was their moral and professional obligation to reach out to the more at-risk families.

One program manager discussed an interesting nuance of this concept of matching the less experienced FSWs with the primiparous families. This pairing allows

the FSW to "grow with the family and child and gain experience in the progression through developmental milestones." A new FSW, paired with a family with multiple children would need much more training in and fluency with child development than one who started with families who have just had their first child.

An important aspect of serving the multiparous families that was often cited was time-management. Because of the added complexity of serving families with more than one child, it was viewed as important that the FSW be skilled at managing their time. Assessing the need for services among multiple children in the family and making referrals for those services require extra time during home visits. Also, if transportation to services is necessary, that will impose a further burden and require more logistical considerations. Here again, the more experienced FSWs were viewed by the Program Managers as being better suited to providing these complex services than less experienced FSWs.

One Program Manager made the point that often older children in the family might have "more serious behavior issues," which can have an impact on the home visits. It takes a skilled home visitor to balance the needs of the mother and target child with those of older children. More experienced FSWs can see such situations as opportunities to model strategies to help the mother develop appropriate disciplinary skills and successfully balance the older children's needs with those of the target child. This point was echoed by other Managers. The consensus was that by assessing the behavior and needs of older children the FSWs can help the mothers see how previously adopted strategies have been unsuccessful and then provide the mother with better options for the future.

The final question asked was, "If you could provide one accommodation to better serve and retain multiparous participants, what would it be?" This question elicited far-ranging responses that addressed the HF program model, the availability of curricula that could address more specifically some of the needs of multiparous families, connections with community services, and funding issues.

One of the first areas addressed was flexibility of the HF program model. The managers expressed that two areas of the program model provide particular challenges when working with multiparous families, although they are not exclusive to those families. First, the model specifies three-to-four visits per month for the first six months after the child is born. Difficulty committing to this schedule is not limited, of course, to multiparous families. The recent economic downturn has made it more difficult with both mothers and fathers working multiple part-time jobs to support their families. HF programs have always found this a difficult standard to meet, but they have become more sensitized to it in recent years.

The other aspect of the HF model discussed by the managers is that it specifies the majority of home visits must take place in the home. While this seems self-evident, the living situations of some participants make it difficult for them to meet at home. Program Managers reflected that additional flexibility to meet more often at workplaces or for the participant to meet the FSW at the program's offices might help participants meet the required home visit schedule.

One adaptation that some of the programs made was to increase the relative weight of cases for multiparous families. That is, where a primiparous family's case might be weighted as "1" for purposes of determining the number of families an FSW

would serve, a multiparous family might be weighted "1.5" to slightly reduce the overall number of families assigned to the FSW. This weighting system took into account the additional time involved in working with additional children, as well as the added time for doing things like transportation and arranging childcare so that services could be provided to the target child.

The Program Managers also expressed that it would be useful to have curriculum resources that were tailored specifically to families with multiple children. Providing families with materials that would help them understand how to manage the activities and schedules of children at different developmental levels, mediate disputes between siblings, and similar issues specific to the multiparous families would potentially help the programs engage families longer and help the families become more cohesive and stable.

One Program Manager suggested that the ability to provide more social-interaction opportunities for the parents, such as support groups and play groups, would be very useful. Because of the previously discussed complications that the multiparous mothers face with arranging transportation and childcare, the Program Manager said that these families tend to become more isolated and potentially would benefit more from opportunities to interact with their peers. The difficulty for the program is that in order to provide these social opportunities they also need to provide childcare and transportation and with limited resources that is not always possible.

The other two areas that the Managers discussed were not specific to multiparous families, but cut across all families served. First, the availability of community services is a constant issue for the HF programs. FSWs are trained to educate and support families in developing a healthy relationship with their growing children. FSWs are not, however,

qualified therapists or medical providers. When families have issues beyond the capabilities of the FSWs, the HF model specifies referral to community services. The problem that many programs encounter is that there are not enough services in the community to help with the needs of the families. When depression or other mental health issues, substance abuse, or domestic violence are uncovered in the course of working with families, the limited capacity of community services makes finding treatment for the families very difficult.

Finally, the Program Managers addressed funding cuts that have impacted both their services and the ability to refer families to services outside their program. HFV, after eight years of stable funding (neither receiving increased appropriations nor cuts) received cuts of over forty-four percent over two years between fiscal years 2010 and 2011. These cuts reduced the programs' ability to hire and retain staff and reduced the availability of other resources. In addition, in Virginia, cuts were sustained across most of the public, human service agencies of the state government. These cuts made it much more difficult for the HF programs to refer participants who needed health or mental health services to programs in their communities. The consensus was that VA would be well served to reinstate funding, not only to the HF programs, but to the human services agencies in general.

While these last two areas of need are not specific to the multiparous families, the Program Managers emphasized that they have a greater impact on multiparous families because of the added complications of additional children. As was said initially, "any of the complications of raising children are made more complex by adding more children."

**Lessons Learned**

This qualitative approach to discussing the implications of serving multiparous families provided an important underpinning to the previously conducted quantitative analyses of participation and outcomes. It was clear from the discussion that the commitment to serving these families imposed significant costs on these organizations. Additional ongoing training and supervision were provided to the FSWs to enable them to adjust to the needs of the multiparous families. Also, the additional complications involved in providing services to siblings, transporting these families to community-based services such as healthcare, and finding childcare for siblings to enable services for the target children required adjusting caseload weights which, of course, reduced the overall number of families that the program could serve.

At the same time, the Managers provided many ways in which serving these families also benefitted the programs. As discussed, some of the programs had developed revenue streams through Medicaid Case Management that would be decreased considerably if they did not serve multiparous participants. They were clear that not serving these families would make it difficult, given recent state budget cuts, to continue to provide HF services in the community.

It should be made clear that not all motivation for serving these families was financial. Several of the Program Managers, including the one whose program is most reliant on the Medicaid Case Management funding, stated that it had never really been considered that the program would serve only primiparous mothers because that would limit the number of at-risk families in the community that could be served.

**CONCLUSION**

This study, funded by the Pew Home Visiting Initiative of the Pew Center on the States, provided a new, detailed examination of the long-held assumption that multiparous families would not participate in and benefit from home-visitation services when compared to primiparous families. Using ten years of participation and outcome data from seven Healthy Families Virginia sites, primiparous and multiparous participants were compared on demographic characteristics, length of services and number of home visits received, and program outcomes: immunization completion, the assessment of the home environment, and rates of subsequent pregnancies.

Several characteristics of the multiparous participants differed from those of the primiparous participants. Multiparous mothers were older, at higher risk, more likely to be Black, employed full-time, and have completed high school or a GED than were primiparous mothers.

While parity was associated with these demographics, when parity combined with the demographics were used to predict program participation as measured by length of service, number of home visits, and the ratio of number of home visits to length of service, the results indicated that although combinations of the demographic variables systematically predicted participation, parity did not. In no analysis was parity a significant predictor of participation when combined with other demographic variables.

Similarly, when parity, demographic characteristics, and participation variables were analyzed as predictors of outcomes, parity was not a significant predictor of any of the outcomes. Length of service and the ratio of number of home visits to length of service significantly predicted the percentage of immunizations received. Neither parity

nor any other demographic characteristic was a significant predictor of immunizations. The same participation variables, with the addition of number of home visits, predicted the total HOME score. Additionally, White participants had higher HOME scores than either the Black or Hispanic participants. Parity and the other demographics were not significant predictors of HOME scores.

Finally, the rates of subsequent births for primiparous and multiparous mothers were examined. The parity groups did not differ on their rates of subsequent births, with both groups having fewer than seven percent subsequent births within 24 months of the initial target child's birth.

In summary, these results support the hypothesis that multiparous mothers participate in similar ways and have similar outcomes to primiparous mothers. The combination of results, no predictive ability for parity, comparable scores for primiparous and multiparous participants on all measures, and stronger prediction of outcomes by participation and demographic variable supports the assertion that it is neither appropriate nor useful to use parity as a variable to exclude families from participation in Healthy Families home visitation services.

In addition to the statistical findings, Program Managers from the seven multiparous-serving sites supported the conclusion that many multiparous families had been very successful in HF services because that was concordant with their experiences. The managers cautioned against treating multiparous families as a unitary bloc on the basis of parity and stated that, just like all other families, the key to success with these families was providing services that were tailored to their individual needs.

Sites had a variety of reasons for beginning to serve multiparous families, both fiscal and philosophical. Some sites depended on the larger family sizes to help them financially through their ability to bill for services to sources such as Medicaid Case Management. Most of the sites expressed that serving only primiparous families was never considered, as it would severely limit their ability to provide services to as many high-risk families as possible in their communities.

All of the Program Managers concurred that serving multiparous families provided additional challenges in comparison to primiparous families. Scheduling, transportation, childcare, medical visits, social activities at the HF offices, were all more difficult to accomplish for parents with more children. Lack of available services in the communities often had an impact, along with budget cuts affecting both the HF programs' services and the services to which they could previously refer participants.

In the most recent years, the economic downturn has exacerbated the challenges faced by all families, but has been particularly trying for multiparous families. In addition to common economic struggles, the Program Managers have seen an increase in homelessness among their service populations. Again, this problem is more difficult for multiparous families who must find living situations for more children. Also, in multiparous families that are served by HF, there are often multiple fathers for the children, making it more challenging to get child support from more than one father.

The Program Managers discussed many of the ways the programs had adapted to serving multiparous families. They emphasized that the HF program model is based on flexibility in tailoring services to address families' needs. Development of the IFSP with each family incorporates the family's needs and strengths into a service plan that is

unique to that family. In multiparous families, the IFSP would also specify services to address the needs of other children in the family.

FSW experience was cited as an important factor in matching families to their service providers. The Program Managers emphasized that because of their additional complexity in terms of needs, scheduling, and time management, only more experienced FSWs should be assigned to multiparous families. The additional benefit of this matching was that less experienced FSWs were able to learn more about the developmental progression within the family by first serving primiparous families from birth onward and not being required to work with children at multiple developmental stages at the beginning of their tenure with the program.

The Program Managers reflected that one accommodation that would make serving multiparous families easier would be more flexibility in the scheduling of home visits. While the HF program model is built on flexibility in many areas, it is more constrained in the specification of the number of home visits that families receive. This standard has been difficult for programs to meet, and the managers expressed that it was particularly difficult with multiparous families.

Overall, this study provided new insight into home visiting services for multiparous families. Despite the assumption that they would not do as well in home visiting programs as primiparous families, and despite the fact that programs that serve them face additional challenges to meet their more complicated needs, this study demonstrated that multiparous families can participate similarly to primiparous families and can achieve similar outcomes. These results confirm that using parity as a

demographic factor to deny families services is not based on sound science, but on a long-standing, untested assumption.

## Future Research Potential

The results of this qualitative study suggested additional areas of future research into services for multiparous participants. The Program Managers emphasized that serving multiparous mothers required more resources and effort. It would be worth examining whether FSWs make more referrals to other services for multiparous compared to primiparous mothers, and whether the types of referrals or services to which participants were referred differ between the two groups. Examination of participants' follow-up to referrals and receipt of referred services would be useful to understand differences or similarities in whether the mothers avail themselves of the referred services.

Another area emphasized by the Program Managers was the importance of matching FSWs and participants on the basis of the FSW experience. The managers stated that multiparous mothers were better served by the more experienced FSWs. This could be examined by assigning families a variable based on the months of experience of their initially assigned FSW. Families could be divided into "low experience" and "high experience" groups and participation and outcomes examined.

**Postscript on the History and Future of Home Visiting**

The authors would be remiss if they did not mention one final thought about the history of home visiting. The answers to our research question are based on findings from the last ten to fifteen years of home visiting in Virginia. Much of the research, discussion, and thinking about home visiting typically refers to the last three decades. It would be naïve to forget that home visiting has had a much longer history that might provide guidance for decision makers today.

In 1993, The Future of Children selected the topic of home-visiting programs for pregnant women and families with newborns as the focus of their winter volume. With the ultimate goal of making recommendations that could expand or improve home-visiting services in the United States, the contributors examined the wide variation in the content, theory, and operation of home-visiting services, as well as the history of home visiting in Europe, with a special focus on the more comprehensive programs in Denmark and Great Britain (Behrman, 1993).

In Europe, home visiting has existed for more than a century and in many countries was a well-accepted part of life. The programs were typically delivered universally to all families, generally well supported by the public at large, and thought to be effective. Perhaps because the programs were so well integrated into the early maternal and child health system and valued, there have been fewer empirical tests of home visiting effectiveness other than those conducted more recently in the United States.

Many of the European programs began between the middle of the nineteenth century and the middle of the twentieth century shortly after World War II. Driving

concerns included epidemics and public health issues such as high infant mortality, clean water, and sanitation. Over time, the programs moved to more social and health goals, focusing on the optimum development of the young child. As in the United States, the contemporary home visiting program in Europe "family-focused goals have increasingly emerged as equally important to child health goals. This trend is most often reflected in more attention to parent education and referral to needed services" (Kamerman & Kahn, 1993).

In summary, most European countries provide all families with voluntary service of at least one or two home visits after the birth of a child. Several countries have more extensive services. Many decisions about targeting home visiting have had more to do with scarce resources than about empirical findings regarding serving first-time mothers. In America many programs such as Head Start and Sesame Street, have been found to be equally effective for high-risk and lower-risk families. In fact, when an experimental trial of Sesame Street was evaluated for effectiveness in closing the achievement gap for poor and minority children, the findings demonstrated that all groups of children benefitted. The high risk children benefitted substantially but the lower risk children actually benefitted more, increasing the gap.

Deborah Daro, a nationally recognized leader in the field of child abuse and neglect prevention, and a recipient of the HFA Award for Lifetime Contribution to Research on Child Abuse and Neglect, had a vision that HFA home visiting would be developed as a universal intervention. More intensive targeted home visiting would be offered, but within the larger context of universal services. Such a model would minimize stigma and maximize appeal to all citizens. Indeed that was the dream of the Hampton

Healthy Families Partnership, a program that has contributed substantially to this research and a program with which the authors have worked for 20 years. The "*Partnership*" title was selected specifically to allow widely-used and well-accepted institutions in the community such as libraries and hospitals to offer new services that would meet the need and appeal to a diverse cross-section of community residents (such as Lamaze Plus services, Welcome Baby services, and family reading activities at the libraries) to garner widespread public support for the initiative. Deborah Daro's dream and HFP's vision should continue to motivate progress in home visiting.

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