



Nurse-Family Partnership

Helping First-Time Parents Succeed

Evaluation Report for the

Wyoming

Nurse-Family Partnership

YEAR FOUR REPORT

Initiation through August 31, 2003

The National Center for Children,
Families and Communities

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EXECUTIVE SUMMARY

This is the fourth evaluation report for the Wyoming Nurse-Family Partnership (NFP), based on the intervention model developed and tested by Dr. David Olds and colleagues. The Wyoming Department of Health's Community and Family Health Division coordinates implementation of the NFP service statewide. Oversight is provided through the Maternal and Child Health Section (administration and implementation) and Public Health Nursing (staffing and supervision). This report presents analysis of data available from program initiation through August 31, 2003.

Throughout the report indicators of program implementation and maternal and child health and functioning for the Wyoming NFP are compared to a national sample of Nurse Family Partnership participants and program standards. Careful thought has been given to crafting the standards drawing on data from prior randomized clinical trials, maternal and child statistics compiled by the Centers for Disease Control, and Healthy People 2010 objectives. It should be noted that the standards are viewed as target goals to be achieved by sites over time and program sites and other stakeholders are, therefore, to view the benchmark standards as "stretch goals" for developing quality improvement plans. Any comparisons to the goals should be regarded in this light.

PART I. GRADUATES OF THE WYOMING NFP PROGRAM: CHARACTERISTICS AND OUTCOMES

The majority of this report examines characteristics and outcomes of Wyoming NFP graduates (participants who remained in the program through their child's second birthday), along with comparisons between graduates and those who dropped from the program prior to program completion. Overall, there are some notable differences between graduates and those who dropped from the program. Those who dropped from the program appear to be at a greater educational and economic disadvantage with fewer high school graduates, lower median income, and greater likelihood of receiving Food Stamps and TANF at program entry.

Graduates of the program are young with a median educational level of 10 years. Thirty-two percent have graduated from high school, 85% are unmarried, 62% unemployed and 66% were receiving Medicaid at program enrollment. Seventy-eight percent of graduates were non-Hispanic White and 12% were Hispanic.

PROGRAM IMPLEMENTATION

Wyoming NFP graduates receive a healthy dose of program exposure with more visits during infancy and toddlerhood, on average, than participants in the national NFP. There is also a strong exposure to program material, with Wyoming NFP closely matching program guidelines for content of home visits. Only time spent on maternal role development during infancy and toddlerhood falls below program guidelines, an area in which many NFP sites work to reach the program standard.

Areas for consideration include participant retention and early enrollment in the program. Retention of participants is a common issue for prevention programs and, through analysis of national NFP data, is shown to be related to entry into the program early in pregnancy. That is, participants who entered the program early in their pregnancy stay in the program longer during the infancy phase of the program. Given that the largest percent of Wyoming NFP participants are leaving the program shortly after the birth of their child, enrolling clients earlier in their pregnancies may help address this issue. Nineteen percent of Wyoming NFP mothers entered the program by 16 weeks gestation, below the 60% standard for the program.

PROGRAM OUTCOMES

Wyoming NFP is producing positive outcomes for mothers with regard to life course development. Mothers are completing their high school diplomas or GEDs and a notable number are continuing to work throughout their time in the program. An area for consideration is subsequent pregnancies, which are at a moderate level 12 months after the birth of participant's children but are above program standards at 24 months. Additionally, a moderate 7% decrease in smoking during pregnancy was observed, lower than the 20% program standard.

Immunization rates are very strong with all immunizations above 98% with the exception of DPT/DTaP at 24 months (83%). Additionally, toddlers are exceeding the program standard for language development. Premature and low birth weight rates are higher than program standards, but only slightly higher than rates seen for the national NFP.

PART II. COMPARISON OF WYOMING NFP COHORT 1 AND COHORT 2

The second section of this report compares those who entered the program earlier in operation (July 1996 – December 1999) and those who entered later (January 2000 – August 2003), referred to as Cohort 1 and 2. The comparison of Cohorts 1 and 2 of the Wyoming NFP indicates that over time the program is enrolling participants with slightly higher levels of education and mental health ratings, and lower economic status. Women in Cohort 2 are older, live in smaller households, and are more likely to live with their husbands/boyfriends than those who enrolled earlier in program operations.

The program is making improvements in program implementation in terms of attrition during toddlerhood, though attrition increased during the pregnancy and infancy phases of the program. Additional strengths include the observation that participants enrolled in later program operations continue to receive the program content needed and are more participants are enrolled in the program earlier in their pregnancies. An area for consideration is the percent of expected visits completed, as this decreased for those in Cohort 2 compared to Cohort 1.

Improvements were also seen with the number of women smoking between intake and the birth of their child through a statistically significant decrease for Cohort 2, while no significant decrease was noted for Cohort 1. Premature and LBW rates are also lower for later phases of program operations.

EVALUATION OF THE
WYOMING
NURSE-FAMILY PARTNERSHIP



YEAR FOUR: NFP GRADUATES AND TRENDS IN
PROGRAM IMPLEMENTATION

REPORT TIME SPAN:
PROGRAM INITIATION THROUGH AUGUST 31, 2003

NURSE HOME VISITATION OVERVIEW

Federal, state, and local governments and a variety of private efforts have attempted for several decades to create interventions that would prevent or at least reduce the incidence of low birth weight infants, child abuse and neglect, crime, welfare dependency, and other severe social and health problems. These attempts included several models of home visitor programs and some programs based in the social welfare system. Our society, nonetheless, still faces persistent rates of child and family poverty, births to adolescents, infant mortality, and juvenile crime. Many of these problems can be traced directly to the behavior of mothers and fathers and conditions in the family home.

One program of prenatal and infancy home visitation by nurses, the Nurse-Family Partnership developed and tested by Dr. David Olds and colleagues, addresses many of the programmatic and clinical deficiencies found in programs tested earlier. Scientifically controlled studies of this program in Elmira, New York; Memphis, Tennessee; and Denver, Colorado have produced a variety of positive outcomes for low-income mothers and their children.¹⁻⁶

THE PROGRAM MODEL

The program consists of having nurse home visitors work with women and their families in their homes during pregnancy and through the first two years of the child's life to accomplish three goals:

- Improve pregnancy outcomes by helping women alter their health-related behaviors, including reducing use of cigarettes, alcohol, and illegal drugs;
- Improve child health and development by helping parents provide more responsible and competent care for their children; and
- Improve families' economic self-sufficiency by helping parents develop a vision for their own future, plan future pregnancies, continue their education and find work.

The model being replicated has a number of key features that differentiate it from other home visitation programs:

- A firm foundation in theories of development and behavioral change and methods to reduce specific risks for poor maternal and child outcomes,
- Focus on low-income women bearing first children,
- A clinical foundation in health,
- Use of registered nurses,
- Initiation of visits during pregnancy and continuing involvement with families for two years postpartum, and
- Use of detailed visit-by-visit protocols to guide the nurses in their work with families.

BASIC COMPONENTS OF THE EVALUATION

One of the potential pitfalls in the dissemination of any model program is that if the results the program was expected to attain are not realized in the new setting, local leaders are likely to quickly claim that the program "really does not work." All too often, however, the underlying issue may not be the lack of effectiveness of the program, but rather a failure to implement the program as it was designed and previously tested. Thus, the principal questions of this evaluation focus on whether the NFP program is being implemented with fidelity to the original model and to what extent the program outcomes attained parallel program standards.

The NFP program in the state of Wyoming has been in operation since July 1996. Given the tenure of this program, 302 participants have had the opportunity to complete the full program cycle from pregnancy to their child's second birthday. However, a number of participants have dropped from the program. Demographics and other descriptive statistics will be presented for these two groups

(Graduates and Non-completers), whereas further consideration of program, mother and infant outcomes will be given to the 76 participants who have completed the program.

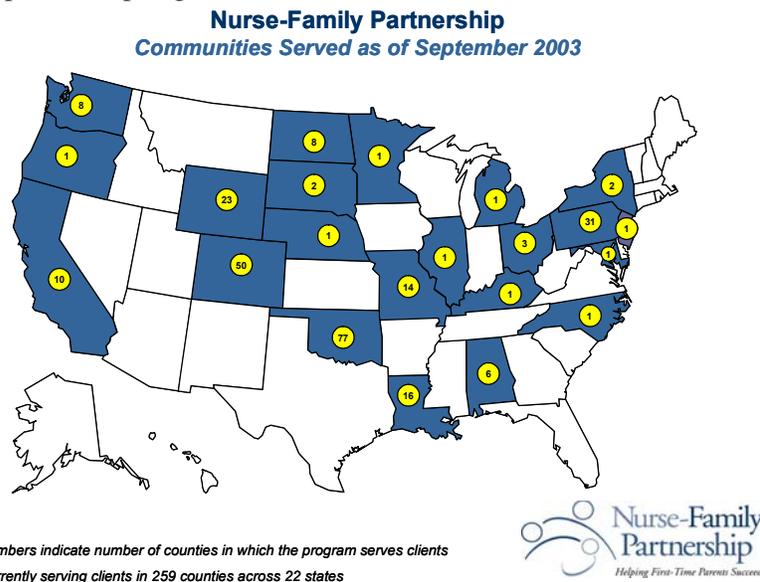
Additionally, of interest is the extent to which the program has followed expected program protocol and whether adherence to the program model has changed over time. This report examines quantitative aspects of program fidelity for those who entered the program from July 1996 through December 1999 versus those who entered the program between January 2000 and August 2003. These groups will be referred to as Cohort 1 and Cohort 2. Aspects of program implementation to be considered include whether the program has recruited and retained a population of low income, first-time mothers; enrolled families early in pregnancy and followed them through the child’s second birthday; and conducted visits that are of comparable frequency, duration, and content as expected for the appropriate program phase. Selected outcome data for the different cohorts also will be considered including changes in maternal health habits during pregnancy, gestational age and weight of infants at birth, immunization rates for infants, rates of subsequent pregnancies, and changes in the mother’s work status.

While the interpretation of such data is complicated when there is no randomly assigned control group, program standards have been developed based on data from prior randomized clinical trials, maternal and child statistics compiled by the Centers for Disease Control, and Healthy People 2010⁷ objectives. These benchmark targets will be used to draw inferences about how the program is working in different sites.

Careful thought has been given to crafting these program standards, but it should be noted that they are being offered in provisional form because they are the first iteration of benchmarks for guiding program performance. Program sites and other stakeholders are, therefore, to view the targets as “stretch goals” for establishing quality improvement plans and any comparisons to the targets should be regarded in this light. It should also be noted that any inferences drawn need to be interpreted with caution as the outcome data are based entirely upon maternal self-report.

THE NURSE FAMILY PARTNERSHIP (NFP)

The Nurse Family Partnership is assisting communities interested in implementing the Nurse Family Partnership (NFP) program which works with first time parents to foster healthier pregnancies, improve the health and development of children, and encourage self-sufficiency. Currently the NFP is serving communities in 22 states across the country. The map below highlights the states with active NFP sites and the number of counties served in those states as of September 2003. Additional information about the Nurse Family Partnership can be found on the web-site at www.nursefamilypartnership.org.



PART I:
GRADUATES OF THE WYOMING NFP PROGRAM

PARTICIPANT CHARACTERISTICS

The demographic information gathered for evaluative purposes includes a variety of characteristics about the participants, other family members, and their households. This information is provided by the participant who may or may not know all of the information being requested, particularly if the participant is a young teen. Information on Wyoming NFP participants who have completed the program, those who have dropped from the program and national NFP graduates is included in this section. Of the 302 of participants who could have completed the program by August 31, 2003, 25% (N=76) graduated from the program.

SOCIO-DEMOGRAPHIC INFORMATION

Table 1 notes various demographic characteristics of the participants who have graduated from the Wyoming NFP, those who have dropped from the program prior to their child's second birthday, and national NFP graduates. As seen in Table 1, those who dropped from the program are significantly less likely to have graduated from high school and more likely to have been receiving food stamps at program entry. Other trends include non-completers are more likely to be unemployed and receiving TANF at program entry, and have a lower median income. That is, those participants who drop from the program are doing poorly from an educational and economic standpoint at program entry when compared to those who go on to graduate from the program.

Graduates of the program are young with a median educational level of 10 years. Thirty-two percent have graduated from high school, 85% are unmarried, 62% unemployed and 66% were receiving Medicaid at program enrollment. Seventy-eight percent of graduates were non-Hispanic White and 12% were Hispanic.

Table 1. Characteristics of Participants at Program Entry

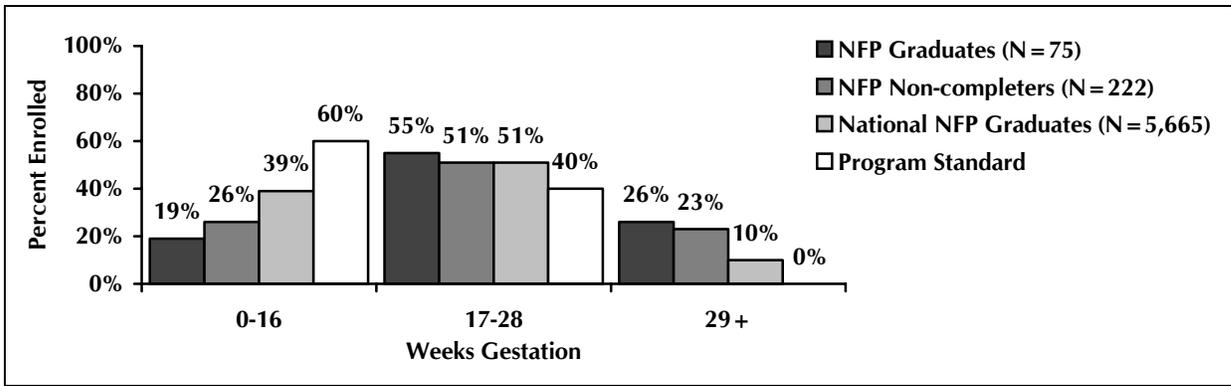
	Wyoming NFP Graduates	Wyoming NFP Non-Completers	National NFP Graduates
Number Enrolled	76	226	5,879
Demographic Characteristics			
Maternal age (median years)	17	17	19
Maternal education (median years)	10	10	11
Completed high school*	32%	20%	50%
Unmarried	85%	91%	72%
First-time mothers	100%	89%	98%
Race/Ethnicity			
Hispanic	12%	13%	14%
Native American	3%	13%	7%
African American/black	0%	1%	16%
Non-Hispanic white	78%	66%	55%
Multiracial/other	7%	8%	6%
Asian	0%	0%	2%
Economic Factors			
Annual household income (median)	\$17,500	\$13,500	\$13,500
Unemployed	62%	73%	61%
Use of Government Assistance			
WIC	51%	55%	73%
Medicaid	66%	69%	57%
Food stamps*	1%	14%	13%
TANF	4%	11%	5%
Household Size			
Number in household (median)	3	3	3
Household Composition			
Lives alone	4%	3%	6%
Lives with husband/boyfriend	37%	26%	40%
Lives with mother	52%	57%	41%
Lives with others	7%	16%	13%

*Statistically significant at $p < .05$ for the difference between graduates and non-completers

MATERNAL HEALTH CHARACTERISTICS

Figure 1 presents breakdown of when graduates and non-completers entered the program during their pregnancies compared to national NFP graduates and program standards. A significant difference between graduates and non-completers was noted in the distribution of when mothers entered the program with 19% of graduates entering the program by 16 weeks into their pregnancies and 26% of non-completers entering the program by that time. Sixty percent of participants should be enrolled by the time the mother is 16 weeks into her pregnancy according to program standards.

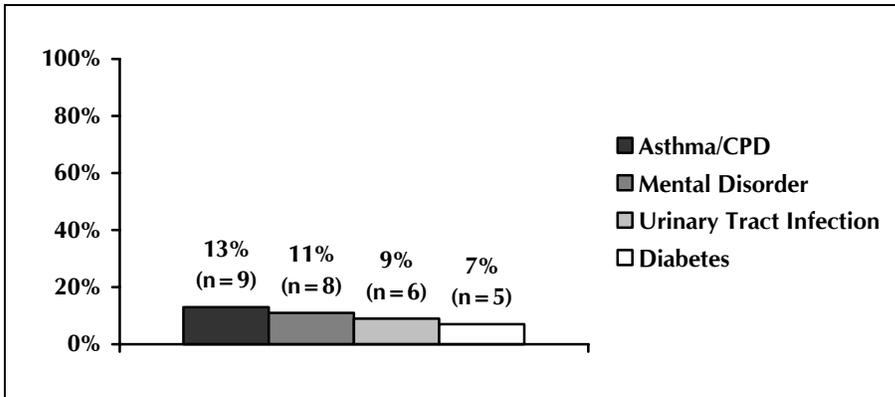
Figure 1. Gestational Age at Enrollment



Statistically significant difference ($p < .05$) in the distribution of when graduates and non-completers entered the program

The mother’s general health history is also an important component of a healthy pregnancy and is assessed by nurse home visitors at entry into the program. The distribution of predominant maternal health problems for Wyoming NFP graduates is noted in Figure 2. Additionally, nine percent of Wyoming NFP graduates were underweight before their pregnancy (compared to 10% for graduates in the national NFP).

Figure 2. Predominant Maternal Health Problems at Program Entry



N = 76, missing = 6

Maternal mental health was assessed at program intake using a short version of the RAND Mental Health Inventory. Additionally, participants’ general psychological ability to cope with life stressors was measured using the Sense of Mastery Scale. Scores range from 1 to 4, with higher scores indicating a stronger sense of mastery over life challenges. As seen in Table 2, nearly the same percent of graduates and non-completers had mental health and mastery scores over 3.0.

Table 2. Psycho-social Participant Characteristics at Intake

	Wyoming NFP Graduates	Wyoming NFP Non-Completers
Percent with mental health score greater than 3.0	52%	54%
Percent with mastery score greater than 3.0	72%	76%

*Statistically significant at $p < .05$ for the difference between graduates and non-completers

FAMILY CHARACTERISTICS

Fathers play an essential role in NFP families. Fifty-two graduates (88%) reported at intake that their husband/current boyfriend was the biological father of their child and, as shown in Table 3, 63% reported daily interaction with the father at intake. Nineteen percent of participants reported no contact

with the father at intake. For those receiving financial assistance from the child's father, the mean amount given was \$867 compared to \$377 for those who later dropped from the program.

Table 3. *Contact with Biological Father at Intake*

	Wyoming NFP Graduates (N = 76, missing = 3)		Wyoming NFP Non-Completers (N = 226, missing = 27)	
	Frequency	Percent	Frequency	Percent
Not at All	14	19.2	38	19.1
Less than once a week	6	8.2	23	11.6
At least once a week	7	9.6	18	9.0
Daily	46	63.0	120	60.3

SUMMARY

Overall, there are some notable differences between graduates and those who dropped from the program. Those who dropped from the program appear to be at a greater educational and economic disadvantage with fewer high school graduates, lower median income, and greater likelihood of receiving Food Stamps and TANF at program entry.

PROGRAM IMPLEMENTATION

A critical feature of this evaluation focuses on whether the program is being conducted with fidelity to the model on which it is based. The analysis of fidelity considers the frequency, duration and content of visits received by program completers. Number and length of telephone contacts that cover program material are also noted. Additionally, for those who dropped from the program, analysis of when these participants dropped from the program is provided.

PARTICIPANT ATTRITION

Of the 302 participants who could have graduated from the program by August 31, 2003, 226 (75%) dropped out of the program at some point between enrollment and their child's second birthday. It is helpful to examine attrition during specific time frames to determine which periods pose the highest risk for clients dropping. Table 4 provides information on when Wyoming NFP participants dropped out, indicating that the largest proportion of drops (37%) occurred between birth and six months of infant age. Of all those who did not complete the program, 85% finished the pregnancy phase of the program and 48% remained in the program at six months of infant age.

These data suggest that efforts to reduce attrition should emphasize the period just after the birth of the infant. The most common reasons for attrition between birth and six months were *declined further participation* (42%) and *moved out of service area* (28%). Across all time frames, the most common reasons for dropping were *declined further participation* (35%) and *moved out of service area* (30%).

Table 4. Timing of Participant Attrition

	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Pregnancy	34	15.0	34	15.0
Infancy				
Birth to six months	83	36.7	117	51.8
Six to 12 months	64	28.3	181	80.1
Toddlerhood				
12 to 18 months	40	17.7	221	97.8
18 to 24 months	5	2.2	226	100.0

N = 226

NUMBER AND DURATION OF COMPLETED NURSE HOME VISITS

An important component of the NFP program is the frequency of client visits. The expected visit schedule for a client is one visit a week for the first four weeks after they enter the program, followed by one visit every two weeks until their child is born. After the birth of their child, mothers are visited once a week for six weeks, and then every two weeks until the child reaches 22 months of age. At 22 months of toddler age, the mother will receive visits once a month for three months until they finish the program. Table 5 provides information regarding the number and duration of home visits during pregnancy, infancy and toddlerhood, and provides a percent of expected visits completed across clients. This calculation compares how long a client has been in the program and how many visit they should have received with how many visits were completed for that client. Aggregate information across all clients is presented.

Graduates of the Wyoming NFP completed 90% of expected visits, comparable to that observed among national NFP graduates for the pregnancy phase of the program. On average national NFP graduates received more visits than Wyoming NFP graduates during the pregnancy phase. During infancy 70% of expected visits were completed, higher than the 60% observed for the national NFP, and Wyoming NFP graduates received, on average, more visits during infancy than national NFP graduates. The same

observation holds true for the toddler phase of the program with Wyoming NFP graduates receiving more visits than national NFP graduates, though both Wyoming and national NFP graduates completed 60% of expected visits.

The program standard for percent of expected visits completed is based on the assumption that this ratio will be calculated using all participants who have, or should have according to their expected date of delivery, completed the appropriate phase of the program, including those who dropped prior to completing that phase. As graduates have no attrition, the percent of expected visits completed for this group is likely to be higher than the program standard for all program participants.

Table 5. *Number and Duration of Completed Nurse Home Visits*

	Wyoming NFP Graduates		National NFP Graduates		Program Standard
	Number	Average	Number	Average	
Pregnancy					
Pregnancy Completed	76	-	5,879	-	-
Completed Visits	651	8.6	55,789	9.5	-
Expected Visits	781	-	68,466	-	-
Percent of expected visits completed	-	90	-	90	80
Attempted Visits	56	0.7	5,195	0.9	-
Average Visit Length (Minutes)	-	73.2	-	77.6	≥ 60 minutes
Average Total Contact Time (Minutes)	-	636.0	-	732.0	-
Infancy					
Infancy Completed	76	-	5,879	-	-
Completed Visits	1,451	19.1	107,921	18.4	-
Expected Visits	2,204	-	169,734	-	-
Percent of expected visits completed	-	70	-	60	65
Attempted Visits	230	3.0	14,921	2.5	-
Average Visit Length (Minutes)	-	69.0	-	73.8	≥ 60 minutes
Average Total Contact Time (Minutes)	-	1342.0	-	1,352.0	-
Toddler					
Infancy Completed	73	-	5,702	-	-
Completed Visits	962	13.2	72,115	12.6	-
Expected Visits	1,533	-	119,153	-	-
Percent of expected visits completed	-	60	-	60	60
Attempted Visits	213	2.9	13,148	2.3	-
Average Visit Length (Minutes)	-	66.2	-	70.2	≥ 60 minutes
Average Total Contact Time (Minutes)	-	886.0	-	895.0	-

*Not applicable

CONTENT OF HOME VISITS

The content of the home visitation program is based upon the visit-by-visit guidelines that are designed to promote five domains of maternal, child, and family functioning. The specific content and emphasis given to these five domains varies depending on the developmental stages and challenges most families encounter during pregnancy, infancy (0 to 12 months), and toddlerhood (13 to 24 months). The focus of each home visit is based on detailed guidelines and is agreed upon by the mother and nurse home visitor at the preceding visit to allow for individualization related to the mothers' and family members' needs. The five program content domains are:

- personal health of the mother,
- environmental health,

- mother's life-course development,
- maternal role, and
- relationships with friends and family.

As illustrated in Table 6, Wyoming NFP participants are receiving the information needed during home visits based on program guidelines for content of visits. Only development of the maternal role during infancy and toddlerhood fell below program guidelines.

Table 6. Average Percent of Nurse Visit Time Spent on Each Domain Area

	Wyoming NFP Graduates	National NFP Graduates	Program Standard
Pregnancy			
Personal Health	37	37.3	35-40
Environmental Health	9	11.0	5-7
Life-course Development	13	12.9	10-15
Maternal Role	27	23.1	23-25
Friends & Family	14	15.6	10-15
Infancy			
Personal Health	20	20.0	14-20
Environmental Health	12	13.9	7-10
Life-course Development	17	15.1	10-15
Maternal Role	38	35.6	45-50
Friends & Family	14	15.3	10-15
Toddler			
Personal Health	19	16.7	10-15
Environmental Health	11	14.2	7-10
Life-course Development	20	17.3	18-20
Maternal Role	37	36.5	40-45
Friends & Family	13	15.2	10-15

TELEPHONE ENCOUNTERS

Nurse home visitors report information on all encounters with mothers and families. Although the most frequent encounter is through home visits, there are times when telephone contacts occur that cover program content. Table 7 presents information about the number of telephone contacts with families during the different phases of the program and the average time per phone call.

During the pregnancy phase of the program the majority of time was spent discussing the personal health of the mother (37%) and development of the maternal role (18%) during phone calls. Phone contacts during infancy focused on development of the maternal role (31%), life course issues (18%) and personal health of the mother (17%). During the toddler phase the focus was on life course development (29%), maternal role development (22%) and personal health of the mother (19%).

Table 7. Telephone Contacts with Families

	Pregnancy	Infancy	Toddlerhood
Number of participants with phone contacts	28	44	37
Total number of phone calls	54	187	129
Mean number of calls per participant	1.9	4.3	3.5
Range of number of calls per participant	1-7	1-26	1-20
Average time per call in minutes	20	22	19

PARTICIPANT OUTCOMES

An important part of the NFP program consists of improving the health and wellbeing of the mothers and children enrolled in the program and monitoring any changes that occur. As noted earlier, the interpretation of these data is complicated when there is no randomly assigned control group with which to compare maternal, child, and family functioning. Thus, where possible, data from the program site have been compared to data from national NFP programs and program standards. It should be noted, however, that data collected in the Wyoming NFP (as in all dissemination sites) are based entirely upon maternal report; hence results may be over- or underestimated. There is likely further bias within the outcome data because data are not available for all participants. For this reason, outcome analyses with data from a small number of participants need to be interpreted with caution.

CHANGE IN MATERNAL HEALTH HABITS

An important aspect of prenatal care is to assess and improve the health status of the pregnant women and their daily habits that can influence their health and the health and well-being of their unborn baby. Prenatal use of tobacco, alcohol and other drugs has been associated with various adverse birth outcomes such as low birth weight, preterm delivery, and spontaneous abortion. Assessments of personal health habits, including smoking and the use of alcohol and other drugs are conducted periodically: shortly after enrollment, at 36 weeks of pregnancy, and at 12, 18 and 24 months of infancy. Because health habits are measured at different time periods, it is possible to consider changes in these behaviors as intervening outcomes.

Table 8 shows detailed information about maternal health habits at intake and 36 weeks of pregnancy in the Wyoming NFP for graduates with information at *both* time intervals, while Table 9 presents information at intake and one year of infancy for graduates with data at both time points. The percent change is the number of women who acquired a certain status between intake and the later time point divided by the number of women who had that status at intake. The statistical test examines whether the observed difference is simply due to chance. One should also bear in mind that the interpretation of change depends on the amount of participants with a particular status. If a status is too infrequently occurring at intake, it is usually not a viable outcome for evaluating the program effect on that status. Please note that the relative percent change cannot be calculated when no participants reported a certain health habit at intake.

Of those graduates that had data at intake and 36 weeks pregnancy, 14 (30%) were smokers at intake and 13 (28%) were smokers at 36 weeks of pregnancy representing a 7% reduction in the number of women who smoked. Program standards aim for a 20% or greater reduction in the number of women who smoke at intake compared to 36 weeks of pregnancy. Additionally, a statistically significant increase was noted in the number of women smoking between intake and one year of infancy.

Table 8. *Change in Maternal Health Habits: Program Intake and 36 Weeks of Pregnancy*

	Program Intake			36 Weeks of Pregnancy		Change	
	Missing	Frequency	Percent	Frequency	Percent	Frequency	Relative Percent
Cigarette smoker	29	14	29.8	13	27.7	-1	-7.1
Smoked 5+ cigarettes last 24 hrs.	29	4	8.5	3	6.4	-1	-25
Marijuana use	30	0	0.0	0	0.0	0	-
Alcohol use	31	1	2.2	0	0.0	-1	-100
Cocaine use	30	0	0.0	0	0.0	0	-
Other drug use	30	0	0.0	0	0.0	0	-

*Statistically significant at $P < .05$

N=76

Table 9. *Change in Maternal Health Habits: Program Intake and One Year of Infancy*

	Program Intake		One Year of Infancy		Change		
	Missing	Frequency	Percent	Frequency	Percent	Frequency	Relative Percent
Cigarette smoker	57	3	15.8	8	42.1	5	167*
Smoked 5+ cigarettes last 24 hrs.	57	1	5.3	4	21.1	3	300
Marijuana use	57	0	0.0	1	5.3	1	-
Alcohol use	57	1	5.3	1	5.3	0	0.0
Cocaine use	57	0	0.0	0	0.0	0	-
Other drug use	57	0	0.0	0	0.0	0	-

*Statistically significant at $P < .05$

$N = 76$

Home visitors work with participants who are unwilling or unable to quit smoking to reduce the number of cigarettes they smoke per day. Those participants who were moderate smokers (5+ cigarettes a day) showed a statistically significant mean decrease of 5.0 in the number of cigarettes smoked over two days from intake to 36 weeks pregnancy. This is greater than the 3.5 mean decrease set by the program standard, and greater than the reduction seen for national NFP graduates. As very few participants are included in this analysis, results should be viewed with caution.

Table 10. *Change in Number of Cigarettes Smoked per Day during Pregnancy*

	Number of Participants	Missing	Total Observations	Mean Change
Wyoming NFP Graduates	6	2	4	-5.0*
National NFP Graduates	73	102	371	-2.2*
Standard	-	-	-	-3.5

*Statistically significant at $p < .05$

INFANT HEALTH

In addition to maternal outcomes infant birth and health outcomes are an equally important aspect of the NFP program. Prematurity and low birth weight rates, infant illnesses, developmental delays, breastfeeding, language development, immunization rates and number of emergency room visits and hospitalizations are presented in this section.

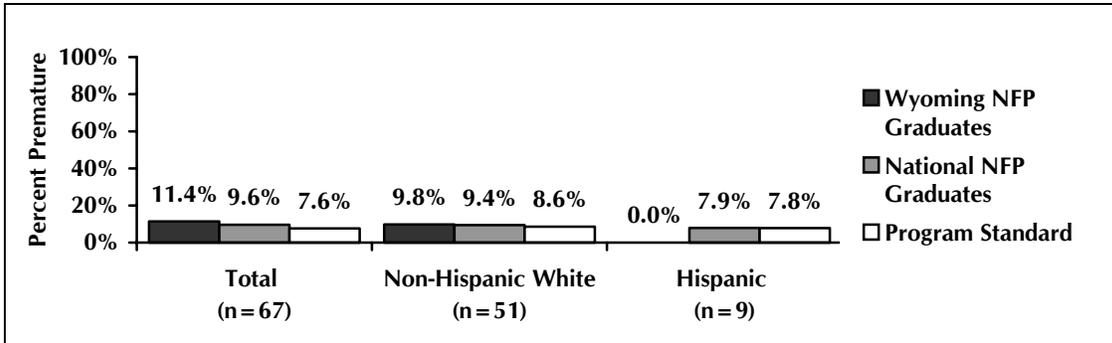
BIRTH OUTCOMES

Gestational age at birth is one measure of infant health with birth before 37 weeks gestation considered premature. As illustrated in Figure 3, 11% of infants born to Wyoming NFP graduates were born prematurely, higher than the program standard of 7.6% and the 9.8% observed among national NFP graduates.

The program standard for premature births is consistent with the target goal set in Healthy People 2010 Objectives⁷ for percent of premature births among all women of childbearing age. While it is a national goal to eliminate disparities in health outcomes among populations, health statistics for women from minority and low income populations served by the NFP currently document the existence of disparities in rates of premature and low birth weight infants by race and ethnicity. Thus, the progress that NFPs can realistically achieve toward the program standard may vary based on the composition of the population served. To help sites monitor their progress toward the longer term target goal for 2010, we have established intermediate target goals for NFP sites that reflect the racial/ethnic distribution of the participants served (see Appendix).

The majority of Wyoming NFP participants are non-Hispanic White (78%) or Hispanic (12%), and rates for these ethnic groups are also presented in Figure 3. The percentages of premature infants for non-Hispanic White participants were 9.8%, slightly higher than the program standard and comparable to the national NFP rate. Wyoming NFP Hispanic participants had no premature births.

Figure 3. Percentage of Premature Infants by Ethnicity

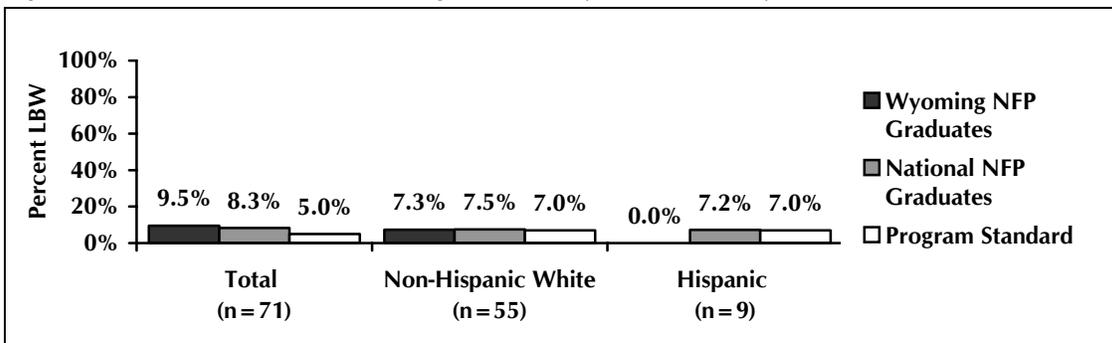


Birth weight is also used as an indicator of infant health, with the occurrence of infant death and/or handicap highly correlated with low birth weight (less than 2,500 grams/5.5 lbs.). Figure 4 shows the percentage of low birth weight (LBW) infants for Wyoming NFP graduates and national NFP graduates, and provides the program standards. Nine and a half percent of infants were LBW, falling below 2,500 grams at birth. This percentage is higher than the program standard of 5% and only slightly higher than the national NFP rate. Wyoming NFP has strong LBW rates for the predominant ethnic groups in the program. As seen in Figure 4, these rates nearly match or fall below the program standards for those groups.

While low birth weight is highly correlated with certain adverse health outcomes and a greater use of resources immediately following delivery, those infants with marginal low birth weight (2268-2500 grams/5.0-5.5 pounds) use much fewer resources and are at less risk for future health problems than infants below five pounds. Six (46%) of the LBW infants born in the program weighed between five and five and one half pounds.

Finally, there was no statistically significant difference between graduates and non-completers for prematurity and low birth weight. Prematurity rates were 7.9% for non-completers and 11.4% for graduates, while LBW rates were 7.7% for non-completers and 9.5% for graduates. These results are tentative and may become clearer as the number of program graduates increases.

Figure 4. Percent of Low Birth Weight Infants by Race/Ethnicity



ILLNESSES

Wyoming NFP participants were asked about their children's illnesses at 6, 12, and 24 months of age. Of the 49 participants who reported on their infant's illnesses at six months of age, four (8%) reported their children had had croup/bronchitis, while one each (2%) reported problems with pneumonia and anemia. Of the 50 participants reporting at 12 months, the predominant health problems noted were croup/bronchitis (n=14, 28%) and asthma (n=3, 6%). Of the 43 participants responding at 24 months, predominant problems were croup/bronchitis (n=9, 21%), asthma (n=5, 12%), and anemia (n=4, 9%).

Given that infants born prematurely or with low birth weight may be at higher risk for respiratory illness, analyses were conducted to examine the percent of children with such problems who had been born premature or with low birth weight. Two of the 27 Wyoming NFP infants who experienced respiratory illness (asthma, croup/bronchitis, or pneumonia) between birth and 24 months were born prematurely (before 37 weeks gestation), one was low birth weight (less than 2,500 grams), and two were premature and low birth weight.

In the United States there were 11 million acute ear infections reported in 1996 for children less than five years of age (CDC). Ear infection is not identified as a specific health problem on the Infant Health Care form, but mothers are asked if there were other health care concerns their infants experienced. Among 30 respondents at six months one reported a problem with ear infections while two of the 21 participants responding at 12 month and one of the 12 participants responding at 24 months reported ear infections as a concern.

DEVELOPMENTAL DELAYS

Developmental milestones are determined by the average age at which children attain specific skills, such as gross motor skills, fine motor skills, mental/cognitive abilities, and speech/language skills. Of the infants evaluated at six, 12, 18 and 24 months of age, four (9%) had speech/language delays at 18 months and three (7%) reported speech/language delays at 24 months. Of the five toddlers with a developmental delay at 6, 12, 18 and/or 24 months, none had been born prematurely or with a low birth weight. Methods of assessing developmental delay are noted in Table 11.

Table 11. Method of Assessment for Developmental Delay Determined At 6, 12 and 24 Months

	Method*	Frequency	Percent
At 6 months (N = 76, missing = 27)	Denver II	1	2.0
	Ages & Stages questionnaire	4	8.2
	Nurse observation	4	8.2
	Physician or health care provider	1	2.0
At 12 months (N = 76 missing = 26)	Denver II	1	2.0
	Ages & Stages questionnaire	15	30.0
	Nurse observation	12	24.0
	Physician or health care provider	4	8.0
At 24 months (N = 68, missing = 25)	Denver II	6	14.0
	Ages & Stages questionnaire	13	30.2
	Nurse observation	21	48.8
	Physician or health care provider	10	23.3

*More than one category could be chosen.

BREASTFEEDING

Table 12 illustrates that breast feeding initiation rates at six, 12 and 24 months of infant age were lower for Wyoming than for the national NFP sample, as were the percentages still breastfeeding at six and 12 months of infant age. Breast milk is considered the ideal form of infant nutrition, with the practice

of breastfeeding demonstrating wide-ranging benefits for infants' general health, immune systems, and development.⁷ Breastfeeding is healthier for infants than formula.

Target goals established by Healthy People 2010 are to have 75% of mothers breastfeeding in the early postpartum period, 50% still breastfeeding at six months, and 25% still breastfeeding at one year of infancy. The percentage of Wyoming NFP infants still breastfeeding at six and 12 months of age is lower than the Healthy People 2010 objectives.

Table 12. Occurrence of Breastfeeding

	Wyoming NFP Graduates				National NFP Graduates			
	N	Missing	Frequency	%	N	Missing	Frequency	%
6 months								
Ever breastfed	76	27	9	18.4	5,879	4,988	434	48.7
Still breastfed	76	28	3	6.3	5,879	5,153	131	18.0
12 months								
Ever breastfed	76	26	15	30.0	5,879	4,898	504	51.4
Still breastfed	76	29	2	4.3	5,879	5,132	94	12.6
24 months								
Ever breastfed	68	27	24	58.5	5,571	4,571	594	59.4
Still breastfed	68	31	2	5.4	5,571	4,886	31	4.5

LANGUAGE DEVELOPMENT

Development of language skills during the preschool years is an important indicator of school readiness. The Language Assessment form (i.e., MacArthur CDI Short Form) is administered when toddlers are approximately 21 months of age. The mother is asked to identify which words her child says, and the number of words that the infant says is summed and compared to age and gender adjusted norms for a sample of low income children on the MacArthur Child Development Index.⁸

Table 13 presents the percentile breakdown of language scores for toddlers of Wyoming NFP graduates showing that these toddlers are doing well with language development. Eighty-eight percent of the toddlers scored above the 10th percentile on language acquisition for their age and gender. This rate satisfies the program standard of 75% or more toddlers above the 10th percentile. The largest proportion of toddlers (32%) scored above the 75th percentile.

Table 13. Percentile Breakdown of Scores for Language Production for Toddlers

Percentile	Frequency	Percent	Cumulative Percent
Below 10th percentile	3	12.0	12.0
10-25th percentile	3	12.0	24.0
26-50th percentile	4	16.0	40.0
51-75th percentile	7	28.0	68.0
Above 75th percentile	8	32.0	100.0

N = 25

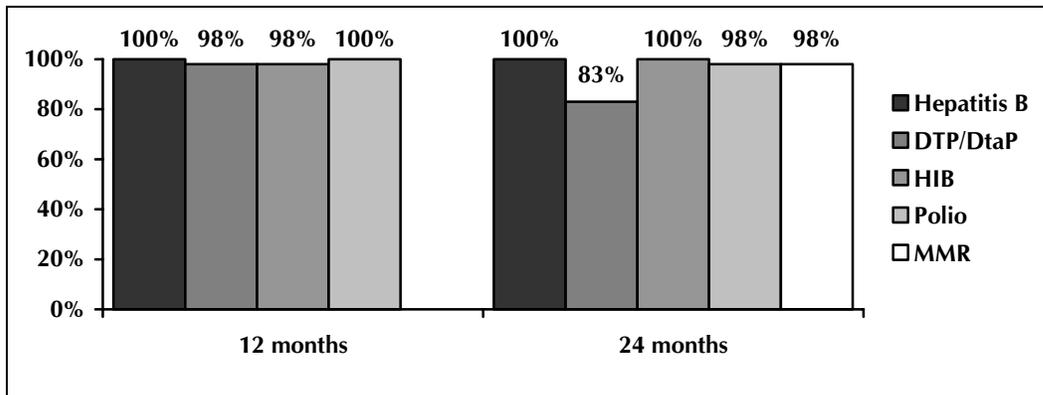
IMMUNIZATIONS

The infancy immunization schedule, published by the Center for Disease Control for 2000, provides a measure of the expected standard of care. At the time of Wyoming NFP program implementation, four vaccines were recommended during the first year of infant life: hepatitisB, DTP/DTaP (diphtheria, tetanus, and pertussis or diphtheria, tetanus and acellular pertussis), *H. influenza* type b, (HIB), and inactivated polio. The recommended childhood immunization schedule released by the CDC for

January-February 2002 has varicella and pneumococcal conjugate (PCV) added as recommended vaccinations; however, these additions are not reflected in this report.

Figure 5 shows that Wyoming NFP has strong immunization rate. Completion rates for vaccinations were above the program standard of 90% for all immunizations with the exception of DTP/DtaP at 24 months.

Figure 5. Summary of Immunization Rates at 12 and 24 Months of Infant/Toddler Age



EMERGENCY ROOM VISITS AND HOSPITALIZATIONS

Table 14 displays information on the frequency of emergency room visits and hospitalizations at 6, 12 and 24 months of infant age. A notable number of infants had at least one ER visits across all time points, though only a small percentage of these were due to injury or ingestion. The majority of infants had no hospitalizations across all time points with only one hospitalization due to injury. The relatively few ER visits and hospitalizations due to injury or ingestion are notable as these reasons for ER visits and hospitalizations are indicators of potential abuse or inadequate parental supervision of young children’s activities.

Table 14. Number of and Reasons for Emergency Room Visits and Hospitalizations Reported at 6, 12, and 24 Months of Infant Age

ER Visits			Hospitalizations		
	Frequency	Percent		Frequency	Percent
6 Months (n = 76 missing = 28)			6 Months (n = 76 missing = 27)		
0 visits	26	54.2	0 visits	39	79.6
1 visits	13	27.1	1 visits	8	16.3
2 Visits	7	14.6	2 Visits	2	4.1
3+ visits	2	4.2	3+ visits	0	0.0
Reasons (n = 33, missing = 0)			Reasons (n = 12, missing = 0)		
Illness	33	100.0	Illness	12	100.0
Injury	0	0.0	Injury	0	0.0
Ingestion	0	0.0	Ingestion	0	0.0
12 Months (n = 76 missing = 26)			12 Months (n = 76 missing = 26)		
0 visits	20	40.0	0 visits	43	86.0
1 visits	18	36.0	1 visits	6	12.0
2 Visits	9	18.0	2 Visits	0	0.0
3+ visits	3	6.0	3+ visits	1	2.0
Reasons (n = 50, missing = 2)			Reasons (n = 11, missing = 2)		
Illness	40	83.3	Illness	8	88.9
Injury	6	12.5	Injury	1	11.1
Ingestion	2	4.2	Ingestion	0	0.0
24 Months (n = 68 missing = 25)			24 Months (n = 68 missing = 25)		
0 visits	8	18.6	0 visits	35	81.4
1 visits	14	32.6	1 visits	7	16.3
2 Visits	9	20.9	2 Visits	1	2.3
3+ visits	12	27.9	3+ visits	0	0.0
Reasons (n = 80, missing = 3)			Reasons (n = 9, missing = 0)		
Illness	66	85.7	Illness	9	100.0
Injury	10	13.0	Injury	0	0.0
Ingestion	1	1.3	Ingestion	0	0.0

MATERNAL LIFE COURSE DEVELOPMENT

A significant focus of the NFP program is on helping parents articulate a vision for the future that involves economic self-sufficiency and personal growth. The NFP program helps mothers achieve these goals by encouraging education, finding work, planning future pregnancies, and forming stable relationships. Women report on these aspects of their personal life-course development at entry into the program and when their child is 6, 12, 18, and 24 months of age.

As shown in Table 15, 2% of Wyoming NFP graduates reported a subsequent pregnancy within six months after the birth of their first child, 16% within 12 months, and 45% became pregnant again within 24 months of the birth of their child. The program standard for the rate of subsequent pregnancies within two years following the birth of the participant's first infant is 25% or less.

Table 15. Subsequent Pregnancies at 6, 12, 18 and 24 months Postpartum

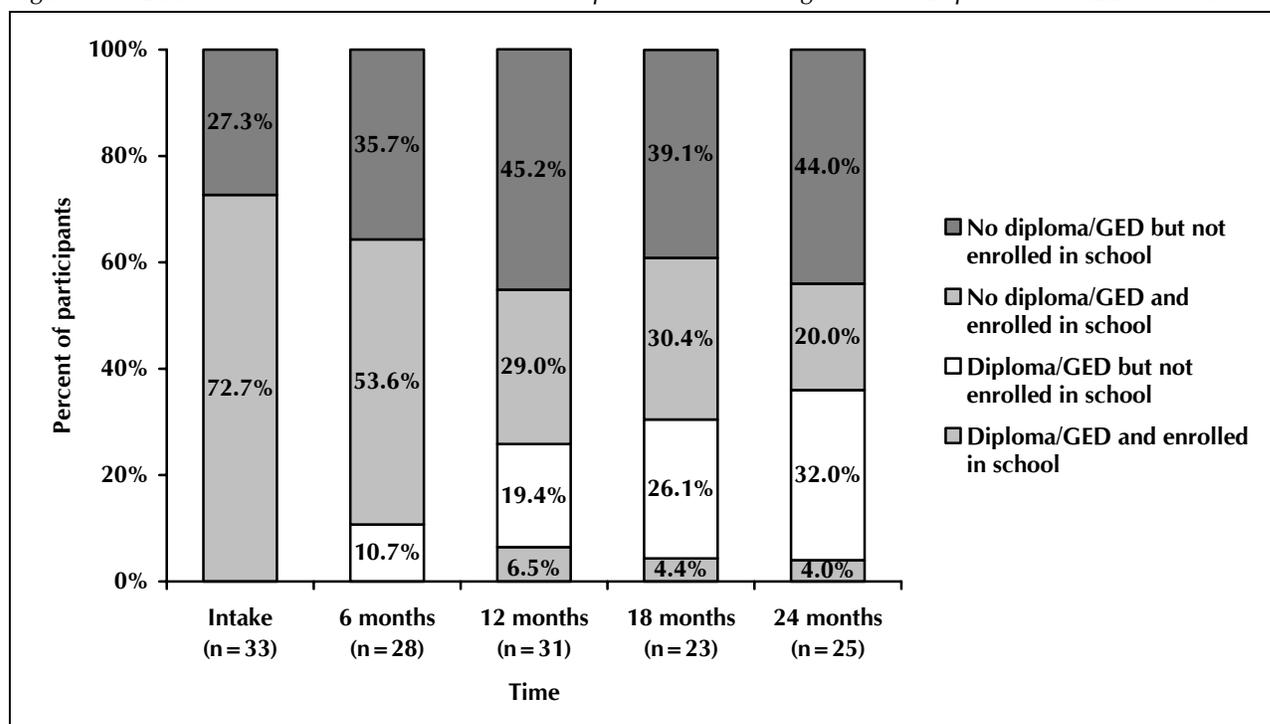
	Wyoming NFP Graduates				National NFP Graduates			
	Number	Missing	Frequency	Percent	Number	Missing	Frequency	Percent
At 6 months	76	20	1	2	5,879	963	190	4.0
At 12 months	76	19	9	16	5,879	1,295	601	13.0
At 18 months	76	24	16	31	5,879	2,124	807	21.0
At 24 months	73	31	19	45	5,739	2,273	1,169	34.0

Education status and enrollment in school are other factors to consider when looking at participants' life course development. Home visitors work with participants to set educational and career goals, including completion of a high school diploma or GED. Figure 6 tracks those participants who entered the program without a high school diploma or GED in terms of diploma/GED completion and school enrollment.

Figure 6 demonstrates that of the Wyoming NFP participants who entered the program without a high school diploma/GED, 73% were enrolled in school at program entry, while 27% were not enrolled. As participants progressed through the program from program entry to 12 months after the birth of their child, an increasing percentage were *not* enrolled in school. This trend reversed as a greater percentage of women returned to school or received their diploma/GED by 18 or 24 months after the birth of their child.

The percent of participants earning their diploma/GED increased over time and by program completion 36% of those participants who entered the program with no high school diploma/GED had completed their diploma/GED. Also at program completion, 4% were pursuing education beyond high school, and 20% had not completed their diploma/GED but were enrolled in school.

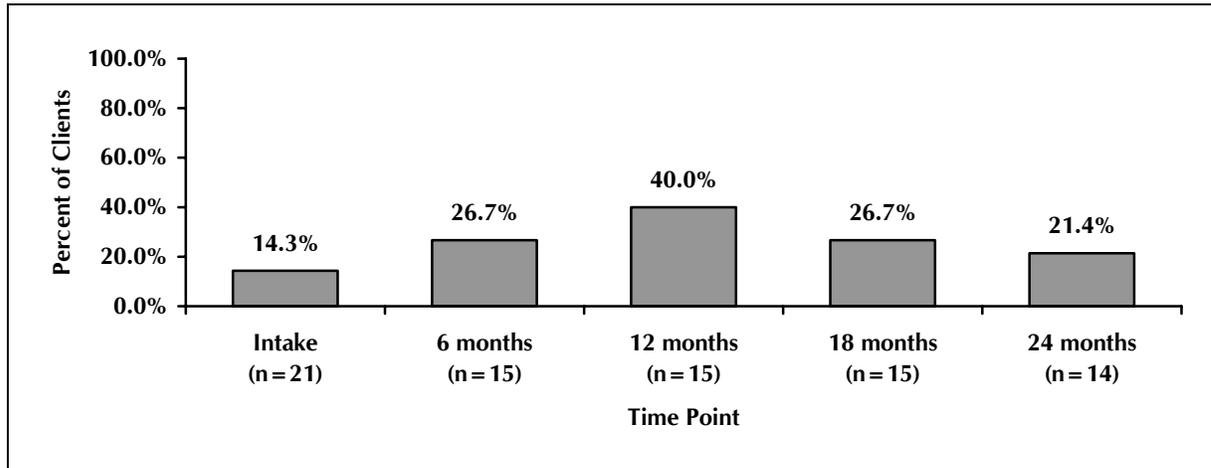
Figure 6. Education Status over Time for Participants with No High School Diploma or GED at Intake



N = 34

For those with a high school diploma or GED at program entry, 14-40% of participants were enrolled in further education at various times (Figure 7).

Figure 7. Enrollment in School over Time for those with a High School Diploma or GED at Intake



N = 22

Participation in the workforce is another area that is tracked as an indicator of the mother’s life course development. For those who have graduated from the program the percentage participating in the workforce at different time points and the amount of time spent in the workforce are considered.

Figure 8 and Table 16 note the percent of participants in the workforce over time broken down by age. For those 18 years or older, 67% of participants were working at program entry and 44% were working when their child turned two years old. For those 17 years or younger, 32% were working at program entry and 64% were working when their child was 2 years old.

Figure 8. Percentage in Workforce over Time Stratified by Age

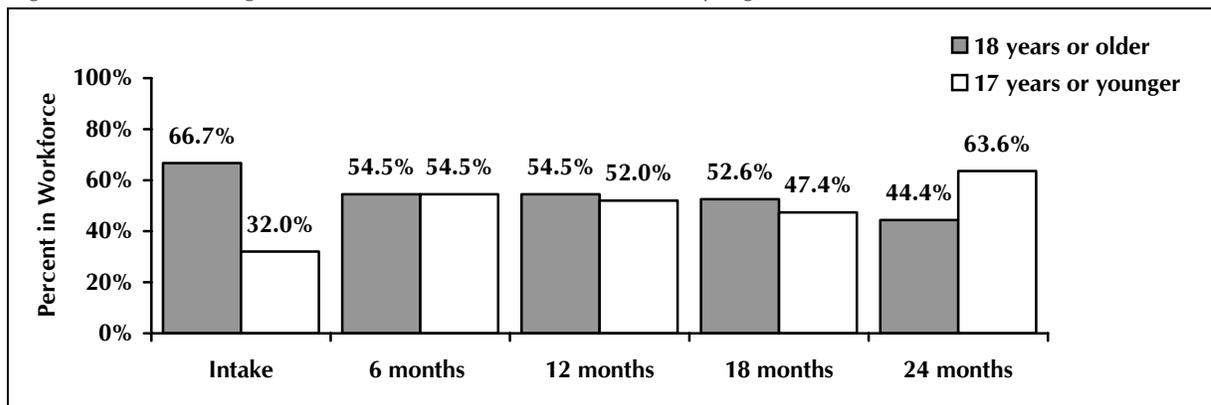
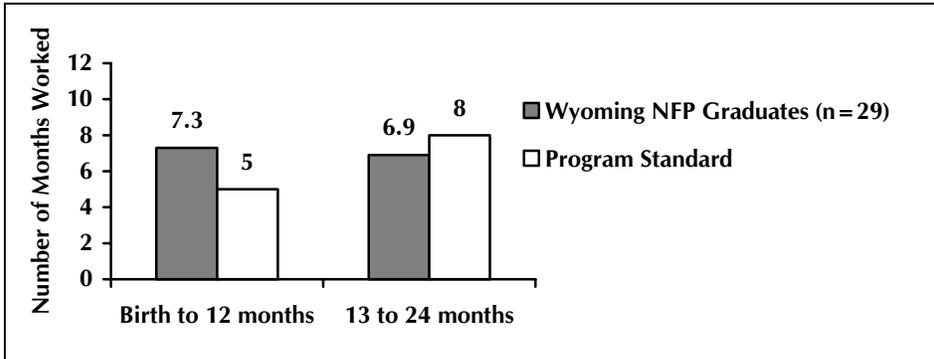


Table 16. Workforce Participation over Time Stratified by Age

	Intake	6 Months	12 Months	18 Months	24 Months
17 years or younger at intake					
n	8	12	13	9	14
% Working	32.0	54.5	52.0	47.4	63.6
18 years or older at intake					
n	16	12	12	10	8
% Working	66.7	54.5	54.5	52.6	44.4

The number of months a participant works during the first (0-12 months) and second (13-24 months) postpartum years is also tracked. The average number of months Wyoming NFP graduates worked is noted in Figure 9. During the first postpartum year Wyoming NFP graduates worked an average of over 7 months, more than the program standard of five months for this time frame. During the second postpartum year, graduates worked an average of nearly seven months, slightly below the program standard for this time period.

Figure 9. Number of Months Worked



Marital status of participants is collected at program entry and every six months after the birth of the participant’s child. Marital status is considered with regard to life course development as an indicator of movement toward establishment of stable relationships. As demonstrated in Figure 10, the percentage of participants who were married increased from 18% at intake to 36% at 24 months of infant age. Further details are provided in Table 17.

Figure 10. Marital Status over Time

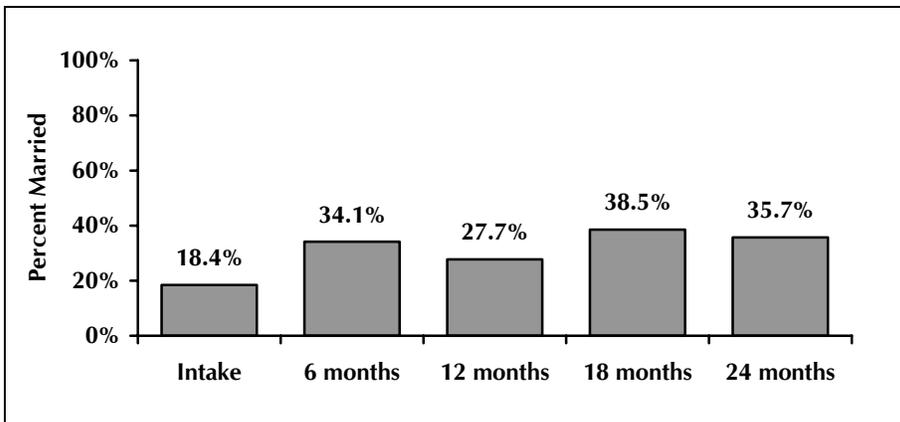


Table 17. Marital Status from Program Intake to Program Completion

	Intake	6 Months	12 Months	18 Months	24 Months
n	9	15	13	15	15
% Married	18.4	34.1	27.7	38.5	35.7

Wyoming NFP participants were asked to report their use of publicly supported government assistance programs at intake and 6, 12, 18, and 24 months infant age. This information is presented in Figure 11 and Table 18 below. For Wyoming NFP graduates, WIC use increased from intake to six months before dropping at 12, 18 and 24 months. Medicaid use followed a similar pattern, with an initial

increase in use followed by a decrease at 12 and 18 months of age. Food stamp use increased from program entry to six months and remained fairly consistent until program completion, while TANF use remained quite low throughout participants' time in the program.

Figure 11. Change in Government Assistance Use: Program Intake to 24 months of Infant Age

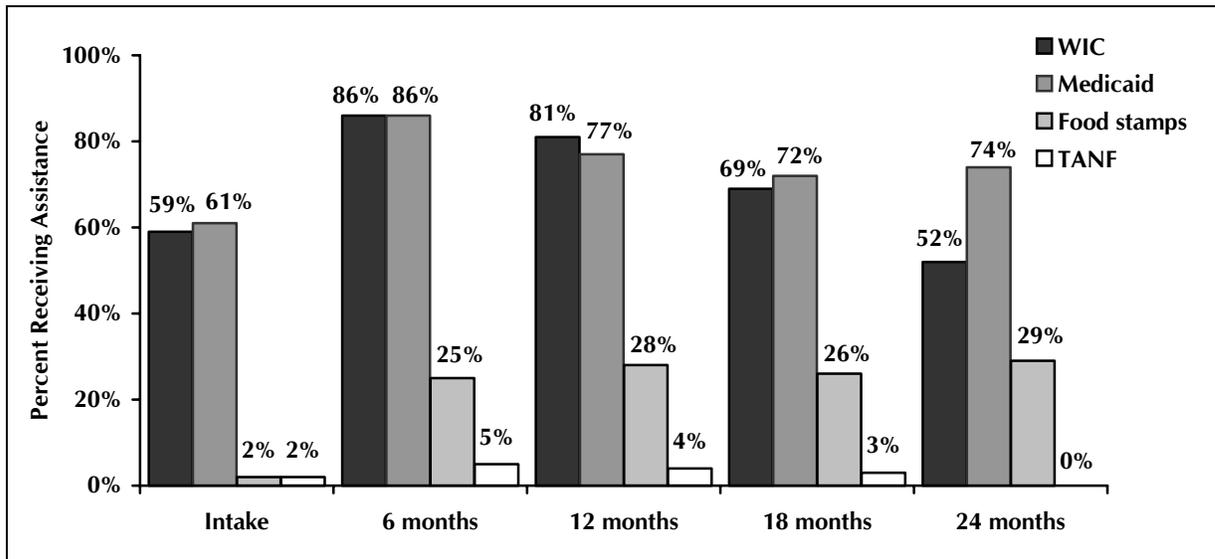


Table 18. Percentage Receiving Government Assistance from Intake to 24 Months of Infant Age

	Intake	6 Months	12 Months	18 Months	24 Months
WIC	59	86	81	69	52
Medicaid	61	86	77	72	74
Food Stamps	2	25	28	26	29
TANF	2	5	4	3	0

PART II:
COMPARISON OF WYOMING NFP
COHORT 1 AND COHORT 2

COHORT COMPARISONS

The Wyoming NFP has been in operation for seven years, allowing for comparison of program implementation and selected outcomes between participants who entered during the earlier phase of program operation and participants who entered the program after the first three and a half years of operation. In the second part of this report, program and participant outcomes will be considered based on when a participant entered the program, comparing Cohort 1 (participants who entered the program between July 1996 and December 1999) and Cohort 2 (those who entered the program between January 2000 and August 2003). There are 162 participants in Cohort 1 and 639 participants in Cohort 2.

Participant characteristics will be noted, followed by comparisons of program, mother and infant outcomes. Data through the toddler phase of the program, or through 24 months of infant age, will be considered.

SOCIO-DEMOGRAPHIC INFORMATION

Table 19 notes various demographic characteristics of the participants in Cohorts 1 and 2, with statistically significant differences in numerous demographic characteristics. Those in Cohort 2 were significantly older with a higher level of education, a greater number of participants who had completed high school, and greater number of participants who were enrolled in school at program entry. More participants in Cohort 2 were married at intake and a greater percentage were first time mothers. Additionally, the racial/ethnic distribution of participants varied between those who entered the program earlier and those who entered later in program operations. Regarding economic indicators, those in Cohort 2 were more likely to be receiving WIC and Food Stamps at program entry and fewer were working at intake than those in Cohort 1. Those in Cohort 2 also had smaller households and the composition of households differed between Cohort 1 and Cohort 2.

Table 19. Characteristics of Participants at Program Entry by Cohort

	Cohort 1 Participants	Cohort 2 Participants	National NFP Participants
Number Enrolled	162	639	37,477
Demographic Characteristics			
Maternal age (mean years)*	17	19	19
Maternal education (mean years)*	10	11	11
Completed high school*	14%	45%	47%
School Enrollment*	41%	60%	
Unmarried*	91%	82%	79%
First-time mothers*	73%	98%	97%
Race/Ethnicity*			
Hispanic	20%	9%	18%
Native American	10%	7%	6%
African American/black	1%	1%	18%
Non-Hispanic white	64%	75%	51%
Multiracial/other	4%	8%	5%
Asian	0%	1%	1%
Economic Factors			
Annual household income (median)	\$13,500	\$13,500	\$13,500
Unemployed	70%	62%	64%
Use of Government Assistance			
WIC*	30%	71%	73%
Medicaid	72%	75%	61%
Food stamps*	4%	15%	15%
TANF	11%	10%	6%
Household Size			
Number in household (mean)*	3.9	3.3	3.5
Household Composition*			
Lives alone	1%	6%	6%
Lives with husband/boyfriend	18%	42%	38%
Lives with mother	67%	40%	40%
Lives with others	13%	12%	15%

*Statistically significant at $P < .05$ for difference between Cohort 1 and Cohort 2

As noted in Part I of this report, maternal mental health and sense of mastery are measured at intake. As seen in Table 20, significantly more participants in Cohort 2 than Cohort 1 had mental health scores greater than 3.0.

Table 20. Psychosocial Participant Characteristics by Cohort

	Cohort 1 (N = 162)	Cohort 2 (N = 639)
Percent with mental health score greater than 3.0*	73%	82%
Percent with mastery score greater than 3.0	52%	54%

*Statistically significant at $P < .05$ for difference between Cohort 1 and Cohort 2

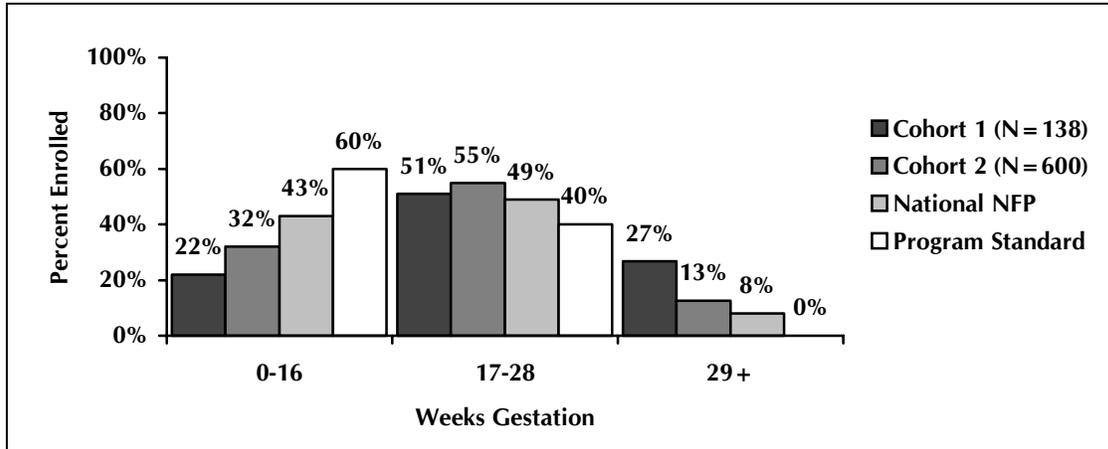
PROGRAM IMPLEMENTATION

As a program progresses and matures, one might expect to see operational differences due to greater understanding of program goals, specific quality improvement efforts, or other administrative initiatives. Differences between early and later program operations are considered below and include gestational age at enrollment, reasons for dropping from the program, number and duration of home visits, and content of visits.

GESTATIONAL AGE AT ENROLLMENT

Figure 12 presents information on when participants entered the program during their pregnancies for Cohort 1, Cohort 2, national NFP participants and provides program standards. The distribution of when participants entered the program differs significantly between Cohort 1 and Cohort 2 with fewer clients entering the program early in Cohort 1 than Cohort 2.

Figure 12. Gestational Age at Enrollment by Cohort



REASONS PARTICIPANTS DROPPED FROM THE PROGRAM

Table 21 notes the reasons participants dropped from the program during pregnancy and infancy for both cohorts. The attrition rate for Cohort 2 is slightly higher than that for Cohort 1 during pregnancy and infancy, but is lower during toddlerhood.

Table 21. *Reasons Participants Dropped by Cohort*

	Cohort 1		Cohort 2	
	Frequency	Percent	Frequency	Percent
Pregnancy				
Declined further participation	6	4.3	19	3.5
Excessive missed appointments	0	0.0	2	0.4
Unable to locate	1	0.7	2	0.4
Moved out of service area	3	2.1	19	3.5
Miscarry/death	1	0.7	12	2.2
Maternal Death	0	0.0	1	0.2
Unable to provide services	0	0.0	5	0.9
No visits for > 180 days	4	2.9	13	2.4
Total	15	10.7	73	13.3
Infancy				
Declined further participation	26	18.6	54	15.7
Excessive missed appointments	4	2.9	16	4.6
Unable to locate	4	2.9	16	4.6
Moved out of service area	20	14.3	41	11.9
Miscarry/death	4	2.9	1	0.3
Child not in custody	1	0.7	13	3.8
Unable to provide services	2	1.4	12	3.5
No visits for > 180 days	1	0.7	9	2.6
Total	62	44.3	162	47.0
Toddler				
Declined further participation	11	7.9	3	1.9
Excessive missed appointments	2	1.4	6	3.8
Unable to locate	1	0.7	5	3.1
Moved out of service area	14	10.0	4	2.5
Miscarry/death	0	0.0	1	0.6
Child not in custody	1	0.7	1	0.6
Unable to provide services	0	0.0	2	1.3
No visits for > 180 days	2	1.4	0	0.0
Total	31	22.1	22	13.8

NUMBER AND DURATION OF COMPLETED NURSE HOME VISITS

Table 22 shows the number and duration of completed home visits for both cohorts and the program standard. As can be seen for both the pregnancy and infancy phases of the program, Cohort 1 had a greater number of expected visits completed than Cohort 2, though the average number of visits received by participants was not consistently higher for one cohort or the other. The average number of visits per participant and the percent of expected visits completed is the same for both cohorts during toddlerhood.

Table 22. Number and Duration of Completed Nurse Home Visits by Cohort

	Cohort 1		Cohort 2		Program Standard
	Number	Average	Number	Average	
Pregnancy					
Pregnancy Completed	140	-	548	-	-
Completed Visits	959	6.9	4,059	7.4	-
Expected Visits	1,379	-	6,266	-	-
Percent of expected visits completed	-	80	-	70	80
Attempted Visits	142	1.0	497	0.9	-
Average Visit Length (Minutes)	-	73.6	-	74.1	≥ 60 minutes
Average Total Contact Time (Minutes)	-	507	-	549	-
Infancy					
Infancy Completed	140	-	345	-	-
Completed Visits	1,436	10.3	3,156	9.1	-
Expected Visits	3,924	-	9,902	-	-
Percent of expected visits completed	-	40	-	30	65
Attempted Visits	236	1.7	691	2.0	-
Average Visit Length (Minutes)	-	66.7	-	69.8	≥ 60 minutes
Average Total Contact Time (Minutes)	-	706	-	642	-
Toddlerhood					
Infancy Completed	140	-	159	-	-
Completed Visits	526	3.8	598	3.8	-
Expected Visits	2,835	-	3,282	-	-
Percent of expected visits completed	-	20	-	20	60
Attempted Visits	94	0.7	179	1.1	-
Average Visit Length (Minutes)	-	67.2	-	66.6	≥ 60 minutes
Average Total Contact Time (Minutes)	-	258	-	246	-

*Not applicable

CONTENT OF HOME VISITS

The program standards for content of home visits reflect the variation in developmental needs of participants as they move through program phases. Different emphases are stressed depending of the stage of a mother's pregnancy or age of the child. Table 23 notes the time spent on each domain area by cohort and includes the program standards for percentage of time spent on different domains.

Wyoming NFP participants continue to receive the program content needed. Only time spent on development of the maternal role during infancy is lower than the program standard, while time spent on the same content area during toddlerhood is approaching the standard.

Table 23. Average Percent of Nurse Visit Time Spent on Each Domain for Pregnancy and Infancy by Cohort

	Cohort 1	Cohort 2	Standard
Pregnancy	N = 138	N = 545	
Personal Health	38.0	38.1	35-40
Environmental Health	8.2	9.0	5-7
Life-course Development	13.9	11.9	10-15
Maternal Role	24.5	26.1	23-25
Friends & Family	13.6	14.7	10-15
Infancy	N = 109	N = 285	
Personal Health	21.1	22.2	14-20
Environmental Health	9.1	9.9	7-10
Life-course Development	17.4	13.2	10-15
Maternal Role	38.7	40.2	45-50
Friends & Family	12.3	14.4	10-15
Toddlerhood	N = 53	N = 52	
Personal Health	15.0	20.3	10-15
Environmental Health	11.1	11.7	7-10
Life-course Development	23.1	16.9	18-20
Maternal Role	37.6	36.8	40-45
Friends & Family	12.5	14.3	10-15

PARTICIPANT OUTCOMES

Changes in program implementation over time may affect outcomes for program participants. Outcomes for mothers by cohort are noted below including changes in smoking, subsequent pregnancies, and workforce participation. Outcomes for infants include prematurity and low birth weight status and immunizations.

CHANGE IN MATERNAL HEALTH HABITS

When considering Table 24 we note that significantly fewer participants in Cohort 2 reported smoking at 36 weeks when compared to intake, while no significant change was noted for Cohort 1 for the same time period.

Table 24. Change in Percent Smoking by Cohort over Time

Pregnancy	Percent at Intake	Percent at 36 Weeks Pregnancy	Relative Percent Change
Cohort 1, (N = 110, missing = 68)			
Cigarette smoker	26.2	19.0	-27
Smoked 5+ cigarettes	2.4	4.8	100
Cohort 2, (N = 441, missing = 137)			
Cigarette smoker	27.0	20.7	-23*
Smoked 5+ cigarettes	12.8	10.5	-18

*Statistically significant at $P < .05$

Home visitors also work with those participants who are not willing or able to quite smoking to decrease the number of cigarettes they smoke per day. Cohort 1 and 2 showed significant decreases of 5.0 and 3.3 respectively in the number of cigarettes smoked per day.

Table 25. Change in Number of Cigarettes Smoked per Day during Pregnancy
(Among Those Who Smoked 5 or More Cigarettes per Day at Program Entry) by Cohort

	Number of Participants	Missing	Total Observations	Mean Change
Wyoming NFP Cohort 1	10	1	9	-5.0*
Wyoming NFP Cohort 2	62	39	23	-3.3*
National NFP	2,109	429	1,680	-2.4*
Program Standard	-	-	-	-3.5

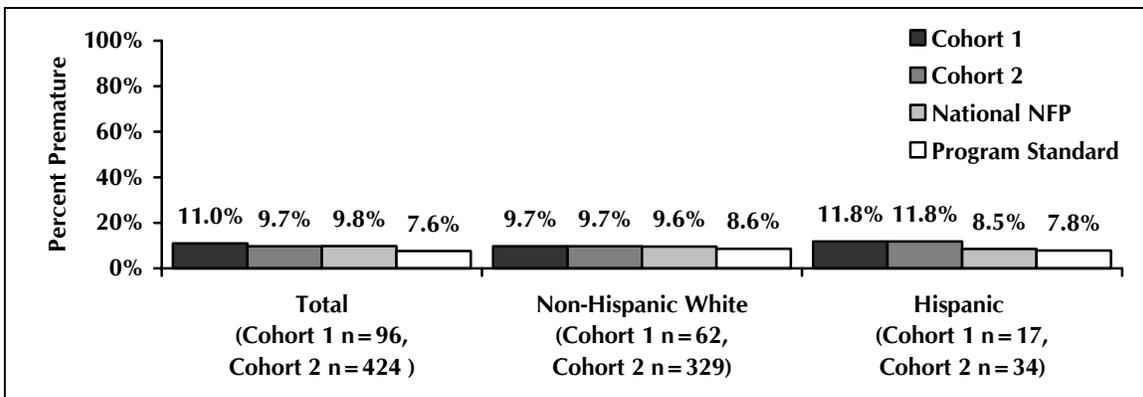
*Statistically significant at $p < .05$

BIRTH OUTCOMES

Home visitors work with mothers throughout their pregnancies on a range of issues that affect their health and wellbeing as well as that of their baby’s. Birth outcomes help measure the impact of the program and include rates of prematurity and low birth weight. Later on in the child’s development immunizations are also tracked. Information on these outcomes is noted by cohort.

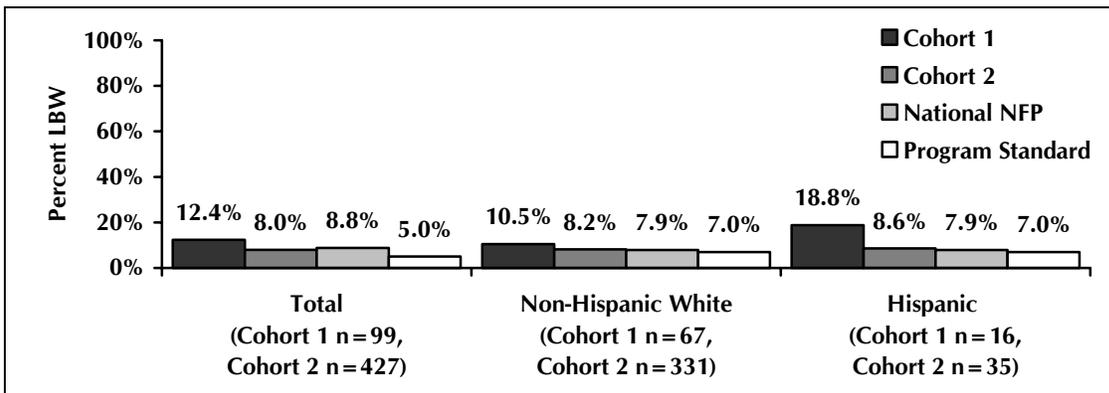
As can be seen in Figure 13, there are no significant differences in the premature rates for Cohort 1 and Cohort 2, though the premature rate for Cohort 2 is lower than that for Cohort 1. Figure 13 also contains the rates of prematurity for non-Hispanic Whites and Hispanics, the largest ethnic groups in the Wyoming NFP. The rates for non-Hispanic Whites for both cohorts are comparable to the national NFP and slightly higher than the program standard. Rates for Hispanics for both cohorts are higher than the national NFP and the program standard.

Figure 13. Percentage of Premature Infants by Ethnicity and Cohort



While there are not significant differences between low birth weights rates for Cohort 1 and Cohort 2, the overall rate and the rates for the predominant race/ethnic groups are lower for Cohort 2 than Cohort 1. It should be noted that premature and LBW rates for Cohort 2 are more stable than those seen for Cohort 1 given the smaller sample size for the earlier cohort.

Figure 14. Percentage of Low Birth Weight Infants by Ethnicity and Cohort



IMMUNIZATIONS

Figure 15 and Figure 16 note the 12 and 24 month immunization rates for both cohorts. All immunizations rates are quite strong with only DPT/DTaP at 24 months falling below 90% for both cohorts.

Figure 15. Summary of Immunization Rates at 12 Months of Infant Age by Cohort

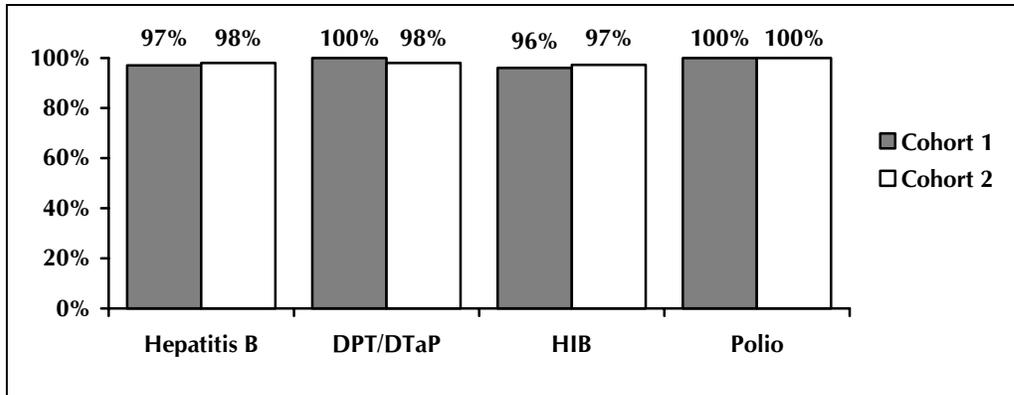
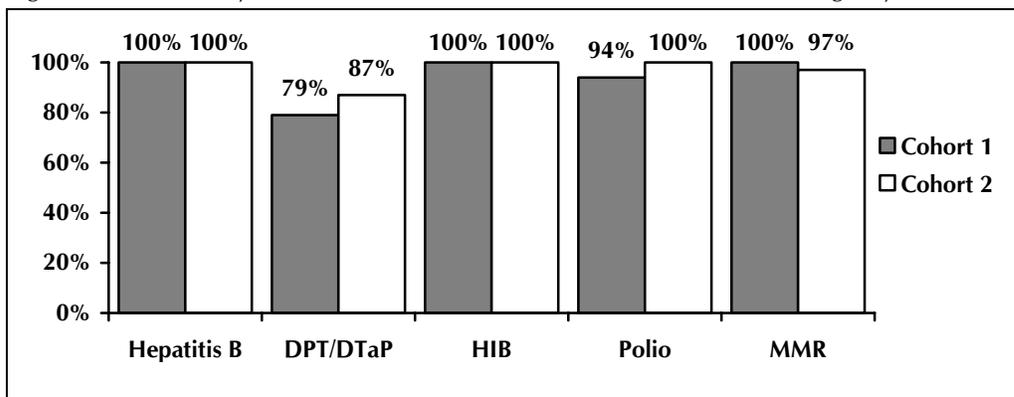


Figure 16. Summary of Immunization Rates at 24 Months of Infant Age by Cohort



MATERNAL LIFE COURSE DEVELOPMENT

Life course development issues receive greater program emphasis after the mother delivers her baby. This focus helps mothers with planning future education, employment and family growth. Subsequent pregnancies and participation in the workforce are two outcomes that address life course development.

As is seen in Table 26, subsequent pregnancies at six and 12 months were similar for Cohort 1 and Cohort 2. The program standard for the rate of subsequent pregnancies is 25% or less by the child’s second birthday.

Table 26. Subsequent Pregnancies at 6 and 12 months Postpartum by Cohort

	Cohort 1*				Cohort 2			
	Number	Missing	Frequency	Percent	Number	Missing	Frequency	Percent
At 6 months	79	41	0	0.0%	217	46	5	2.9%
At 12 months	54	20	5	14.7%	119	25	14	14.9%
At 18 months	-	-	-	-	60	15	11	24.4%
At 24 months	-	-	-	-	41	15	12	46.2%

*Due to the low number of participants in this analysis, there is not sufficient data for Cohort 1 at 18 and 24 months.

Figure 17 and Table 27 show the number and percent of participants working over time for both cohorts. For each cohort the percent of participants in the workforce remained fairly constant throughout their time in the program.

Figure 17. Workforce Participation from Program Entry to 24 Months of Infant Age by Cohort

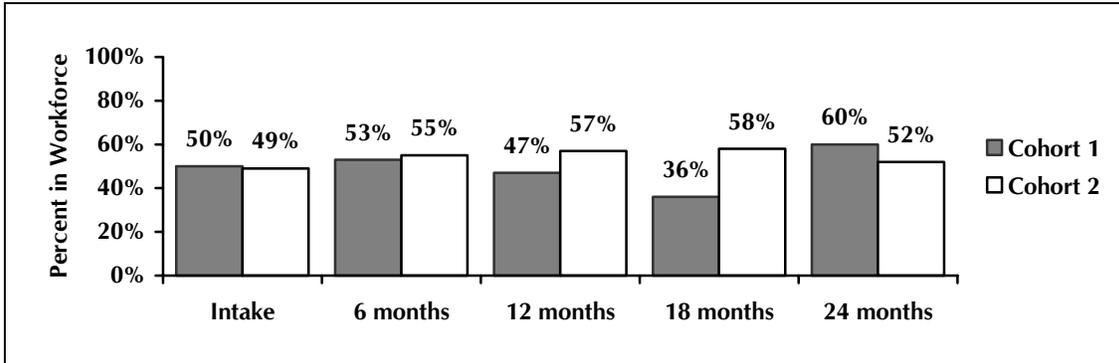
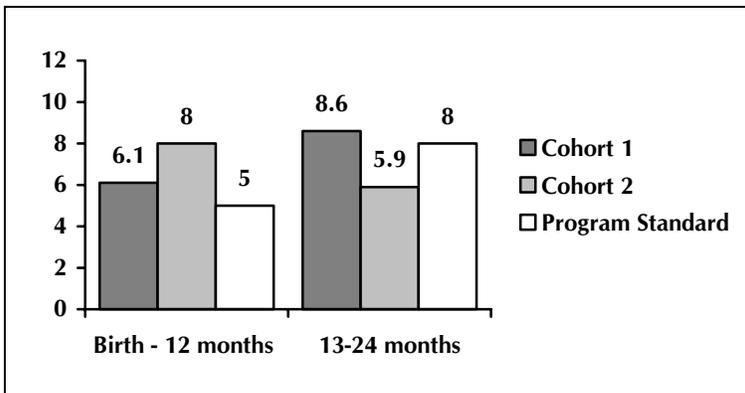


Table 27. Frequency and Percentage of Participants in the Workforce from Intake to 24 Months of Infant Age by Cohort

	Intake	6 Months	12 Months	18 Months	24 Months
Cohort 1					
N	16	15	17	14	15
Frequency	8	8	8	5	9
Percent	50	53	47	36	60
Cohort 2					
N	33	29	30	24	25
Frequency	16	16	17	14	13
Percent	49	55	57	58	52

Another consideration for the mother’s life course is the number of months she works after the delivery of her baby. As seen in Figure 18, participants in Cohort 2 worked more, on average, than those in Cohort 1 during the first postpartum year, while those in Cohort 1 worked more, on average, than those in Cohort 2 during the second post partum year.

Figure 18. Number of Months Worked by Cohort



SUMMARY

This comparison of Cohorts 1 and 2 of the Wyoming NFP indicates that over time the program is enrolling participants with slightly higher levels education and mental health ratings, and lower economic status. Women in Cohort 2 are older, live in smaller households, and are more likely to live with their husbands/boyfriends than those who enrolled earlier in program operations.

The program is making improvements in program implementation in terms of attrition during toddlerhood, though attrition increased during the pregnancy and infancy phases of the program. Additional strengths include the observation that participants enrolled in later program operations continue to receive the program content needed and are enrolled in the program earlier in their pregnancies. An area for consideration is the percent of expected visits completed, as this decreased for those in Cohort 2 compared to Cohort 1.

Improvements were also seen with the number of women smoking between intake and the birth of their child through a statistically significant decrease for Cohort 2, while no significant decrease was noted for Cohort 1. Premature and LBW rates are also lower for later phases of program operations.

CONTACTS

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APPENDIX: SITE PERFORMANCE STANDARDS

The has drafted standards to help Nurse-Family Partnerships track their fidelity to the model and monitor program outcomes related to common indicators of maternal, child and family functioning. The standards have been drawn from the program's research trials, early dissemination experiences, and current national health statistics (e.g., National Center for Health Statistics, Centers for Disease Control and Prevention; Healthy People 2010). The standards are intended to provide guidance for quality improvement efforts and long-term targets for sites to achieve over time.

While staff has given careful thought in crafting these standards, they are being offered in provisional form because they are, after all, the first iteration of benchmarks for guiding program performance. Staff will continue to review national trends emerging from CIS data, as well as changes in national indicators of relevant maternal, child and family functioning, to identify areas where the standards may need to be modified. Equally important will be sites' own experiences in working with the standards during the next year. It will be important to understand from actual experience what may need to be added or dropped from the standards, for them to be as useful as possible in supporting efforts to continue to improve the performance of the NFP, both nationally and in each and every site.

OBJECTIVE 1: Site demonstrates fidelity to basic elements of program model.

Related Site Performance Standards:

- A. Program is reaching the intended population of low-income, first-time mothers.
 - 75% of eligible referrals are enrolled in the program
 - 100% of enrolled women are first-time mothers (no previous live birth)
 - 60% of pregnant women are enrolled by 16 weeks gestation or less
- B. Program attains overall enrollment goal and recommended caseload of 25 for all full-time nurses within 8-9 months of program operation.
- C. Program successfully retains participants in program through child's second birthday.
 - Cumulative program attrition is 40% or less through the child's second birthday, e.g.,
 - 10% or less for pregnancy phase
 - 20% or less for infancy phase
 - 10% or less for toddler phase

Although attrition rates at sites when home visitors are first learning the program model (i.e., initial three year program cycle) may exceed the target goals defined above, we believe that program staff needs to carefully attempt to develop strategies to fully engage participants in the program through the child's second birthday. In examining current rates of attrition among our national sample of NFP participants, we note considerable variability among sites, with an overall average of about 65% attrition through the child's second birthday (15% pregnancy, 33% infancy, and 17% toddler). Thus, we have established an intermediate goal of reducing attrition nationally by 12-15% over the next five years.

To encourage progress toward this intermediate goal, we encourage individual sites to work toward reducing participant attrition by 2-3% each year, targeting those reasons why participants drop out of the program early that are likely to be most amenable to change (e.g., declined further participation, missed appointments resulting in agency discharge, failure to notify agency of address changes resulting in home visitor being unable to locate them for follow-up, etc.)

- D. Home visitors maintain established frequency of visits with families, such that
 - Completed/Expected visit ratio is 0.80 or greater for pregnancy phase
 - Completed/Expected visit ratio is 0.65 or greater for infancy phase
 - Completed/Expected visit ratio is 0.60 or greater for toddler phase
- E. On average, length of home visits with participants is ≥ 60 minutes.
- F. Content of home visits reflects variation in developmental needs of participants across program phases, i.e.,

Mean Proportion of Time on Content Domains during Pregnancy	
Personal Health	35-40%
Environmental Health	05-07%
Life Course Development	10-15%
Maternal Role	23-25%
Family and Friends	10-15%
Mean Proportion of Time on Content Domains during Infancy	
Personal Health	14-20%
Environmental Health	07-10%
Life Course Development	10-15%
Maternal Role	45-50%
Family and Friends	10-15%
Mean Proportion of Time on Content Domains during Toddlerhood	
Personal Health	10-15%
Environmental Health	07-10%
Life Course Development	18-20%
Maternal Role	40-45%
Family and Friends	10-15%

OBJECTIVE 2: Site demonstrates attainment of outcomes for target population that are comparable to benchmarks drawn from RCTs and/or national health statistics.

Related Site Performance Standards:

- A. Change in smoking during pregnancy for women who were smokers at enrollment into the program demonstrate:
 - 20% or greater reduction in the percent of women who smoked from intake to 36 weeks pregnancy
 - On average, 3.5 cigarette reduction in no. of cigarettes smoked between intake and 36 weeks pregnancy among women who smoked 5 or more cigarettes per day at intake
- B. Percent of premature and low birth weight infants demonstrate progress toward Healthy People 2010 objectives, e.g., 7.6 percent premature births and 5% low birth weight infants.

The national target goals listed above are for all women of childbearing age. Participants enrolled in the Nurse-Family Partnership typically are at higher risk for having premature and low birth weight infants because, on average, they are younger, low income, less educated, primigravidas drawn from diverse racial and ethnic populations. While it is a national goal to eliminate disparities in health outcomes among populations, health statistics for women from minority and economically disadvantaged populations currently demonstrate the existence of disparities in rates of premature

and low birth weight infants. Thus, the progress that NFPs realistically can achieve in reaching Healthy People 2010 objectives may vary based on the composition of the population served.

To help sites monitor their progress toward the longer-term target goals for 2010, we have established intermediate goals for 2006 based on the racial/ethnic distribution of participants served. The intermediate targets presented in the table below were established by analyzing data from our national dissemination database (N=19,850 NFP participants) and setting a target goal for each racial/ethnic population that represents a 10% reduction in our currently observed rates of prematurity and low birth weight for that population. *If a site has already achieved the goals presented in the table, we encourage that they target site-specific goals that are 10% below their current percentages for premature and low birth weight infants among their NFP participants.*

Racial/Ethnic Status	% Premature Infants	% Low Birth Weight Infants
Asian	8.0	8.0
African American	11.0	12.0
Hispanic	7.8	7.0
Native American	8.3	6.8
Non-Hispanic White	8.6	7.0
Mixed Racial/Ethnic	8.0	6.0

- C. Rate of subsequent pregnancies within two years following birth of infant is 25% or less.
- D. Rates of completion for all recommended immunizations are 90% or greater by time child is two years of age.
- E. Percent of toddlers who fall below the 10th percentile on the MacArthur CDI for acquisition of language skills for their age and gender is 25% or less.
- F. Mean number of months women (18 years or older) employed following birth of infant is:
- 5 months from birth to 12 months
 - 8 months from 13 to 24 months