

# RESEARCH BRIEF: NURSE-FAMILY PARTNERSHIP

## ABSTRACT

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This brief summarizes the research evaluating the Nurse-Family Partnership (NFP). Under the NFP, nurses make home visits to first-time mothers during the last two trimesters of pregnancy and during the first two years of infancy. The nurses provide information and help mothers form plans to achieve their goals. Three blind, randomized treatment-control studies were conducted to evaluate the effectiveness of the NFP; these studies resulted in thirteen papers measuring the impact of the NFP on mothers and children up to fifteen years after childbirth.

The methodology used to study the NFP has been first-rate. Based on an analysis of all the papers, the findings are classified into four categories. There is **no empirical evidence** that the NFP has a positive or negative impact on: birthweight of the child, length of gestation, preterm delivery, child's IQ, mother's educational attainment, or the amount of time the mother was employed. There is **conflicting empirical evidence** about whether the NFP had a positive impact on: the number of future pregnancies, the amount of time the mother spent on welfare, whether the mother got married, and whether the child was abused. There is **some empirical evidence** that the NFP had a positive impact on: the mother's awareness of pregnancy services, some measures of children's mental ability, and reducing the number of home hazards; for high-risk children and mothers there were some positive NFP impacts on criminality. There is **convincing empirical evidence** that the NFP reduced: the amount mothers smoked during pregnancy, the number of dangerous ingestions by children, and the number of days children were hospitalized. In general, there is some evidence that the NFP may be especially beneficial for mothers and children with more risk factors.

## Background<sup>1</sup>

- The mission of the Nurse-Family Partnership (NFP) is to improve the health and well-being of low-income, first-time parents and their children
- The program has three major goals:
  1. Improve pregnancy outcomes by helping women practice sound health-related behaviors, including prenatal care, diet, and reduced use of tobacco, alcohol, and drugs
  2. Help parents with child care to improve children's health and development
  3. Help parents develop vision, continue education, and find jobs
- The NFP has grown to more than 150 sites in 20 states, serving over 20,000 families annually; currently there is no site in Wisconsin
- The program is administered by nurses whose caseload does not exceed 25 mothers; nurses are used because they are respected and have relevant training<sup>2</sup>
- Optimally, nurse visits begin early in the second trimester and continue until the child's second birthday
- The NFP seeks to modify specific risks that are associated with negative outcomes such as: child abuse and neglect, poor birth outcomes, injuries, and compromised parental life course
- Nurses try to make 14 visits during pregnancy and 28 visits during infancy; the nurses: provide information, encourage family members to help, help mothers envision a future consistent with their values and goals, and help mothers evaluate contraception, childcare options, and career choices
- Currently, funding for the program comes from: states, counties, Medicaid, federal block grants, Temporary Assistance for Needy Families (TANF), tobacco settlement funds, and private foundations
- The NFP is estimated to cost about \$8600 per family in 2005 dollars<sup>3</sup>

## Research

- The NFP has conducted three blind<sup>4</sup> treatment-control group studies and followed both the mothers and children for up to 15 years; the participants were all first-time mothers and almost all had "at-risk" factors such as: being a single parent, being a high-school dropout, or living in poverty
- In all of the studies, the "control" group did receive some free services (e.g. transportation to doctor's office or prenatal screening) and thus the baseline in these studies is best labeled "minimal treatment" rather than "no treatment"

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<sup>1</sup> Most of this information comes from the NFP website: [www.nursefamilypartnership.org](http://www.nursefamilypartnership.org).

<sup>2</sup> A study was conducted comparing the outcomes under paraprofessional-administered and nurse-administered programming. Outcomes were consistently better in nurse-administered.

<sup>3</sup> "Prenatal and Infancy Home Visiting by Nurses: From Randomized Trials to Community Replication." *Prevention Science*. 2002, p. 168. The dollar amount was adapted for inflation using the Consumer Price Index.

<sup>4</sup> Since the mothers obviously know whether they received visits from nurses, the study could not be double-blind. However, the interviewers did not know what treatment group the mother and child were in when they conducted the evaluation (single-blind).

- The attrition rates were typically low and there were no large differences in attrition rates between groups; for example, after fifteen years, one study had attrition rates of less than 23 percent
- All studies focused on mothers and children who are more likely to have problems because they have at least one risk factor, such as: being unmarried, being a high-school dropout, being a teenager, being unemployed or low-income
- The first study took place in Elmira (New York) a rural region in Appalachia where the vast majority of participants were white; the second study took place in Memphis (Tennessee) where the vast majority of participants were African-American, and the third study took place in Denver (Colorado) where a plurality of mothers were Latina
- These three studies have resulted in 13 published peer-reviewed papers, typically published in very good medical journals
- The multiple studies and measurement at multiple times means that it is possible to see whether the program increased maternal employment in different groups of women after different periods of time
- Although the experimental methodology is first-rate, the statistically significant results must be interpreted cautiously because some papers measured treatment effects for over 20 possible outcomes and often at least one particular subgroup was also examined;<sup>5</sup> statistical tests lose validity when no corrections are made for conducting multiple significance tests and consequently the most convincing results are the ones where multiple studies using different data find the same significant results<sup>6</sup>
- Based on all the papers, I divided the results into four categories
  1. Outcomes where there is no evidence that the NFP has beneficial effects (i.e. outcomes where no study/studies finds a significant difference between NFP and control groups and at least one study finds no significant difference between NFP and control groups)<sup>7</sup>
  2. Outcomes where there is conflicting evidence that the NFP has beneficial effects (i.e. outcomes where at least one study finds a significant

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<sup>5</sup> Some studies also used different factorial designs and included different covariates in their empirical model. While there are valid reasons for switching designs and models, different empirical models can cause different results to be statistically significant.

<sup>6</sup> Literally, a conventional statistically significant test result means: assuming that the NFP did not have a positive effect, there is less than a five percent chance the data would have shown the large positive effect we observed (and since that is unlikely we assume the NFP caused the effect). Of course, if you conduct significance tests on many different outcomes or subgroups, the chance that at least one of them will have a “statistically significant result” is much greater than five percent. There are statistical procedures to correct for multiple tests, but unfortunately such procedures were not used in these papers. To illustrate the perils of many significance tests, some studies actually found a significant negative impact of the NFP; I do not believe that the NFP actually caused any bad outcomes, but when many statistical tests are conducted, there is a large probability that there will be some significant differences even when the treatment does not have a true impact.

<sup>7</sup> I classify outcomes in this category even if one study found a statistically significant difference for a particular subgroup. Based upon the sheer number of statistical tests conducted in each paper, one would expect significant results among subgroups even if the NFP had no real impact.

- difference between the NFP and control group but another study or other studies finds no significant difference between NFP and control groups)
3. Outcomes where there is some evidence that NFP has beneficial effects (i.e. only one study finds a significant difference between NFP and control groups and there are no studies that do not find a significant difference)
  4. Outcomes where there is convincing evidence that NFP has beneficial effects (i.e. outcomes where at least two studies find significant differences between NFP and control groups and no study fails to find a difference between NFP and control groups)

#### No Empirical Evidence that NFP has Beneficial Effects

- Two studies with two different samples found no significant differences between NFP and control groups in either birthweight or length of gestation<sup>8</sup>
- There were no significant differences between NFP and control groups in mothers' gestational weight gain, number of preterm deliveries, Apgar scores, or the number of prenatal hospitalizations<sup>9</sup>
- There were no significant differences between NFP and control groups in problems during pregnancy or maternal alcohol consumption during pregnancy<sup>10</sup>
- There were no significant differences between NFP and control groups in children's IQ scores (measured two years and four years after childbirth)<sup>11</sup>
- There were no significant differences between NFP and control groups in parental neglect (measured two and four years after childbirth)<sup>12</sup>
- There were no significant differences between NFP and control group in mothers' educational attainment (measured two and four years after childbirth);<sup>13</sup> a second study with a different group of mothers, also found no significant differences in educational attainment (measured 4.5 years after childbirth);<sup>14</sup> and a third study

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<sup>8</sup> "Improving the Delivery of Prenatal Care and Outcomes of Pregnancy: A Randomized Trial of Nurse Home Visitation." *Pediatrics*. 1986. "Effect of Prenatal and Infancy Home Visitation by Nurses on Pregnancy Outcomes, Childhood Injuries, and Repeated Childbearing." *Journal of the American Medical Association*. 1997.

<sup>9</sup> Apgar is a test given to newborns and stands for Activity, Pulse, Grimace, Appearance, and Respiration. "Effect of Prenatal and Infancy Home Visitation by Nurses on Pregnancy Outcomes, Childhood Injuries, and Repeated Childbearing." *Journal of the American Medical Association*. 1997.

<sup>10</sup> NFP women did have significantly fewer kidney infections, but this was the exception as there were many findings of no difference between NFP and control mothers. "Improving the Delivery of Prenatal Care and Outcomes of Pregnancy: A Randomized Trial of Nurse Home Visitation." *Pediatrics*. 1986.

<sup>11</sup> "Does Prenatal Infancy Nurse Home Visitation have Enduring Effects on Qualities of Parental Caregiving and Child Health at 25-50 Months of Life" *Pediatrics*. 1994.

<sup>12</sup> "Does Prenatal Infancy Nurse Home Visitation have Enduring Effects on Qualities of Parental Caregiving and Child Health at 25-50 Months of Life" *Pediatrics*. 1994.

<sup>13</sup> "Improving the Life-Course Development of Socially Disadvantaged Mothers: A Randomized Trial of Nurse Home Visitation." *American Journal of Public Health*. 1988.

<sup>14</sup> "Enduring Effects of Nurse Home Visitation on Maternal Life Course." *Journal of the American Medical Association*. 2000.

- with a different group of mothers found no significant differences in educational attainment (measured two and four years after childbirth)<sup>15</sup>
- There were no significant differences between NFP and control groups in the amount of time mothers were employed (measured two and four years after childbirth);<sup>16</sup> a second study with a different group of mothers, also found no significant differences (measured 4.5 years and six years after childbirth);<sup>17</sup> a third study with a third group of mothers also found no significant differences in number of months worked (measured two and four years after childbirth)<sup>18</sup>

### Conflicting Empirical Evidence that NFP has Beneficial Effects

- **Later pregnancies/births**
  - Compared to control mothers, one study found that NFP mothers had significantly fewer subsequent births (measured two years after the first birth)<sup>19</sup>
  - Another study with a different sample found NFP mothers had fewer subsequent pregnancies and that the later pregnancies were spaced farther apart (measured 4.5 years and six years after the first birth)<sup>20</sup>
  - A third study with a third sample found no significant differences in subsequent pregnancies or time period between subsequent births (measured four years after childbirth),<sup>21</sup> however, another later paper with the same sample found that *high-risk* NFP mothers, compared to *high-risk* control mothers had significantly fewer subsequent pregnancies (measured 15 years after childbirth)<sup>22</sup>

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<sup>15</sup> “Home Visiting by Paraprofessionals and Nurses: A Randomized, Controlled Trial.” *Pediatrics*. 2002. “Effects of Home Visits by Paraprofessionals and by Nurses: Age 4 Follow-up Results of a Randomized Trial.” *Pediatrics*. 2004.

<sup>16</sup> “Home Visiting by Paraprofessionals and Nurses: A Randomized, Controlled Trial.” *Pediatrics*. 2002. “Effects of Home Visits by Paraprofessionals and by Nurses: Age 4 Follow-up Results of a Randomized Trial.” *Pediatrics*. 2004.

<sup>17</sup> “Enduring Effects of Nurse Home Visitation on Maternal Life Course.” *Journal of the American Medical Association*. 2000.

<sup>18</sup> This study did find that among a subgroup of poor, unmarried women, NFP mothers did have significantly more months of employment. “Improving the Life-Course Development of Socially Disadvantaged Mothers: A Randomized Trial of Nurse Home Visitation.” *American Journal of Public Health*. 1988.

<sup>19</sup> “Home Visiting by Paraprofessionals and Nurses: A Randomized, Controlled Trial.” *Pediatrics*. 2002.

<sup>20</sup> “Enduring Effects of Nurse Home Visitation on Maternal Life Course.” *Journal of the American Medical Association*. 2000.

<sup>21</sup> This same study found that among the subgroup of poor unmarried women, NFP mothers did have significantly fewer pregnancies and more months between pregnancies. “Improving the Life-Course Development of Socially Disadvantaged Mothers: A Randomized Trial of Nurse Home Visitation.” *American Journal of Public Health*. 1988.

<sup>22</sup> The authors define high risk as low-socioeconomic status, unmarried women. “Long-term Effects of Home Visitation on Maternal Life Course and Child Abuse and Neglect.” *Journal of the American Medical Association*. 1997.

- **Aid for Families with Dependent Children (AFDC) and food stamps**
  - One study found that NFP mothers had spent fewer months on AFDC and food stamps, compared to control mothers (measured 4.5 years and six years after childbirth)<sup>23</sup>
  - Another study with different participants found no significant differences in the amount of time spent on AFDC (measured four years after childbirth);<sup>24</sup> however, another later paper using the same participants found that *at-risk* NFP mothers reported receiving AFDC and food stamps for significantly fewer months than *at-risk* control group mothers (measured 15 years after childbirth)<sup>25</sup>
  - Another study with a third group of mothers found no significant differences in the amount of time spent on AFDC (measured two and four years after childbirth)<sup>26</sup>
- **Marriage/living with partner**
  - NFP mothers were significantly more likely to be married and living with a partner that worked, compared to control mothers (measured 4.5 years after childbirth);<sup>27</sup> however, this difference was not significant later (measured six years after childbirth)<sup>28</sup>
- **Child Abuse**
  - There were no significant differences in child abuse rates between NFP and control groups (measured two years after childbirth);<sup>29</sup> however, two later papers with the same sample, found that NFP mothers had fewer Child Protective Services reports that they had abused their children (measured 15 years after childbirth)<sup>30</sup> and significantly fewer reports of substantiated child neglect (measured 15 years after childbirth)<sup>31</sup>

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<sup>23</sup> “Enduring Effects of Nurse Home Visitation on Maternal Life Course.” *Journal of the American Medical Association*. 2000. “Effects of Nurse Home-Visiting on Maternal Life Course and Child Development: Age 6 Follow-Up Results of a Randomized Trial.” *Pediatrics*. 2004.

<sup>24</sup> “Improving the Life-Course Development of Socially Disadvantaged Mothers: A Randomized Trial of Nurse Home Visitation.” *American Journal of Public Health*. 1988.

<sup>25</sup> “Long-term Effects of Home Visitation on Maternal Life Course and Child Abuse and Neglect.” *Journal of the American Medical Association*. 1997.

<sup>26</sup> “Home Visiting by Paraprofessionals and Nurses: A Randomized, Controlled Trial.” *Pediatrics*. 2002. “Effects of Home Visits by Paraprofessionals and by Nurses: Age 4 Follow-up Results of a Randomized Trial.” *Pediatrics*. 2004.

<sup>27</sup> “Enduring Effects of Nurse Home Visitation on Maternal Life Course.” *Journal of the American Medical Association*. 2000.

<sup>28</sup> “Effects of Nurse Home-Visiting on Maternal Life Course and Child Development: Age 6 Follow-Up Results of a Randomized Trial.” *Pediatrics*. 2004.

<sup>29</sup> “Preventing Child Abuse and Neglect: A Randomized Trial of Nurse Home Visitation.” *Pediatrics*. 1986.

<sup>30</sup> The NFP seemed to have a large protective effect, with NFP mothers having roughly half the number of CPS reports as non-protective mothers. However, it should be noted that the reports were a relatively rare occurrence with less than one report per child on average. Furthermore, the NFP seemed especially effective in cases where there was little domestic violence; in households with high domestic violence, the NFP was not estimated to have a protective effect. “Preventing

### Some Empirical Evidence that NFP has Beneficial Effects

- Compared to control mothers, during pregnancy NFP mothers were significantly: more aware of available community services, attended childbirth classes more frequently, received more Women, Infants, and Children (WIC) vouchers, and were accompanied to the delivery room more often<sup>32</sup>
- Compared to control mothers, NFP mothers had significantly fewer yeast infections during pregnancy and less pregnancy induced hypertension<sup>33</sup>
- Compared to control children, NFP children had significantly better mental processing and receptive vocabulary (measured six years after childbirth);<sup>34</sup> another study with a different group of children found that NFP “low-resource” children had significantly better: language development, executive functioning, and behavioral adaptation (measured four years after childbirth)<sup>35</sup>
- Compared to control mothers, NFP mothers had significantly fewer hazards (e.g. ingestible poisons, flaking paint etc.) around the home (measured three and four years after childbirth)<sup>36</sup>
- Compared to *high-risk*<sup>37</sup> control children, *high-risk* NFP children had significantly: fewer arrests, fewer convictions, drank less alcohol, and had fewer sex partners (measured 15 years after childbirth)<sup>38</sup>
- Compared to *high risk*<sup>39</sup> control mothers, *high-risk* NFP mothers had significantly: fewer arrests, fewer criminal convictions, and fewer days in jail (measured 15 years after childbirth)<sup>40</sup>

### Convincing Empirical Evidence that NFP has Beneficial Effects

- Two studies found that NFP mothers reported smoking significantly less than control mothers during pregnancy, and laboratory tests supported this difference<sup>41</sup>

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Child Abuse and Neglect with a Program of Nurse Home Visitation: The Limiting Effect of Domestic Violence.” *Journal of the American Medical Association*. 2000.

<sup>31</sup> “Long-term Effects of Home Visitation on Maternal Life Course and Child Abuse and Neglect.” *Journal of the American Medical Association*. 1997.

<sup>32</sup> “Improving the Delivery of Prenatal Care and Outcomes of Pregnancy: A Randomized Trial of Nurse Home Visitation.” *Pediatrics*. 1986.

<sup>33</sup> “Effect of Prenatal and Infancy Home Visitation by Nurses on Pregnancy Outcomes, Childhood Injuries, and Repeated Childbearing.” *Journal of the American Medical Association*. 1997.

<sup>34</sup> Effects of Nurse Home-Visiting on Maternal Life Course and Child Development: Age 6 Follow-Up Results of a Randomized Trial. *Pediatrics*. 2004.

<sup>35</sup> “Effects of Nurse Home-Visiting on Maternal Life Course and Child Development: Age 6 Follow-Up Results of a Randomized Trial.” *Pediatrics*. 2004.

<sup>36</sup> “Does Prenatal Infancy Nurse Home Visitation have Enduring Effects on Qualities of Parental Caregiving and Child Health at 25-50 Months of Life?” *Pediatrics*. 1994.

<sup>37</sup> The authors define “high-risk” as low-income households headed by an unmarried mother.

<sup>38</sup> “Long-term Effects of Nurse Home Visitation on Children’s Criminal and Antisocial Behavior.” *Journal of the American Medical Association*. 1998.

<sup>39</sup> The authors define high risk as low-socioeconomic status, unmarried women.

<sup>40</sup> The arrests and convictions were verified by looking at state records. “Long-term Effects of Home Visitation on Maternal Life Course and Child Abuse and Neglect.” *Journal of the American Medical Association*. 1997.

- Two studies with two different samples of children found that NFP children spent significantly fewer days hospitalized and had significantly fewer injuries and ingestions (measured two years (two papers) and four years after childbirth)<sup>42</sup>

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<sup>41</sup> “Improving the Delivery of Prenatal Care and Outcomes of Pregnancy: A Randomized Trial of Nurse Home Visitation.” *Pediatrics*. 1986. “Home Visiting by Paraprofessionals and Nurses: A Randomized, Controlled Trial.” *Pediatrics*. 2002.

<sup>42</sup> The first study involved white women in a rural area in New York State. The second study involved predominantly African-American women in Memphis, Tennessee. “Does Prenatal Infancy Nurse Home Visitation have Enduring Effects on Qualities of Parental Caregiving and Child Health at 25-50 Months of Life” *Pediatrics*. 1994. “Effect of Prenatal and Infancy Home Visitation by Nurses on Pregnancy Outcomes, Childhood Injuries, and Repeated Childbearing.” *Journal of the American Medical Association*. 1997.