

Social Programs That Work Review

Evidence Summary for the Nurse Family Partnership

HIGHLIGHTS:

- **PROGRAM:** A nurse home visitation program for first-time mothers – mostly low-income and unmarried – during their pregnancy and children’s infancy.
- **EVALUATION METHODS:** Seven well-conducted randomized controlled trials (RCTs), each carried out in a different population and setting (four in the United States, one in the Netherlands, one in the United Kingdom, and one in Canada).
- **KEY FINDINGS:** Four of the seven studies found a pattern of sizable, sustained effects on important child and maternal outcomes, including reductions in child maltreatment and injuries (20-50%) and reductions in mothers’ subsequent births (10-20%) during their late teens and early 20s. The other three RCTs, conducted more recently and with mostly larger samples, found no statistically significant effects on the same or similar child and maternal outcomes. Possible reasons for the discrepant findings are discussed in this summary, but these are only hypotheses as we believe additional research is needed to determine the conditions and populations in which NFP is effective.

I. Evidence rating: **SUGGESTIVE TIER**

The standard for Suggestive Tier is:

Programs that have been evaluated in one or more well-conducted RCTs (or studies that closely approximate random assignment) and found to produce sizable positive effects, but whose evidence is limited by only short-term follow-up, effects that fall short of statistical significance, or other factors. Such evidence suggests the program may be an especially strong candidate for further research but does not yet provide confidence that the program would produce important effects if implemented in new settings.

II. Description of the Program:

The Nurse-Family Partnership (NFP) program provides nurse home visits to pregnant women with no previous live births, most of whom are (i) low-income; (ii) unmarried; and (iii) teenagers. The nurses visit the women one to two times per month during their pregnancy and the first two years of their children’s lives. The nurses teach (i) positive health related behaviors; (ii) competent care of children;

and (iii) maternal personal development (family planning, educational achievement, and participation in the workforce). The program costs approximately \$15,000 per woman over the three years of visits (in 2019 dollars).

[Click here for Nurse Family Partnership's website.](#)

III. Evidence of Effectiveness:

This summary of the evidence on NFP is based on a systematic search of the literature and correspondence with leading researchers to identify all well-designed and implemented RCTs of NFP. Our search identified seven such studies, each conducted in a different population and setting (Elmira, New York; Memphis, Tennessee; Denver, Colorado; the Netherlands; the United Kingdom; British Columbia, Canada; and South Carolina).

Four of the seven studies (studies 1, 2, 3, and 4, below) found the program to produce sizable, sustained effects on important outcomes for mothers and their children, including: (i) reductions in measures of child abuse and neglect (including injuries and accidents); (ii) reductions in mothers' subsequent births during their late teens and early twenties; (iii) reduction in prenatal smoking among mothers who smoked at the start of the study¹; and (iv) improvement in cognitive and/or academic outcomes for the subgroup of children born to mothers with low psychological resources (i.e., intelligence, mental health, self-confidence).

The other three studies (studies 5, 6, and 7, below) were conducted more recently and with mostly larger samples in the United Kingdom, Canada, and South Carolina. None of these studies found statistically significant positive effects on their prespecified primary outcomes, which, depending on the study, included measures of: (i) prenatal smoking; (ii) adverse birth outcomes (e.g. preterm birth, low birthweight); (iii) rapid repeat pregnancy; (iv) healthcare encounters for injury or suspected abuse or neglect during a child's first two years of life; or (v) needing social services due to concerns about the child's health, development, or well-being by age 7.

Possible reasons for the discrepant findings are discussed in our summaries below – but are only hypotheses, as we believe further research is needed to determine the conditions and populations in which NFP is effective.

The following summarizes the program's effects on all of the main outcomes measured in each of the seven studies, including any such outcomes for which no or adverse effects were found. All effects shown are statistically significant at the 0.05 level unless stated otherwise.

STUDY 1 (Elmira, NY)

This was a randomized controlled trial with a sample of 300 women in Elmira, New York, a semi-rural community. The women, who had agreed to enroll in the study, were randomly assigned either to (i) a

¹ The reduction in prenatal smoking is not discussed in detail in this summary because of the summary's focus on longer-term life outcomes. However, the smoking reduction may have affected some of these longer-term outcomes (e.g., child cognitive development).

group given the opportunity to participate in the Nurse-Family Partnership, or (ii) a control group that was provided developmental screening and referral to treatment for their child at ages 1 and 2 and, in some cases, free transportation to prenatal and well-child care. Approximately 90% of the women were white, 60% were low income, and 60% were unmarried. Their average age was 19.

Effects on the first-born children of the nurse-visited women at ages 15-19 (versus the control group):

- 48% fewer officially verified incidents of child abuse and neglect as of age 15 (an average of 0.26 incidents per nurse-visited child versus 0.50 per control-group child).
- 43% less likely to have been arrested, and 58% less likely to have been convicted, as of age 19 (21% of nurse-visited children had been arrested versus 37% of control-group children, and 12% versus 28% had been convicted, according to self-reports).
- 57% fewer lifetime arrests and 66% fewer lifetime convictions, as of age 19 (an average of 0.37 versus 0.86 arrests, and 0.20 versus 0.58 convictions, according to self-reports).
- There were no significant effects on recent substance use, high school graduation rates, likelihood of becoming pregnant or giving birth or causing a pregnancy or birth, likelihood of being engaged in economically productive activities (e.g., work or school), or lifetime use of welfare or other public assistance (per self-reports at age 19).

Effects on the nurse-visited women when their children reached age 15 (versus the control group):

- 20% less time spent on welfare over the 15 years (an average of 53 months per nurse-visited woman versus 66 months per woman in the control group). *This effect was statistically significant at the .10 level, but not the .05 level.*
- 19% fewer subsequent births (an average of 1.3 births versus 1.6).
- 61% fewer self-reported arrests (an average of 0.13 versus 0.33).
- 72% fewer self-reported convictions (an average of 0.05 versus 0.18).
- There were no significant effects on months employed, months on food stamps or Medicaid, or behavior-impairing substance abuse.

There was suggestive evidence that the above effects on the children and women were largest for the subgroup of women who, at study enrollment, were unmarried and of low socioeconomic status.

Discussion of Study Quality:

- This was a relatively sizable study with a long-term follow-up (child age 15-19) and low attrition: Data on the outcomes described above were obtained for 77-83% of the original sample (depending on the outcome), and follow-up rates were similar for the nurse-visited and control groups.

- At the child age-15 and 19 follow-up, the women in the nurse-visited group and those in the control group were highly similar in their observable pre-program characteristics (e.g., demographics).
- The study measured outcomes for all mothers and children assigned to the nurse visitation group, regardless of whether or how long they actually participated in the program (i.e., the study used an “intention-to-treat” analysis).
- Official records of criminal activity and/or delinquency, although not complete, tended to corroborate the mothers’ self-reports. (Such crime/delinquency records were too incomplete to provide similar corroboration for the children’s self-reports.)
- Research staff gathering outcome data were blind as to whether women were assigned to the nurse-visitation group or the control group.

STUDY 2 (Memphis, TN)

This was a randomized controlled trial with a sample of 742 women in Memphis, Tennessee. The women, who had agreed to participate in the study, were randomly assigned to (i) a group given the opportunity to participate in the Nurse-Family Partnership, or (ii) a control group that was provided free transportation to scheduled prenatal medical appointments, and developmental screening and referral to treatment for their child between birth and age 2.

92% of the women were African-American, 85% came from households with income at or below the poverty line, and 98% were unmarried. Their average age was 18.

Effects on the first-born children of nurse-visited women at age 2 (versus the control group):

- 23% fewer health care encounters for children's injuries or ingestions (an average of 0.43 encounters per child in the nurse-visited group vs. 0.56 in the control group).
- 78% fewer days hospitalized for injuries or ingestions (an average of 0.04 days versus 0.18 days).
- No significant effects on children's immunization rates, mental development, or behavioral problems.

Effects on the first-born children of nurse-visited women at age 12 (versus the control group):

- Nurse-visited children in the full sample were –
 - › Less likely to have used cigarettes, alcohol, or marijuana in the past month (1.7% of children in the nurse-visited group had used these substances vs. 5.1% of children in the control group).
 - › 28% less likely to have an internalizing disorder, such as depression or anxiety (22.1% vs. 30.9%).

- › There were no significant effects on these children’s academic performance (e.g. test scores, grade retentions, special education placements), conduct outcomes (including arrests), ability to sustain attention, or mortality.
- Nurse-visited children in the subgroup whose mothers had low psychological resources prior to program participation (i.e. were in the lower half of the sample in intelligence, mental health, and self-confidence) made sizable gains in academic performance. These children:
 - › Scored 6 percentile points higher on Tennessee state reading and math achievement tests in grades 1-6 than their counterparts in the control group (the nurse-visited group scored in the 41st percentile, versus the 35th percentile for their control group counterparts).
 - › Had 8% higher reading and math grade point averages in grades 1-6 (an average GPA of 2.46 vs. 2.27).
 - › The effects on academic performance were sustained over the follow-up period, including the final two years (grades 4-6).
 - › There were no significant effects on these children’s conduct outcomes (including arrests), mental health, grade retentions, special education placements, or ability to sustain attention.

Importantly, the above effects on children’s substance use may be valid but could also have appeared by chance due to the study’s measurement of a sizable number of child outcomes at age 12. The effects on internalizing disorders for the full sample, and on academic performance of children whose mothers had low psychological resources, are more likely to be valid since similar effects were found in Study 3 (Denver, CO).

Effects on the first-born children of nurse-visited women at age 18 (versus the control group):

- For the full sample of nurse-visited children, the study found no statistically significant effects on the study’s pre-specified primary outcomes² at this follow-up – namely, nonverbal intelligence, receptive language (i.e. vocabulary), math achievement, substance use, pregnancies, births, sexually-transmitted infections, internalizing behavior problems (e.g. depression and anxiety), arrests, convictions, interpersonal violence, and gang membership. One effect – modestly higher math achievement for the nurse-visited group versus for the control group – approached statistical significance ($p=0.08$) and may be a true finding but could also be a false-positive that occurred by chance due to the study’s measurement of many primary outcomes for the full sample.
- For the subgroup of nurse-visited children whose mothers had low psychological resources prior to program participation (i.e. were in the lower half of the sample in intelligence, mental health,

² The study team specified this list of age-18 primary outcomes for the full sample of children prior to the completion of data gathering and any analysis of program effects. They also pre-specified (i) three primary outcomes for the subgroup of children whose mothers had low psychological resources and (ii) one primary outcome for the full sample of mothers, as discussed in subsequent sections of this evidence summary. The full set of pre-specified outcomes is [shown here](#) on clinicaltrials.gov.

and self-confidence), the study found sizable, statistically significant effects on two of the three primary outcomes for this subgroup at the age-18 follow-up, as follows:

- › An improvement in math achievement (effect size of 0.38 standard deviations, which means that the program would have moved the average child in the control group from the 50th to the 65th percentile, had he or she been assigned to the nurse-visited group).
- › An improvement in receptive language (effect size of 0.24 standard deviations, which means that the program would have moved the average child in the control group from the 50th to the 59th percentile).
- › The study found no significant effect on nonverbal intelligence.

The credibility of these subgroup effects on math and language achievement is bolstered by similar subgroup findings on cognitive outcomes in Study 3 (Denver, CO).

Effects on the nurse-visited women when their children reached age 12 (versus the control group):

- A reduction of approximately \$16,000, or 10%, in total discounted government spending per woman on welfare (i.e., AFDC and TANF), food stamps (i.e., SNAP), and Medicaid over the 12 years (approximately \$159,000 for the control group vs. \$143,000 for the nurse-visited group, in 2019 dollars). This spending reduction roughly offset the program's cost of approximately \$15,000, in 2019 dollars.
- There was no significant effect on the number of subsequent births over the whole 12 years. However, during the first six years – when the women were in their late teens and early twenties – there was a statistically-significant 16% reduction in subsequent births (an average of 1.08 for the nurse-visited women vs. 1.28 for the control group women).
- There were a few other statistically significant effects, such as an increase in duration of the mother's relationship with her current partner at the three points this was measured (the 6, 9, and 12-year follow-ups), and an increase in the mother's sense of mastery over the full 12 years.
- There were no significant effects on mothers' time employed, likelihood of partnership with or marriage to the child's biological father, experience of intimate partner violence, substance use, arrests, incarcerations, psychological distress, or child foster care placements.

Importantly, the effects noted above on duration of the mother's relationship with her current partner and on her sense of mastery may be valid but could also have appeared by chance due to the study's measurement of a sizable number of maternal outcomes at the 12-year follow-up. The effects on mothers' use of government assistance and on subsequent births during their teens and early twenties are more likely to be valid since similar effects were found in Study 1 (Elmira, NY).

Effects on the nurse-visited women when their children reached age 18 (versus the control group):

- On the one primary pre-specified outcome for women at this follow-up – total discounted government spending on welfare, food stamps, and Medicaid over the 18 years – the study found a reduction of approximately \$20,000, or 9%, per woman (approximately \$229,000 for the

control group vs. \$209,000 for the nurse-visited group, in 2019 dollars). This spending reduction more than offset the program's cost of approximately \$15,000 in 2019 dollars.

Discussion of Study Quality:

- This was a sizable study with a long-term follow-up (child age 18) and low-to-moderate attrition: Data on the outcomes described above were obtained for 74-92% of the original sample (depending on the outcome), and follow-up rates were very similar for the nurse-visited and control groups.
- At all study follow-up points (child age 2, 6, 9, 12, and 18), the women in the nurse-visited group and those in the control group were highly similar in their observable pre-program characteristics (e.g., demographics, self-reported substance use).
- The study measured outcomes for all mothers and children assigned to the nurse-visited group, regardless of whether or how long they actually participated in the program (i.e., the study used an "intention-to-treat" analysis).
- The study used a variety of sources to measure outcomes, including mother, teacher, and child reports (e.g., on child behavior), school records (e.g., achievement test scores, GPA), direct testing of cognitive and math/language outcomes at age 18, and state administrative records (e.g., receipt of welfare and other government assistance).
- Research staff gathering outcome data were blind as to which women were assigned to the nurse-visited group versus the control group.
- The study evaluated the program as implemented on a sizable scale in a low-income community by the county health department, thus providing evidence about the program's effectiveness under real-world implementation conditions.

STUDY 3 (Denver, CO)

This was a randomized controlled trial with a sample of 490 women in Denver, Colorado. The women, who had agreed to participate in the study, were randomly assigned to (i) a group given the opportunity to participate in the Nurse-Family Partnership or (ii) a control group provided with developmental screening and referral to treatment for their children between birth and age 2.

These women were almost all low-income (their annual household income averaged approximately \$22,000 in 2019 dollars), 46% were Mexican American, 36% were white, 15% were African American, and 84% were unmarried. Their average age was 20.

The study's hypothesis is that the program would produce effects on child outcomes similar to those found in Study 2 (Memphis, TN) – namely, improvements in behavioral and emotional outcomes for the full sample of children, and improvements in cognitive and educational outcomes limited to the subgroup of children whose mothers had low psychological resources prior to program participation (i.e., low intelligence, mental health, and self-confidence). This subgroup was defined the same way in both studies, and in Denver comprised approximately 40% of the full sample.

Effects on the first-born children of nurse-visited women at age 4 (versus the control group):

- The subgroup of children whose mothers had low psychological resources prior to program participation made sizable gains in researcher-assessed –
 - › Language development (standardized effect size of 0.31, which means that the program would have moved the average child in the control group from the 50th to the 62nd percentile, had he or she been assigned to the nurse-visited group);
 - › Behavioral adaptation – e.g., attention, impulse control, sociability (standardized effect size of 0.38, which means that the program would have moved the average child in the control group from the 50th to the 65th percentile); and
 - › Executive functioning – e.g., capacity for sustained attention, fine and gross motor skills (standardized effect size of 0.47, which means that the program would have moved the average child in the control group from the 50th to the 68th percentile).
- There were no significant effects on emotional regulation (e.g., anxiety, regulation of mood, or mother-reported rule-breaking or aggressive behavior) in this subgroup.
- For the full sample of children (as opposed to the above subgroup), there were no significant effects on these child outcomes.

Effects on the first-born children of nurse-visited women at ages 6 and 9 (versus the control group):

- Behavioral and emotional outcomes for the full sample: Across various measures, children in the nurse-visited group had consistently better outcomes than children in the control group, but these differences did not reach statistical significance at conventional (0.05) levels, possibly because the study sample was not sufficiently large. As representative examples, at age 9 –
 - › 3.6% of nurse-visited children scored in the borderline or clinical range for internalizing problems, such as depression and anxiety, versus 8.2% of control-group children. This difference was statistically significant at the 0.10 level, but not the 0.05 level.
 - › 6.6% of nurse-visited children scored in the borderline or clinical range for externalizing problems, such as aggression or impulsiveness, compared to 10.2% of control-group children. This difference was not statistically significant ($p=0.25$).

These findings help corroborate the behavioral and emotional effects found in Study 1 (Elmira) and Study 2 (Memphis), but to a limited degree since they did not reach statistical significance.

- Cognitive and educational outcomes for the subgroup of children whose mothers had low psychological resources: The effects on these outcomes generally favored the children in the nurse-visited group, with a few reaching statistical significance. *However, we believe these findings in Denver are only suggestive because of a study limitation for this subgroup at the age 6 and 9 follow-ups – namely, a sizable difference in sample attrition between the nurse-visited children and control group children (see “Discussion of Study Quality,” below).*

Effects on the nurse-visited women when their children reached age 4 (versus the control group):

- There were no significant effects on most of the women's outcomes, including welfare receipt; employment; high school graduation; mental health; substance use; percent married or living with a partner; or number of subsequent births, abortions, miscarriages, or low birthweight newborns. The study did find a significant reduction in the incidence of women experiencing domestic violence from their partner in the past 6 months, but this finding could have appeared by chance given the study's measurement of a sizable number of maternal outcomes.

Discussion of Study Quality:

- This was a relatively sizable study with a long-term follow-up (child age 9).
- At the child age-4 follow-up, the study had low sample attrition: Data were obtained for 82-86% of the original sample (depending on the outcome), and follow-up rates were similar for the nurse-visited and control groups. (Sample attrition was higher at the child age 6 and 9 follow-ups, as discussed below.)
- At the child age 4, 6, and 9 follow-ups, the nurse-visited women and the control group women in the follow-up sample were highly similar in their observable pre-program characteristics (e.g., demographics, self-reported substance use).
- The study measured outcomes for all mothers and children assigned to the nurse-visited group, regardless of whether or how long they actually participated in the program (i.e., the study used an "intention-to-treat" analysis).
- Children's behavioral, emotional, cognitive, and educational outcomes were measured through assessments whose reliability and validity are well-established (e.g., Preschool Language Scales-3, Child Behavior Checklist).
- The research staff administering these assessments and other outcome measures were blind as to whether women were assigned to the nurse-visited or the control group.
- The study evaluated the program as implemented on a large scale in a low-income community, thus providing evidence about the program's effectiveness under real-world implementation conditions.
- A limitation of the study at the child age 6 and 9 follow-ups was moderate to high sample attrition. Specifically –
 - › **For the full sample:** The study obtained data on behavioral and emotional outcomes for between 70% and 81% of the sample at the age-6 follow-up (depending on the outcome measure), and between 62% and 72% of the sample at the age-9 follow-up. Although the attrition rates were similar for the nurse-visited versus control group, and the follow-up samples for the two groups were still highly similar in their observable characteristics, the attrition conceivably could have caused unobservable differences between the two groups,

possibly leading to inaccurate estimates of the program's effects. (This limitation does not apply to the full-sample findings at child age 4).

- › For the subgroup of children whose mothers had low psychological resources: Sample attrition was similarly high and differed by an average of 13 percentage points between the nurse-visited and control groups at the age 6 and 9 follow-ups. This difference in attrition could have created systematic differences in characteristics between the two groups, leading to inaccurate estimates of the program's effects. For this reason, we believe the study's findings for this subgroup are only suggestive. (This limitation does not apply to the subgroup findings at child age 4).

STUDY 4 (The Netherlands)

Overview:

This was a generally well-conducted randomized controlled trial of a Dutch nurse home visitation program – the VoorZorg program – that is essentially the same as U.S. Nurse-Family Partnership (NFP) program. The study was conducted in 20 municipalities in the Netherlands and had a sample of 460 women. VoorZorg provides at-risk, first time mothers with 40-60 home visits by a trained, specialized nurse during pregnancy and the first two years of the child's life, following the NFP program protocol. Earlier reports on this study, which we have reviewed and found to be credible, found a significant reduction in mothers' self-reported smoking two months after childbirth, a significant increase in self-reported breast-feeding six months after childbirth, and no significant effects on any birth outcomes (e.g., birthweight, premature births).³

The study report summarized below examined the program's effects on the incidence of child abuse and neglect (which was pre-specified as a primary outcome of the study), using data on Child Protective Services (CPS) reports of suspected maltreatment. The study found that the program produced a sizable, statistically-significant reduction in maltreatment – 19% of the control group had a CPS report during the first three years of the child's life, versus 11% of the treatment group.

Description of the Program:

The VoorZorg program enrolls pregnant women meeting the following criteria: under 26 years of age, low educational level, first pregnancy, maximum 28 weeks gestation, and at least one of nine additional risk factors (e.g., being single, unwanted pregnancy, financial problems, alcohol or drug abuse). The program, which adheres closely to the U.S. NFP program model, consists of approximately 10 home visits during pregnancy, 20 during the child's first year of life, and 20 during the child's second year, delivered by trained and experienced VoorZorg nurses. The nurses offer health education and aim to teach parenting skills, to enhance the women's self-efficacy, to reduce risk factors of child maltreatment, and to improve the utilization of social and community resources.

³ An earlier report also measured the program's effect on intimate partner violence (IPV) and found positive effects on some types of IPV but not others. However, the study had very high and differential sample attrition in measuring IPV outcomes, which we believe renders the IPV findings only suggestive in nature.

Overview of the Study Design:

This was a randomized controlled trial conducted in 20 municipalities in the Netherlands, with a sample of 460 at-risk, first-time mothers meeting the criteria described above. Women in the sample were randomly assigned to a treatment group, which received the VoorZorg program plus usual care, or a control group, which received only usual care (consisting, for example, of women's visits to a midwife during pregnancy that were reimbursed by insurance, and free medical check-ups for the baby).

Key Findings:

- On the primary outcome measure of child maltreatment: During the first three years of the children's lives, the program produced a statistically significant 42% reduction in CPS reports of suspected maltreatment (19% of the control group had a CPS report, versus 11% of the treatment group).
- The study also found generally positive effects on secondary outcomes related to child development (e.g., behavior) and home environment, measured at children's age 2 follow-up. However, the study had high and differential sample attrition in measuring these outcomes, which we believe renders these findings only suggestive in nature.

Discussion of Study Quality:

Based on our review, we believe this was a well-conducted randomized controlled trial of the program as delivered in real-world community settings across the Netherlands. The study appropriately prespecified its primary outcome and analyses. The treatment and control groups were highly similar in pre-program characteristics, and child maltreatment outcomes were measured with CPS reports of suspected maltreatment which, according to CPS, represent valid incidents of maltreatment in 93 percent of cases.

The only study limitation we identified is that two of the ten child protection agencies in the regions where the study took place did not provide CPS maltreatment data for the children living in their region; thus, such data were only available for 71% of treatment-group children and 74% of control-group children (i.e., those living in regions served by the other eight child protection agencies). While this modestly reduces the final sample size and generalizability of the study's findings, there is no reason to think it would produce inaccurate impact findings for the children in the final sample.

STUDY 5 (The United Kingdom)

Overview:

This was a well-conducted, large, multisite randomized controlled trial of an adaptation of the Nurse-Family Partnership (NFP) in the United Kingdom. The study randomly assigned 1,645 teenagers who were pregnant with their first child to either receive NFP or to a control group that received usual community services. At the initial follow-up, which occurred when children were age 2, the study found no statistically significant effects (or pattern of non-significant effects) on the primary outcomes of: (i) maternal smoking during late pregnancy; (ii) birthweight; or (iii) repeat pregnancy. The study also found a possible adverse effect on the primary outcome of child emergency department or hospital admissions during the first two

years of life. At subsequent follow-up, when children were age 7, the study found no significant effect on the primary outcome for that follow-up – percent of children with state-verified “Child in Need” status.

These null findings stand in contrast to the positive findings for many of these outcomes found in the previous RCTs of NFP in the United States and the Netherlands (studies 1, 2, 3, and 4). Possible reasons for the discrepant findings include: (1) the control group in this study received more comprehensive care than the control groups in prior studies, including, for example, an average of 16 home visits from a public health nurse and 11 midwife visits through the child’s second birthday; and (2) the study used maternal age (<20 years) as the primary eligibility criterion, which may have yielded a less disadvantaged, lower-risk sample than in prior studies, and evidence from prior studies suggests NFP’s effects are strongest among higher-risk mothers.

Description of the Program:

The U.K. Nurse Family Partnership (known in the U.K. as the Family-Nurse Partnership) is adapted from the U.S. NFP program. The program provides up to 64 home visits by trained family nurses from early pregnancy until the child turns 2 years old. The U.K. adaptation requires that women be first-time mothers aged 19 years or younger to be eligible for services. The incremental per person cost of the program is approximately \$3,200, compared to usual services (in 2019 dollars).⁴

Overview of the Study Design:

Participants were recruited from 18 community maternity centers in England between June 2009 and July 2010. The sample consisted of 1,645 teenage mothers who were less than 25 weeks pregnant with their first child. Women were stratified by site, smoking status, length of gestation, and preferred language, and then randomly assigned either to (i) a group given the opportunity to participate in NFP (n=823), or (ii) a control group (n=822) that received usual services, consisting of publicly funded health and social care, including screening, education, immunization, and regular home visits by midwives and public health nurses until their child’s second birthday.

Key Findings:

- At the child age-2 follow-up, the study did not find significant effects on the following primary outcomes: smoking in late pregnancy (56% of mothers in both the treatment and control groups smoked), subsequent pregnancy within 24 months postpartum (66% of mothers in both the treatment and control groups became pregnant again), and birthweight (children in the treatment and control group weighed about 3,200 grams on average).
- The study found a possible adverse effect on one other primary outcome at age-2 follow-up: children in the treatment group were statistically significantly more likely to have an emergency department or hospital admission during their first two years of life compared to the control group (81% of treatment group children had at least one such admission versus 77% of the

⁴ £1,993 in 2011 pounds converts to approximately \$3,200 in 2019 dollars. For reference, the gross cost of NFP in the United States is approximately \$15,000 (in 2019 dollars).

control group). Admissions rates for injuries and ingestions – a proxy for child maltreatment – were not significantly different between the groups, in contrast to U.S. study findings.

- At the child age-7 follow-up, the study found no significant effect on the primary outcome for that follow-up: the percentage of children with state-verified Child in Need (CIN) status, indicating that the child had been formally identified by children's social services as needing child welfare or family support services due to concerns about the child's health, development, or well-being (21% in the NFP group received CIN status vs. 22% in the control group).

Discussion of Study Quality:

This was a large, well-conducted RCT. The study appropriately prespecified its primary outcomes and analyses. Maternal self-reports on the primary outcomes of interest were corroborated by more objective sources (e.g., smoking was verified biochemically, pregnancy and emergency department and hospital admissions were measured using medical records). The study measured outcomes for all mothers and children, regardless of whether or how long they actually participated in the program (i.e., the study used an “intention-to-treat” analysis). Treatment and control groups were highly similar in their baseline characteristics. The study had low-to-moderate attrition for the primary outcomes of interest, with follow-up rates ranging from 66% to 92% of the sample depending on the outcome (66% for smoking, 78% for second pregnancy, 90% for ER visits, 92% for birthweight, and 92% for CIN status). Sample attrition rates were approximately the same for the treatment and control groups. Based on program implementation measures, NFP appears to have been implemented reasonably well.

STUDY 6 (British Columbia)

Overview:

This was a large, well-conducted randomized controlled trial of NFP in British Columbia, Canada. The study randomly assigned to 737 women who were pregnant with their first child to (i) a group given the opportunity to participate in the Nurse-Family Partnership or (ii) a control group provided with services as usual. The study found no effect on the primary, prespecified outcome: healthcare encounters for child injuries from age 0-2.

These null results contrast with findings from the previous evaluations of NFP in the U.S. and Netherlands (studies 1, 2, 3, and 4). One possible reason why the British Columbia study did not replicate the earlier positive findings is that British Columbia's comprehensive public health and social services are generally more robust than comparable services available in the U.S.

Description of the Program

The British Columbia Healthy Connections Project implements the standard NFP program as delivered in the United States. The program provides up to 64 structured home visits by trained family nurses, beginning in early pregnancy and continuing until the child reaches age 2.

Overview of the Study Design:

This was a randomized controlled trial conducted in 26 urban and suburban health areas in British Columbia, Canada, with a sample of 737 pregnant women enrolled between 2013 and 2016 who met the following eligibility criteria: first pregnancy, maximum 28 weeks gestation, less than 25 years old, and socioeconomically disadvantaged. Women were randomly assigned to either a treatment group, which received the Healthy Connections NFP program in addition to usual care, or to a control group, which received usual care only. Usual care consisted of British Columbia's comprehensive public health and social services and that are more robust than comparable services available in the U.S.

Overall, the sample was highly disadvantaged – 91% were single mothers, 51% had not completed high school, 27% were Indigenous, and their average income was approximately \$10,000 Canadian dollars per year. The average age of women in the sample was 20.

Key Findings:

- The study found no effect on the primary, prespecified outcome: healthcare encounters for child injuries from age 0-2. There were 316 encounters per 1000 person-years in the treatment group vs. 305 in the control group, a difference that was not statistically significant.
- The study found statistically significant effects on two of five prespecified secondary outcomes measured at child age 2: maternal-reported language (effect size of 0.17) and maternal-reported problem behavior (39% of treatment mothers versus 52% of control mothers reported children's problem behavior).
- There were no effects on the three other secondary outcomes: mother's subsequent pregnancies and direct researcher assessments of child language and cognition.

Discussion of Study Quality:

This was a well-conducted RCT. The study appropriately prespecified its primary outcome and analyses. The study measured outcomes for all mothers and children, regardless of whether or how long they actually participated in the program (i.e., the study used an "intention-to-treat" analysis). Treatment and control groups were highly similar in their baseline characteristics. The study had negligible attrition on the primary outcome, and low-to-moderate attrition for the secondary outcomes, with follow-up rates ranging from 77% to 81% of the sample depending on the outcome. Sample attrition rates were approximately the same for the treatment and control groups. Research interviewers and analysts were blinded to participants' random assignment when conducting direct assessments.

A limitation of the study is that the two findings that reached statistical significance – problem behavior and language development – relied on the mother's self-reports, which can be prone to social desirability bias (e.g., the program group's overstatement of positive outcomes out of gratitude to the program).

Based on program implementation measures, Healthy Connections appears to have been well-implemented. Treatment families received a median of 41 NFP visits out of a possible maximum of 64 visits.

STUDY 7 (South Carolina)

Overview:

This was a large, well-conducted randomized controlled trial of NFP in South Carolina. The study randomly assigned 5,670 Medicaid-eligible women who were pregnant with their first child to (i) a group given the opportunity to participate in the Nurse-Family Partnership, or (ii) a control group receiving usual care services available in South Carolina. The study found no effects on any of the three primary, prespecified outcomes: (i) a composite measure of adverse birth outcomes; (ii) rate of subsequent births within 21 months postpartum; and (iii) a composite measure of adverse child health outcomes due to injury or suspected abuse or neglect.

These null results contrast with findings from the previous evaluations of NFP in the U.S. and Netherlands (studies 1, 2, 3, and 4). One possible reason why the South Carolina study did not replicate the earlier positive findings is that the sample was less at-risk than in the earlier NFP trials (e.g., approximately 40% of women had attended college). However, the study also found no effects for the subgroup of women defined as socially vulnerable at baseline.

Description of the Program:

Starting in 2016, the state of South Carolina expanded access to NFP, roughly doubling the number of women served. Nine implementing agencies across the state offered the standard package of NFP services. All visits took place at the participant's home until the onset of the COVID-19 pandemic when visits transitioned primarily to a virtual format.

Overview of the Study Design:

This was a randomized controlled trial with a sample of 5,670 pregnant women enrolled between April 2016 and March 2020 who met the following eligibility criteria: first pregnancy, maximum 28 weeks gestation, aged 15 years or older, and income-eligible for Medicaid (with a household income less than 200% of the Federal Poverty Line). Women in the sample were randomly assigned 2:1 to a treatment group (n=3806), which was offered the NFP program, or a control group (n=1864), which had access to usual services.

55% of the women were Black, 35% were white, and 6% were Hispanic. Their average age was 22.5, and all were income-eligible for Medicaid.

Key Findings:

- The study found no effects on any of the three prespecified, primary outcomes:
 - No effect on a composite measure of adverse birth outcomes, which included preterm birth, low birthweight, small for gestational age, and perinatal mortality. 27% of the treatment group experienced an adverse birth outcome versus 26% of the control group.
 - No effect on the rate of subsequent births within 21 months postpartum. 11% of the treatment group had a subsequent birth within 21 months versus 12% of the control group.

- No effect on a composite measure of adverse child health outcomes, which included a healthcare encounter or mortality associated with a major injury or suspected abuse or neglect during a child's first two years of life. 27% of the treatment group experienced an adverse child health outcome versus 27% of the control group.
- The study also found no effects on any of the three primary outcomes for a prespecified subgroup of interest: socially vulnerable women, defined as those who, at baseline, were younger than 19, had not finished high school, or had challenges with mental health.

Discussion of Study Quality

This was a large, well-conducted RCT. The study appropriately prespecified its primary outcomes and analyses. The study's primary outcomes were measured using administrative data, including vital records, Medicaid claims data, and hospital discharge data. The study measured outcomes for all mothers and children, regardless of whether or how long they actually participated in the program (i.e., the study used an "intention-to-treat" analysis). Treatment and control groups were highly similar in their baseline characteristics. Sample attrition was low and approximately the same for both groups.

Based on program implementation measures, NFP appears to have been well-implemented. Treatment families received a median of 40 NFP visits out of a possible maximum of 64 visits. Although nurse home visits largely shifted to virtual visits during the COVID-19 pandemic, exploratory analyses suggest the results were similarly null for the subsample of women who completed the program prior to the onset of the pandemic.

OTHER STUDIES

Three other randomized controlled trials of NFP have been conducted. The findings from two of these studies, although short-term, are generally consistent with the results of studies 1, 2, 3, and 4 described above. However, these trials fall outside this initiative's criteria and so are not summarized here (e.g., because they did not use an "intention-to-treat" approach to estimate the program's effects). A third study, although well conducted, evaluated NFP alongside three other home visiting program models and did not report model-specific results with sufficient detail to assess the NFP-specific effects. The pooled findings from this study showed minimal effects of the four home visiting programs, and the available model-specific information suggests that NFP's effects were also small, which is more aligned with the results of studies 5, 6, and 7.

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