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:** Five well-conducted randomized controlled trials (RCTs), each carried out in a different population and setting (three in the United States, one in the Netherlands, and one in the United Kingdom).
- **KEY FINDINGS:** Pattern of sizable, sustained effects on important child and maternal outcomes in four of the five studies. Effects replicated across two or more studies include: (i) reductions in child abuse/neglect and injuries (20-50%); (ii) reduction in mothers' subsequent births (10-20%) during their late teens and early twenties; and (iii) improvement in cognitive/educational outcomes for children of mothers with low mental health/self-confidence/intelligence (e.g., 6-percentile point increase in grade 1-6 reading/math achievement).

I. Evidence rating: TOP TIER

The standard for Top Tier is:

Programs shown in well-conducted RCTs, carried out in typical community settings, to produce sizable, sustained effects on important outcomes. Top Tier evidence includes a requirement for replication – i.e., the demonstration of such effects in two or more RCTs conducted in different implementation sites, or, alternatively, in one large multi-site RCT. Such evidence provides confidence that the program would produce important effects if implemented faithfully in settings and populations similar to those in the original studies.

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[1]).

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 five such studies, each conducted in a different population and setting (Elmira, New York; Memphis, Tennessee; Denver, Colorado; the Netherlands; and the United Kingdom).

Four of the five studies found the program to produce sizable, sustained effects on important outcomes for mothers and their children. The specific effects that were reproduced in two or more of the studies – and thus are the most likely to replicate in a new implementation of the program – are: (i) reduction in measures of child abuse and neglect (including injuries and accidents), (ii) reduction 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 study,[2] and (iv) improvement in cognitive and/or academic outcomes for children born to mothers with low psychological resources (i.e., intelligence, mental health, self-confidence).

The fifth study, conducted in the United Kingdom, found no significant positive effects on any of the primary outcomes (e.g., rates of maternal smoking during late pregnancy, birthweight, repeat pregnancy within 24 months, emergency department or hospital admissions). Possible reasons for the discrepant findings include: (i) 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 through the child's second birthday; and (ii) this study targeted a lower-risk sample of mothers than most of the prior studies, and the other studies generally found NFP's effects to be strongest among higher-risk mothers.

The following summarizes the program's effects on all of the main outcomes measured in each of the five 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 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

[1] Throughout this summary we have converted all reported dollar amounts to 2019 dollars.
[2] 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).

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).
- No significant effect on recent substance use (per self-reports at age 19).
- No significant effect on high school graduation rates (per self-reports at age 19).
- No significant effect on likelihood of becoming pregnant or giving birth, or causing a pregnancy or birth (per self-reports at age 19).
- No significant effect on percent engaged in economically productive activities at age 19 (e.g., work or school), or on lifetime use of welfare or other public assistance, per self-reports.

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. Therefore, we believe these effects need to be confirmed in additional studies. 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 outcomes[3] 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.

[3] 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.

- 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, 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. Therefore, we believe these effects need to be confirmed in additional studies. 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 birth weight 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 is being conducted in 20 municipalities in the Netherlands, and has 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).[4]

This new study report examines 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-time 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

[4] 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.

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.

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 impacts 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 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 a control group that received usual community services, and measured outcomes through the child's second birthday. The study found no significant

effects (or pattern of non-significant effects) on the following primary outcomes: rates of maternal smoking during late pregnancy, birthweight, or repeat pregnancy within 24 months. The study found a possible adverse effect on one primary outcome: emergency department or hospital admissions.

The U.K. findings stand in contrast to the positive findings for many of these outcomes found in RCTs of NFP in the United States and the Netherlands. 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) this study targeted a lower-risk population than most of the prior studies, and prior evidence indicates that 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).[5]

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 (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: 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 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. The study also measured a large number of secondary outcomes related to child health and development and maternal life course, and found no clear pattern of effects favoring either the NFP or control group.

[5] £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).

These null results contrast with findings from previous evaluations of NFP in the U.S. and Netherlands, which have generally found significant reductions in rates of smoking during pregnancy, child maltreatment, and mothers' subsequent births in their late teens and early twenties. Possible reasons why the U.K. study did not replicate the earlier positive findings include:

- 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 though the child's second birthday. By contrast, usual care in the U.S. studies typically included only developmental screenings and referrals to treatment, without home visits from a nurse or midwife.

- Previous evaluations found stronger effects among high-risk women. However, this study's sample may have been somewhat less disadvantaged on average than samples from prior studies, since this study only used maternal age as a proxy for disadvantage in determining eligibility criteria, rather than multiple measures of disadvantage as in most other NFP RCTs.

Discussion of Study Quality:

This was a well-conducted RCT. 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, and 92% for birthweight). 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.

OTHER STUDIES

Two other randomized controlled trials of NFP have been conducted. Their results, although short-term, are generally consistent with the results of the studies 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).

IV. Summary of the Program's Benefits and Costs:

If taxpayers fund implementation, what benefits to society can they expect to result, and what would be their net cost? The following table provides a summary. This is intended to be a general overview of social benefits in relation to taxpayer cost, rather than a comprehensive benefit-cost analysis. It assigns monetary value to particular benefits and costs only when doing so requires minimal assumptions. All monetary amounts shown are in 2019 dollars.

Benefits To Society

The following benefits were found in at least two studies of NFP

- 20-50% reductions in child abuse, neglect, and/or injuries.
- 10-20% reduction in mothers' subsequent births during their teens and early twenties.
- Improvement in cognitive and/or educational outcomes for children born to mothers with low mental health, confidence, and/or intelligence (e.g., in Study 2 (Memphis, TN), a 6 percentile point increase in grade 1-6 reading and math test scores).

Net Cost To Taxpayers

- $15,000 per woman, to deliver program services (i.e., three years of home visits by a trained nurse).
- This cost was offset in two of the studies by reduced government spending on mothers' use of welfare and other public assistance (e.g., approximately $20,000 in lower spending per woman over 18 years in Study 2 (Memphis, TN)). Both Study 1 (Elmira, NY) and Study 2 (Memphis, TN) found such lower welfare spending, but the Study 3 (Denver, CO) did not. These outcomes were not measured in the two international studies.

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