Supporting first-time vulnerable mothers and their infants and toddlers: Evaluation study of the Nurse Family Partnership program Bulgaria

Evaluation report

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Report and contributing analyses completed by:

Prof. Dr. De Laat[1], J. J., Kraus, H., MPP. & Van der Harst, A.M.R., MScs;

Utrecht University – Centre for Global Challenges

Trust for Social Achievement

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[1] Correspondence: Prof. dr. Joost de Laat, Utrecht University School of Economics, Centre for Global Challenges, Utrecht University, 3584 CS Utrecht, The Netherlands. Email: j.j.delaat@uu.nl

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Acronyms

ASQ – Ages and Stages Questionnaire

ECEC – Early Childhood Education and Care

NFP – Nurse Family Partnership

TSA – Trust for Social Achievement

Executive summary

The purpose of this current study is to evaluate the Nurse Family Partnership (NFP) program and its projected outcomes after six years of implementation. The NFP is a community health program designed to support vulnerable families in Bulgaria. The study captures the period of implementation between 2016 and 2022. NFP is an evidence-based program, originally designed to support vulnerable families in the United States. NFP matches first-time, low-income mothers with a nurse, who visits regularly from pregnancy through the child's second year. Studies from other contexts where NFP operates have found effects that include:

- Improved prenatal health;
- Improved pregnancy outcomes;
- Decrease in infant mortality;
- Fewer accidents and injuries among children;
- Fewer cases of child abuse and neglect;
- Longer intervals between pregnancies;
- Increased employment rate among mothers;
- Better school readiness;
- Decreased likelihood of involvement in criminal activities (for children and mothers);
- Reduced use of social benefits.

The Trust for Social Achievement (TSA) adapted the NFP to the Bulgarian context to support vulnerable families facing various challenges when expecting their first child. Through regular home-visits by nurses and midwives, the program provides preventive healthcare services, support and guidance during pregnancy and early childhood (until the child's second birthday). The NFP program aims to help parents become more competent in caring for themselves and their children, to engage in sensitive and responsive parenting activities and to set goals for the future. These efforts seek to contribute to the improvement of maternal and child health, the promotion of school readiness, and ultimately the reduction of intergenerational poverty.

Bulgaria is the first country in Eastern Europe licensed to test the NFP program. The program has been implemented by TSA in cooperation with the Specialized Obstetrics and Gynaecology Hospital

Sheynovo in Sofia and St. George University Hospital in Plovdiv. About two-thirds of NFP clients are located in Sofia, and about one-third in Plovdiv. NFP nurses conduct home visits for up to 20 clients each and perform between 50 and 64 (with an average of 57) home visits to each family participating in the program. Over the past six years it has reached over 350 vulnerable young (mostly teenage) first-time mothers and their families.

For the evaluation study, data were collected by Alpha Research Bulgaria between May 16, 2022 and July 27, 2022, and were collected among three groups of first-time mothers:

1. **159 NFP clients in vulnerable, predominantly Roma (and some Turkish) communities**. This group included clients enrolled in the program at the time of data collection (whose children were aged 6 months to 2 years at the time of data collection), and NFP graduates (whose children were aged 2 to 5 years at the time of data collection).
2. **301 mothers who did not participate in NFP and live in the same vulnerable, predominantly Roma communities**. The sample was selected based on three criteria: living in the same neighborhoods where NFP is operating, sharing the same mother's ages at the time of the first pregnancy (they had their first child below the age of 22), and sharing the same ages of the child (their first child was born between 2017 and 2021).
3. **305 mothers among the general Bulgarian population**, who had their first child within the period 2017 and 2021.

As seen in this list, the majority of Group 1 and Group 2 identifies as Roma, but there are also other ethnicities within this group. For simplicity, in the text we continue to describe these groups as "Roma", however it should be noted that the full groups do not identify as such.

Detailed data on mother and child outcomes was collected. A tailor-made Knowledge, Attitudes and Practices (KAP) survey was designed to collect information on the mother's demographics, education- and employment (and plans), geographic mobility, social network (family, household, community), maternal well-being, child rearing knowledge, attitudes, and practices, pregnancy-related questions, access and use of public services, and experiences with the NFP program. To collect information on the child's development, the Ages and Stages Questionnaire (ASQ-3) was used. There are 5 developmental areas screened through ASQ-3; communication, gross motor, fine motor, problem solving and personal-social. In addition, the ASQ social and emotional (ASQ-SE) assessment was implemented.

This report concludes that there is a clear gap in child development outcomes between the general population sample and the sample of Roma mothers who did not participate in NFP. A variety of indicators highlight that Roma families in this study are in more vulnerable situations than the general population families. These findings are discussed in more detail below.

The study also finds that when comparing the NFP sample with the comparison non-NFP sample of Roma mothers and children, the NFP children score significantly higher across multiple domains of two child development tests, with results more similar to those children from the general population sample, even after controlling for background characteristics. These findings are summarized below.

Comparing the Roma (non-NFP) sample with the general population

The Roma first-time mother sample has a considerably lower level of education and is poorer than first-time mothers from the general population from the same two cities. The Roma sample is much less educated (11% completed secondary education compared with 99% of the general population

sample). Whereas the Roma mothers speak a variety of primary languages at home (42% Bulgarian, 40% Romany, and 18% Turkish), 99% of the general population sample speaks Bulgarian. Further, 82% of the Roma mothers report being full-time homemakers (looking after the home/children/relatives) or on formal parental leave, compared with 42% of the general population sample. The Roma sample is also considerably poorer: only 39% confirm that they live in a household above the poverty threshold, compared to 98% of mothers in the general population. Furthermore, 12% of Roma mothers lack running water at home and 26% lack a toilet inside the house, compared to none of the general population mothers.

Children of Roma mothers have, on average, lower child development outcomes than children of mothers from the general population as measured by the ASQ-3 and ASQ-SE assessments, although this varies by domain. Across the five ASQ-3 domains – communication, gross motor, fine motor, problem solving, and personal-social, children of Roma mothers score on average 73% of the maximum possible points. This is 9.2 percentage points lower than the general population, meaning their development is less likely to be "on track" for their age. The gaps are biggest in the Fine Motor and Problem Solving domains, followed by Communication, Personal-Social, and Social-Emotional (ASQ-SE) domains. The gap is smallest in the Gross Motor skills domain.

In terms of birthweight, we find that the Roma children are significantly lighter – 3,006 grams vs 3,262 grams, and more likely to have a low birthweight (below 2,500 grams): 12% of Roma children fall into this category compared with 4% of children in the general population sample. The gestational ages are nearly identical between the two groups.

With regards to pre-pregnancy indicators among mothers, on average, Roma mothers are considerably less likely to name different methods of contraception compared to mothers in the general population, with the gaps in naming birth control pills and IUDs being the largest. By far, the most common form named by Roma mothers are condoms: 66% (versus 74% among the general population). However, fewer than one-third of Roma mothers named any of the other methods: 28% mentioned birth control pills (vs 60%), 26% mentioned IUDs (vs 59%), 12% mentioned interrupted intercourse (vs 32%), 1% mentioned family planning (vs 18%), and 0% mentioned emergency contraception (vs 19%).

Indicators around the pregnancy itself also point to gaps. First, knowledge among Roma mothers about factors affecting the baby's well-being during pregnancy and what to expect during childbirth is lower among Roma than among general population mothers. Second, Roma mothers report eating nutritious foods at lower frequency during pregnancy and are more likely to have smoked during their pregnancy. The percentage of mothers who report consuming alcohol during pregnancy is modest and similar across both groups (8% of Roma mothers versus 9% of general population mothers).

Furthermore, a sizable share (23%) of Roma mothers reports having been without health insurance during pregnancy, and while the frequency of prenatal check-ups is generally high, it is also lower than the general population. A sizeable proportion does not meet the national benchmark of 8 check-ups. On average, Roma mothers feel comfortable contacting a GP with questions about the pregnancy, although less comfortable than the sample of general population mothers. The vast majority – 95% of Roma mothers- had their first pregnancy monitored by a GP, obstetrician, or midwife.

In some areas, gaps between Roma mothers and mothers in the general population persist post-pregnancy, but not in others. For example, Roma and general population mothers report similar favorable preferences toward mandatory vaccines for their baby, and the duration of breastfeeding is

similar, albeit below the recommended duration. On the other hand, there are several indicators that point to children of Roma mothers being in more vulnerable situations than children of general population mothers. This includes a large gap in whether the mother currently has health insurance (41% vs 99%, for those aged 18 and older), a higher frequency of going to the emergency room with the baby in the first year of life, higher rates of mother's smoking (49% vs 27%), significantly higher average scores on a loneliness scale, and lower scores on a Pearlin scale assessing whether someone feels their life chances are under their personal control.

Furthermore, since early stimulation through parenting activities plays an essential role in child development, the questionnaire asked mothers about the activities that household members do with the infants and young children. Roma mothers report substantially lower frequencies when it comes to reading books to their children, telling stories, naming, counting, and drawing, as well as playing with toys. Rates of singing songs and children spending time outside are similar between the two groups, while the amount of screen time per day is considerably higher for the Roma children compared to the general population.

Assessment of the impact of the NFP program

The impact assessment results in this report provide an indication of where the effects of the NFP program may be concentrated, but caution is warranted in interpreting the findings as causal. To estimate the effects of the NFP program on various child- and maternal-level outcomes, we used ordinary least squares regression models that compare outcomes for NFP clients and their children with outcomes of non-NFP Roma first-time mothers from the same neighborhoods, controlling for background characteristics. Both the sampling strategy and control variables help to eliminate factors that may bias the assessment of the effect of the NFP program. However, caution is warranted in interpreting the findings as causal as there still might be *un*observed characteristics that we cannot control for in our estimations, affecting both participation in NFP and the outcomes of interest.

In terms of child development outcomes, the sample of children from mothers who participated in NFP ("NFP children") score nearly the same across ASQ-3 domains as children from the general population, and significantly higher than the sample of children from non-NFP Roma mothers, after controlling for background characteristics. According to the estimation results, 3.30 percentage points of the gap in average ASQ-3 scores (across domains) between NFP and non-NFP Roma children cannot be explained by differences in background characteristics, suggesting that the NFP may be raising ASQ scores and improving child development outcomes. When looking at the estimation results by domain, NFP children score 2.97 percentage points higher on "Gross Motor", 3.95 percentage points higher on "Fine Motor", and 5.98 percentage points higher on "Problem Solving", when compared to children of Roma mothers who did not participate in NFP (all statistically significant). NFP children also score 2.77 percentage points (statistically significant) higher on the "ASQ Social-Emotional" assessment, compared to children from the Roma comparison sample. Based on the survey of mothers, when it comes to the languages that the child can comfortably speak or understand, the regression analyses find that children who participate in NFP are 5 percentage points more likely to speak or understand Bulgarian than children from the Roma comparison sample, again controlling for background characteristics. The regression estimation results show no significant differences between NFP and non-NFP Roma children when it comes to birthweight and gestational age.

We find that the effects of the NFP program on child development results (as measured by ASQ) depend on the language spoken at home, with the ASQ scores being particularly higher among children of NFP mothers who speak Romany or Turkish at home. This indicates that the NFP program

may improve child development outcomes particularly for children who speak Romany or Turkish at home (compared to the effects among Roma mothers who speak Bulgarian at home). These non-Bulgarian speaking Roma families may be more vulnerable than Bulgarian speaking Roma families.

With regards to mother outcomes, NFP mothers tend to demonstrate greater knowledge of contraception methods, but there are mixed results among pregnancy outcomes.

The regression results indicate that the NFP program may be closing gaps in contraception knowledge. Specifically, on average, mothers who participate in NFP are 17 percentage points more likely to name birth control pills and 30 percentage points more likely to name IUDs compared to Roma mothers who do not participate in NFP, always after controlling for background characteristics. NFP mothers also demonstrate greater knowledge about the developing fetus, but there is no evidence that nutrition improves, nor is alcohol consumption lower than non-NFP Roma mothers (though on average, alcohol consumption during pregnancy for both Roma groups is lower than for general population mothers). Smoking during pregnancy is lower (both frequency and number of cigarettes), but this difference is not significant after controlling for background characteristics.

There are also few significant differences between NFP participants and the comparison group of Roma mothers with respect to other pregnancy outcomes, including having health insurance during pregnancy, number of prenatal check-ups, and experiences of complications during pregnancy. The exceptions where differences are significant are in the reported use of services, and how comfortable mothers feel when contacting the GP. For instance, NFP mothers report relying less on financial assistance/benefits during pregnancy. NFP mothers also report receiving more psychological support services. While NFP nurses do not provide psychological care, this finding may be explained by respondents perceiving the home visits as a source of psychological support. Lastly, NFP mothers report feeling significantly less comfortable contacting their GP about the pregnancy.

Post-pregnancy, the findings are encouraging. NFP mothers have improved child feeding practices in the first year of the baby's life, and improved post-childbirth parenting outcomes more broadly, particularly around early stimulation parental engagement activities. With regards to child feeding practices in the first year of the baby's life, mothers in NFP breastfed their first child for at least 0.79 months longer than the comparison group of Roma mothers. There is also evidence that participation in the NFP program may improve both depression symptoms and feelings of loneliness and social isolation among Roma mothers. There is no evidence that the program reduces smoking after giving birth or leads to improved feelings of self-efficacy[2] among mothers.

The regression analyses find that NFP mothers have considerably higher levels of parental engagement activities with the child than non-NFP Roma mothers, which may explain the higher ASQ results observed above. Mothers who participate in NFP are 23 percentage points more likely to read books with their child, 17 percentage points more likely to tell stories, 16 percentage points more likely to count and draw, and 8 percentage points more likely to play with toys. Conversely, children

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[2] Within the NFP model, the concept of 'self-efficacy' is based on the theory which proposes that individuals choose those behaviours that they believe will lead to a given outcome and that they can carry out successfully (Bandura, 1977). One way this study measures self-efficacy is through the Pearlin mastery and control scale.

who participate in NFP spend significantly less time in front of screens than children from the Roma comparison sample.

There is no evidence that the NFP program increased the frequency that parents sing songs or go outside with their child, but both activities are already very common among Roma. Finally, there is no evidence from the regression analysis that the NFP program helps to close the gap between Roma children and general population children in attending formal day-care or kindergarten.

Questions for further consideration

Based on the findings presented in this report, several follow-up questions can be shared. These can inform the ongoing monitoring of the program and the efforts to strengthen implementation through continuous quality improvement – important strands within the approach of the program.

What might explain why some intended outcomes were not significant, and what can be done to strengthen such areas? As mentioned before, there are areas where findings did not indicate improvement through NFP, for example, in improving birthweight, improving diet, reducing smoking, comfort in contacting the GP about the pregnancy, supporting greater preschool participation, and raising feelings of self-efficacy around life's chances. In interpreting the findings, it is important to note that the program is only in its sixth year of implementation, and for certain program areas, it may take longer before intended outcomes become visible. Moreover, mothers in the NFP client group are at different stages of the program, which means that some may not have gone through all the modules included in the NFP program. This may for instance affect the findings around goal setting and self-efficacy –because these modules are offered in later stages of the program. Finally, there may be variables such as environmental factors, or structural barriers that were not observed or controlled for in this study, that may (co-)determine outcomes of interest.

What can be done to support young Roma women and men living in vulnerable conditions to delay their first pregnancies, and first complete at least a secondary school education? The positive indications of the NFP program on child development outcomes suggest that the program may help provide the foundation for the next generation of young men and women to have improved educational outcomes. In addition, the positive indications on family planning knowledge indicate that the gap in family planning knowledge, in particular around birth control and IUDs, among young Roma women can be closed. Because the NFP is designed to reach vulnerable women once they are pregnant, closing this knowledge gap among girls and young women *before* their first pregnancy would require outreach that goes beyond the NFP, for example through school- and community-based outreach to young men and women.

What complementary public programs could further improve child- and mother-level outcomes? The NFP is designed to create a safe space to allow for coaching and guidance, built on trusted relations between nurses and vulnerable young mothers. Which public programs could complement such nurse-client interactions? One domain might be programs aimed at addressing knowledge and awareness among young men and women, vulnerable ones especially, around family planning, pregnancy, and child development. For example, school- and or community based programs informing adolescents, young adults, and (expecting) parents about family planning methods, risky behaviors around pregnancy, accessing health insurance, creating a safe home environment, feeding practices, and the importance of early stimulation parenting practices.

These questions point to additional areas of exploration that can inform what mix of cost-effective policies can best support vulnerable children and their parents to achieve improved child development outcomes, and reduce the numerous inequalities found by this analysis.

1. Introduction

The purpose of this study is to evaluate the Nurse Family Partnership (NFP) program and its projected outcomes after six years of implementation in Bulgaria.

The NFP is an evidence-based community health program designed to support vulnerable families. The NFP was originally designed to support vulnerable families in the United States and has been implemented in Bulgaria since 2016.

The evaluation of the NFP program is based on data that was collected by Alpha Research Bulgaria between May 16, 2022 and July 27, 2022. Detailed data on mother- and child outcomes was collected and compared among three groups of first-time mothers: NFP clients in Roma communities, first-time mothers in Roma communities not participating in NFP, and first-time mothers among the general Bulgarian population.

1.1 Description of the Nurse Family Partnership program

The Nurse Family Partnership is a community health program, originally designed to support vulnerable families in the United States (Olds 2006). NFP matches first-time, low-income mothers with a nurse, who visits regularly from pregnancy through the child's second year. While NFP was developed to target mothers primarily, the program welcomes fathers, partners, family members and close friends, to participate. The goal is to ensure that everyone who will be supporting the baby and ideally forming close attachments with the child, will be well-equipped to do so. The program is based on three main theories which complement each other and lay the foundation of the program – child attachment, human ecology, and self-efficacy (Olds, Hill, O'Brien et al. 2003).

The three program goals are to improve pregnancy outcomes, to improve child health and development, and to improve families' economic self-sufficiency. Research from the United States demonstrates that the NFP program has long-reaching impacts on both the child and the mother. The program was tested for 20 years before it was scaled up in the USA in 1997. By now, the NFP model has been implemented in more than nine countries. Based on random assignment experiments, proven program results include: reduction in child abuse and neglect (*reanalysis of* Olds, Eckenrode et al. 1997), reduction in ER visits for accidents and poisonings (Olds, Henderson, et al. 1986), reduction in language delays at child age 21 months (Olds, Robinson, et al. 2002), less behavioral/intellectual problems at age 6 (Olds, Kitzman, et al. 2004), fewer subsequent pregnancies (Olds, Eckenrode et al. 1997), increase in mothers' employment (Olds, Henderson, et al. 1988), fewer arrests of the mothers (Olds, Eckenrode, et al. 1997), reduction of child arrests at age 15 (*reanalysis of* Olds, Henderson, et al. 1998).

In 2016, the Trust for Social Achievement (TSA) initiated the Nurse-Family Partnership (NFP) in Bulgaria, the first country in Eastern Europe where the NFP program was licensed. The NFP model was adapted to the Bulgarian context to support low-income families facing a range of problems when expecting their first child. Through regular home-visits by nurses and midwives, the program provides

preventive healthcare services, and various types of support during pregnancy and early childhood (until the child's second birthday). The NFP program aims to help parents become more competent in caring for themselves and their children, to engage in supportive parenting activities and to set goals for the future. These efforts seek to contribute to the improvement of maternal and child health, the promotion of school readiness, and the reduction of intergenerational poverty.

The program has been implemented by TSA in cooperation with the Specialized Obstetrics and Gynaecology Hospital Sheynovo in Sofia and St. George University Hospital in Plovdiv. Eligibility criteria for enrolment are:

- <28 weeks in pregnancy
- Mothers are under the age of 22 years at conception
- Mothers are expecting their first child (no previous live births)
- Client is with low income at the time of enrolment
- Client lives in the neighborhoods where the program is active

The NFP program is relevant for all vulnerable groups in Bulgaria. To target low-income families, TSA implemented the program in poor neighborhoods in Sofia and in Plovdiv. About two-thirds of NFP clients are in Sofia, in the neighborhoods of Fakulteta, Filipovtsi, and Hristo Botev. About one-third of clients are in Plovdiv, mainly in the neighborhoods of Stolipinovo and Sheker Mahala. . Over the past 6 years, NFP reached over 370 young (mostly teenage) first-time mothers and their families. The vast majority of clients are low-income ethnic Roma families (232 families), followed by 126 Turkish Roma families, and 16 ethnic Bulgarian families.

The NFP team on the ground consists of 10 family nurses and 4 health mediators. TSA also collaborates with two local NGOs - the Health and Social Development Foundation in Sofia and the National Alliance for Volunteer Action in Plovdiv - that support the teams with psychological supervision and social work consultations. The central team implementing NFP in Bulgaria consists of a program manager, data analyst and clinical leader. Additional support is provided by TSA's First Foundations Program Officer. Guidance is provided by an international implementation team at the University of Colorado, Denver, under the leadership of Prof. David Olds, who developed the NFP program. On the national level the program is reinforced by National and Local Advisory Boards that contribute to its quality and sustainability, and to the integration of the service into the health care system.

Each NFP nurse conducts home visits for up to 20 clients, and performs up to 64 home visits to each family participating in the program, individualized to family needs. The home visits are intended to provide a trust-based, personal approach that allows for a holistic/multidimensional character to the program. Home visiting teams provide direct mentorship and support to the mothers, but also involve the client's partner and extended family. Building and cultivating a relationship of trust with the clients and their families is considered key in this approach.

The involvement of family and a trust-based relationship are considered essential features of the program, since the work extends into intimate spheres of life such as parenting, family planning and reproductive health, and opens conversations about topics which are not easily discussed in general, and may even be considered taboo by some.

TSA adjusted the NFP model to fit the Bulgarian context, which included:

- Introducing community health mediators – to promote engagement of the communities served, facilitate client enrolment, ensure cultural sensitivity in program delivery, translate during home visits when needed, and support client access to other services;

- Assigning a maximum of 20 clients (instead of 25) to each of the nurses - on the assumption that more home visits per client will be needed due to high level of illiteracy, lack of access to health services, and deep poverty;
- Coverage of some medical costs for clients in need – during pregnancy in order to reduce infections that could lead to premature and/or complicated birth;
- Coverage of some medical needs for babies in need – as many of the families live in deep poverty, they cannot afford prescribed medications when the baby is sick and this could lead to many complications, chronic diseases, and mortality in infants and toddlers caused by treatable conditions;
- Requiring nurses and midwives to have completed education which gives them the right to practice in Bulgaria – this does not necessarily involve a Bachelor's degree, as only since 2008 do nurses and midwives in Bulgaria obtain Bachelor's degrees;
- Expanding the ongoing education curricula to ensure sufficient knowledge according to the international NFP requirements – this was needed because some program staff lacked specific NFP-required knowledge due to curricula differences across universities, colleges, and vocational schools in the last few decades.

As a result of the Covid-19 pandemic, nurses had to resort to online consultations, performed through a Telehealth method. This allowed nurses to perform remote visits according to guidelines approved by the University of Colorado, Denver. However, some clients were hard to reach because they did not own a mobile phone. Community health mediators supported the nurses in reaching clients, and in the case of Plovdiv, performed an additional role as interpreters.

2. Literature review

Adversity affects early childhood with long lasting consequences

Early childhood is widely recognized as a critical, and therefore potentially vulnerable stage in life. Evidence from across a wide range of disciplines points to the years from zero to three as formative years, and as a period in which the most rapid development in human life takes place. Brain research has shown that brain maturation and the development of important neural pathways and connections are progressively developed after birth and in early childhood (EPHA 2018; Johnson et al 2016). In this sensitive period of intensive growth, environmental influences have an important impact on the development of the brain and nervous system (Shonkoff, Gardner et al. 2012). Risk factors in early childhood – such as those caused by adversity – can have irreversible negative consequences for cognitive, social, and emotional development, academic achievement, and behavioral adjustment (Amso & Lynn 2017; Blair & Raver 2016; Leseman & Slot 2014).

Existing literature suggests that disadvantages can affect early development in various ways. For instance, prolonged early-life stress can affect the biological stress response, which can lead to alterations in the prefrontal–hippocampal–amygdala circuits. These circuits play an important role in the autonomous nervous system, emotion regulation, self-regulation, memory, and learning (Smith & Pollak 2020). When stress response systems are activated for extended periods of time, it can lead to dysregulation, and negative psychological and behavioral outcomes (Smith & Pollak 2020). These processes can also increase vulnerability to mental and physical health disorders later in life (Amso & Lynn 2017; Smith & Pollak 2020). Moreover, literature on socioeconomic disadvantage provides evidence of the negative effects of poverty in many brain regions (Hair et al 2015; Hanson et al. 2013;

Leijser et al. 2018). For instance, Blair and Raver (2016) find that children growing up in poverty have reduced volumes of grey matter in the regions of the brain associated with school readiness and achievement.

In the last two decades, the scientific study of early development has progressed substantially (Daelmans, Darmstadt et al. 2017), generating insight into the effects of adversity on a child's development and how these may be mitigated. A growing body of evidence shows that adversity undermines healthy brain development with far reaching consequences. Children exposed to adversity lack the necessary enabling environment to acquire a strong foundation for health, learning and development throughout life (Black, Walker et al. 2017; Daelmans, Darmstadt et al. 2017). Gaps are found to emerge as early as two or three years of age, and if these remain unaddressed at that point, tend to widen further (Daelmans et al. 2017). Studies on long term outcomes indicate that deficits may even be passed on to the subsequent generation, producing a vicious cycle of lost capital and perpetuated poverty (Daelmans, Darmstadt et al. 2017:9).

Neuroscience on so called 'sensitive periods' and plasticity expands our understanding of skill development and genetic-environmental interactions, crucial for optimal intervention timing – to match the times when a child's development is sensitive to specific experiences and environmental conditions. The period from conception to age two to three is of particular importance. During this period, improvements in e.g. nutrition or nurturing care can (still) attenuate the effects of adversity (Black, Walker, et al. 2017).

Roma communities constitute particularly at-risk populations

Despite its membership in the European Union, high infant mortality rates, teenage childbirths and abortions, and limited access to prenatal care for uninsured pregnant women, and high out-of-pocket costs for health care and prescribed medicines, are among the most urgent problems Bulgaria is facing in the field of maternal and infant wellbeing. Addressing these challenges has been part of governmental priorities since 2008 and are included in the population- and healthcare strategies and in education action plans. Poor maternal and infant health and wellbeing are predominantly faced by the most vulnerable families in Bulgaria– those living in poverty and/or social segregation, often with a Roma background.

The majority of the NFP clients in the targeted neighborhoods where the NFP has been implemented are low-income Roma families, alongside low-income Turkish families. Roma are amongst the most marginalized ethnic minorities in Europe, facing high levels of poverty, systematic social exclusion, high rates of unemployment, low quality housing, and unequal access to vital services (European Union Agency for Fundamental Rights 2021, RECI 2020, European Roma Rights Centre 2020). Studies have consistently found that the health status among Roma is worse than the health of majority populations, with lower life expectancy than national averages, higher infant mortality compared to non-Roma populations (EPHA 2018), and higher rates of both communicable as well as non-communicable diseases (Petraki et al. 2021).

A similarly dire picture is reflected in the data for Roma communities in Bulgaria. Within the distribution of Bulgarian people suffering from serious material deprivation, Roma populations make up the largest share (81%), and among Roma, an estimated 90% are at risk of poverty and social exclusion (UNICEF 2018). Roma parents often lack access to resources, support, and health care to achieve good health and wellbeing for themselves and their children.

Roma children are thus particularly at risk of growing up in adversity early in life. The presence of one or two risk factors in a family does not have to be detrimental to child development. However, risk

factors are found to act in a cumulative manner, and more than two factors combined substantially increases the likelihood of negative outcomes (Atzaba-Poria, Pike and Deater-Deckhard 2004; Bauman, Silver and Stein 2006). Roma children are likely to experience an accumulation of risk factors, increasing the probability on adverse effects on their early development.

Early development data for Roma children

While available studies and reports indicate the prevalence of risk factors for Roma children, data on child development outcomes in early years are lacking. What do we know about the early life health status of Roma children? Which children are most at risk of negative outcomes? Is there a gap in the early development of Roma children compared to their majority population counterparts? If so, in which development domains is it most pronounced? What are (early) manifestations of such gaps? Below, we will first review the available data for Roma children in Europe, before taking a closer look at (early) development data for Roma children in Bulgaria.

ROMA CHILDREN IN EUROPE

Data on the health status of Roma people, and children in particular, is sparse. Studies on health at birth in Central and Eastern Europe show that Roma experience a higher prevalence of low birthweight and preterm births (Balázs & Rákóczi et al. 2013; Bobak, & Dejmek, et al. 2005; Diabelková & Rimárová et al. 2018), and higher rates of infant mortality in some countries (European Commission 2015). However, most of these studies have been conducted more than 8 years ago and cannot provide an accurate picture of Roma children's health status today.

Measures of (early) development and learning are equally hard to find for Roma children, especially for younger age groups. For school-aged children, the scarce data suggests that Roma students' learning is often behind that of their non-Roma peers, and that Roma students are more likely to develop disabilities or cognitive delays.

International assessment instruments such as the OECD Program for International Student Assessment (PISA), which measures 15-year-old students' learning outcomes, have made major contributions in putting educational equity on the agenda, especially by revealing existing achievement gaps for students from low socio-economic status families or with a migration background. However, these instruments do not currently provide data on learning outcomes for non-migrant minorities. With the design of the instrument, Roma-specific data can only be collected though a question about the language spoken at home (and only if "Romani" is included as a response option to this question). Only Slovakia included this response option in the past, allowing for reanalysis of PISA data to generate findings for Romani-speaking students (although based on a small sample size) (Brüggemann & Bloem 2013). The PISA results in Slovakia showed that Roma students entered school at a later age, repeated grades more frequently (and were thus more often in lower grades),and were overrepresented in vocational tracks compared to their non-Roma counterparts. Furthermore, Romani-speaking students performed significantly worse in all disciplines. If the PISA scores would be translated into schooling years, Roma students would be almost four years of regular schooling behind their peers (Brüggemann & Bloem 2013).

A recent study based on survey data of four western Balkan countries (Kosovo, Montenegro, the Republic of North-Macedonia and Serbia) aims to estimate prevalence of disabilities and cognitive delays comparing Roma and non-Roma student populations (Emmerson & Llewellyn 2022) through secondary analysis of survey data collected by UNICEF (the Multiple Indicator Cluster Surveys) including n=6,290 Roma and n=13,005 non-Roma students. This study finds that Roma children under

five "were 60% more likely to have a less severe disability, just over twice as likely to have a disability, four times more likely to have multiple disabilities and five times more likely to have significant cognitive delay than their peers when the risk was adjusted to take account of between group differences in age and gender" (2022:3). For the determination of child disability, the survey relied solely on parental report, which requires parents to make judgments about the capabilities of their child compared to other children of the same age.

ROMA CHILDREN IN BULGARIA

Data on health indicators disaggregated by Roma ethnicity in Bulgaria are largely missing, but some data is available around health at birth. In the period between 2005-2020, maternal and infant mortality rates in Bulgaria have shown a steady decrease overall, yet there are large differences within the population. There is no official disaggregated data, but the Roma Inclusion Index suggests that the infant mortality rate of Roma in Bulgaria was still double the rate of the overall population in Bulgaria in 2015 (Roma Inclusion Secretariat 2015). Premature births have been reported to have slowly increased in the same 15-year period (2005-2020). No ethnically disaggregated data is available for either premature births or low birthweight.

Available studies about the prevalence of major infectious diseases show that Roma are at a higher risk of infection than majority populations (Tombat et al., 2020), and this seems to be the case among Bulgarian Roma as well. Recent measles outbreaks have for instance, disproportionately affected Roma communities. In 2017 a measles epidemic struck the Plovdiv region, and Roma inhabitants in particular, with the highest number of cases among young children under the age of four (Levterova et al., 2018).

Moreover, one of the few studies on mental illnesses among Roma children in Bulgaria implies the existence of stark mental health disparities compared to the general population (Lee 2014). Children report experiencing a much higher burden of mental health problems, with between two to six times higher odds of internalizing disorders (such as phobias, generalized anxiety disorders and major depressive disorders).

With regards to education, recent survey results provided by the Fundamental Rights Agency (EU FRA 2022) give insight into enrollment in education and educational attainment. The share of Roma children enrolled in Early Childhood Education and Care (ECEC) in Bulgaria was 58%, while 80% of the general population's children attended ECEC (FRA 2022: 37). The share of 20- to 24-year-old Roma who have attained at least upper secondary education is 28%, while 85% of their general population peers finish at least secondary education (FRA 2022: 38). Compared to other EU nation-states, school segregation is particularly pronounced in Bulgaria. More than half (64%) of Roma children attend a school where most children are Roma. The share of children attending segregated education also increased by 6 percentage points in recent years (FRA 2021). Roma parents or students report experiencing discrimination because of being Roma when they are in contact with school authorities. In the most recent FRA study, 11% of respondents in Bulgaria felt discriminated against in the past 12 months (2021). Data on learning outcomes broken down by Roma ethnicity are lacking.

A recent study on educational reforms in Bulgaria explored perceptions of early childhood educators among 21 teachers in three communities and found that all but one of the participating non-Roma teachers expressed anti-Roma views (Lambrev et al., 2020). These teachers were supportive of school segregation and expressed their perception of Roma children's (inherent) academic inability and language deficiency. In other accounts of institutionalized discrimination, Roma children are often

(systematically) misdiagnosed with mental disabilities and therefore overrepresented in special education for pupils with disabilities (Lee et al. 2014; Bruggeman & Bloem 2013). Despite positive governmental policy provisions, educational reforms have been described as ineffective in achieving inclusion of Roma students and supporting their educational success. (Lambrev et al. 2020).

Overall, there remains an extensive gap in the evidence base around early development as well as learning outcomes. There is an overall scarcity of ethnic data for Roma populations, and it can be difficult to draw conclusions from the information available because many of these studies work with estimations and contain a wide margin for error (Van Caeneghem 2019). In the past few years, there have been some promising developments around the collection of data to capture the situation of Bulgaria's children, for instance the launch of an integrated information system of the Agency for Social Assistance, the commitment of the Ombudsman of the Republic of Bulgaria to conduct independent studies around the rights of the most vulnerable children, and the strengthened capacity of NGOs to give insight into the enforcement of children's rights (UNICEF 2018). However, the lack of disaggregated data, and the limited research to support our understanding of the situation of Roma children, constitute serious impediments to the development of evidence-based policies.

Early interventions

Early childhood is not just a vulnerable period where the metaphorical 'race' can be lost, it is just as much a critical window of opportunity to address social, cognitive and income inequalities before these start widening over time and become harder to modify (Gantenio Gabel 2009). Health, wellbeing, and a supportive environment in the early childhood period are key determinants of health, educational status, and opportunities later in life. As is widely recognized and backed up by research, high quality early childhood education and care is one of the most effective means to break the cycle of disadvantage (Leseman & Slot 2014), especially when it succeeds in including the most at-risk populations. However, reaching and including Roma children with early childhood services continues to be a particular challenge for Europe (FRA 2022).

Including Roma children in early years services

Among past initiatives in Central and Eastern Europe, there have been various programs which successfully included Roma children in early years services. However, very few of these initiatives have been documented, comprehensively evaluated, or scaled-up beyond initial pilot stages. Yet, several key elements can be derived from past initiatives and the wider literature to inform new and future efforts to support the development of young Roma children. Successful services are described to be those that prioritize strong parental support component(s) (e.g. through home visiting), include community engagement or cultural brokering (e.g. by bringing Roma professionals and practitioners into the early years services) and those that bring the services into the communities (Klaus & Marsh 2014; UNICEF 2011; Roma Education Fund 2013).

Caregivers play crucially important roles in the early development of their child. Parenting programs focused on skill building or the provision of support, are found to be highly efficient means for improving children's cognitive and socio-emotional development (Britto, Proulx, Yousafzai et al. 2017; Attansio, Cattan and Meghir 2021). There are three additional reasons to suggest that a substantial gain can be expected particularly from supporting parents in disadvantaged communities. Firstly, interventions that provide caregiver support may hold an even bigger potential for parents in disadvantaged communities, because caregivers are also indispensable for the human capital formation of their children (e.g. Attanasio, Cunha, et al. 2019; Attanasio, Boneva, et al. 2022; Attanasio, Cattan, and Meghir 2022). Secondly, caregivers coping with a wide range of stressors

caused by poverty may not always be able to provide the child-centered attention that parenting requires. Chronic stress can undermine caregivers' motivation to stimulate the child or monitor its safety and wellbeing (Shonkoff et al. 2012). In such circumstances, support networks can be essential resources to reduce stress among parents and to help them maintain positive, child-centered emotions (Leseman &Slot 2014). A third angle in favor of parent and family support highlights the family as the most important identity domain from which young Roma can derive a sense of collective identity. Collective identity and a sense of belonging constitute an important resource for coping and are important predictors of wellbeing (Dimitrova, Chasiotis, Bender 2014). Where groups face exclusion and oppression, mainstream as well as ethnic identities may no longer be positive sources of identification. Other sources of identification such as those derived from familial ties, which are not challenged by the majority population, gain importance (Dimitrova et al. 2014). Roma with 'strong familial identities feel more connected to their social environment and are less likely to experience psychological distress' (idem 2014:382).

(Khalfaoui, García-Carrión, & Villardón-Gallego 2020). In a variety of pilot programs, participation was facilitated by bringing services closer to the communities, either physically by offering services in Roma neighborhoods, or interpersonally by engaging Roma mediators or professionals (Klaus & Marsh 2014). Such approaches not only make enrolment more likely, but also may contribute by nurturing Roma identity positively and helping children build confidence before they face what is generally perceived as an unwelcoming environment towards Roma in the wider society (Klaus & Marsh 2014).

One way of delivering early years family support services is through regular home visits by qualified professionals. Home visiting services enable a personalized approach, the establishment of a relationship of trust, and a level of flexibility to anticipate parents' needs. The question whether a universal or targeted design would be most fit for this purpose, merits a study of its own, and a full discussion of this question falls outside the scope of this report. However, a recent study reviewing claims of universal and targeted approaches to early education gaps suggests that interventions that seek to purposefully support disadvantaged parents and families and address inequalities in early development, may be best served by a targeted design (Leseman & Slot 2020). There is broad support for the beneficial, lasting effects (with high return on investment) of early childhood programs targeting disadvantaged groups (Heckman 2006; Heckman et al. 2010; Reynolds et al. 2011). In contrast, findings for universal, non-targeted services aren't conclusive (examples of such services show positive effects, no effects, or even negative effects). Furthermore, a consistent finding is that disadvantaged children benefit least from universal models of early childhood programs. According to Leseman & Slot, targeted early development services are found to be more effective relative to the cost (Leseman & Slot 2020).

3. Data collection methodology

Data on which this evaluation is based were collected by Alpha Research Bulgaria, and ethics approval was obtained by the Bulgarian Association of Marketing and Opinion Researchers. Interviews were done between May 16, 2022 and July 27, 2022. Fully anonymized data were shared with Utrecht University for analysis.

3.1 Description of sample
For the evaluation study, data was collected among three groups of first-time mothers:

1. NFP clients in predominantly Roma communities. This group includes clients enrolled in the program at the time of data collection (whose children were aged 6 months to 2 years at the time), and NFP graduates with children aged 2 to 5 years.
2. Mothers who did not participate in NFP and live in the same vulnerable, predominantly Roma communities ("non-NFP Roma mothers"). The sample was selected based on three criteria: living in the same neighborhoods where NFP is operating, sharing the same mother's age at the time of the first pregnancy (they had their first child below the age of 22), and sharing the same ages of the child (their first child was born between 2017 and 2021).
3. A sample of mothers among the general Bulgarian population, who had their first child between 2017 and 2021.

As seen in this list, the majority of Group 1 and Group 2 identifies as Roma, but there are also other ethnicities within this group. For simplicity, in the text we continue to describe these groups as "Roma", however it should be noted that the full groups do not identify as such.

Alpha Research contacted all active NFP clients and graduates. At the time of data collection, there were approximately 70 active clients, 48 discontinued and 115 graduated clients. Out of this, most clients were reached: 50 active clients, 21 discontinued clients, and 88 graduates.

To sample the comparison group of first time non-NFP mothers, a random starting point was selected for each of the neighborhoods in Sofia and Plovdiv where NFP is active. Every fifth household was visited in densely populated areas of the neighborhoods, while in less densely populated areas every third household was visited.

For the third group (first-time mothers in the general population), respondents were selected by applying a quota sample to ensure a representative sample based on two demographic criteria of the target group in each city (Sofia and Plovdiv): 1. the age of the child at the time of the interview (6 months to 5 years old) and, 2. the educational level of the mother.

The sampling led to the following breakdown in ethnicity across the three groups:

What would best describe your ethnicity?

	Group 1: NFP mothers	Group 2: Comparison sample of Roma mothers (not NFP)	Group 3: General population mothers
Romany	79%	71%	0%
Turkish	12%	16%	0%
Bulgarian	9%	11%	99%
Other	0%	1%	1%

In total, the following number of interviews was conducted (in the two cities and per target group):

City	Target group	Number of KAP interviews
Sofia	Group 1: NFP clients and graduates	127
Sofia	Group 2: Comparison sample of mothers from the neighborhoods where NFP operates	201
Sofia	Group 3: Representative sample of mothers from the general population	205
Plovdiv	Group 1: NFP clients and graduates	32

Plovdiv	Group 2: Comparison sample of mothers from the neighborhoods where NFP operates	100
Plovdiv	Group 3: Representative sample of mothers from the general population	100

The interviews conducted in Sofia, were distributed over the program sites as follows:

Neighborhood	Target group	Number of KAP interviews
Fakulteta	Group 1: NFP clients and graduates	107
Filipovtsi	Group 1: NFP clients and graduates	19
Hristo Botev	Group 1: NFP clients and graduates	1
Fakulteta	Group 2: Comparison sample of mothers from the neighborhoods where NFP operates	89
Filipovtsi	Group 2: Comparison sample of mothers from the neighborhoods where NFP operates	72
Hristo Botev	Group 2: Comparison sample of mothers from the neighborhoods where NFP operates	40

The interviews conducted in Plovdiv, were distributed over the program sites as follows:

Neighborhood	Target group	Number of KAP interviews
Stolipinovo	Group 1: NFP clients and graduates	28
Sheker Mahala	Group 1: NFP clients and graduates	4
Stolipinovo	Group 2: Comparison sample of mothers from the neighborhoods where NFP operates	93
Sheker Mahala	Group 2: Comparison sample of mothers from the neighborhoods where NFP operates	7

The number of children for which ASQ data was collected was slightly higher, as the groups included four sets of twins: [3]

City	Target group	Number of ASQ-3 screenings applied	Number of ASQ-SE screenings applied
Sofia	Group 1: Children in age group 6 months to 5 years old of NFP clients and graduates	127	127
Sofia	Group 2: Children in age group 6 months to 5 years old of the comparison sample of mothers from the neighborhoods where NFP operates	202	202

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[3] There are four mothers in the dataset who each had a set of twins (eight children in total). Because the mother's outcomes are presented to reflect the circumstances under which all the children grow up, these four mothers appear twice in all analyses done for this report, as they reflect the circumstances of two separate (twin) children.

Sofia	Group 3: Children in age group 6 months to 5 years old of mothers from the general population	207	207
Plovdiv	Group 1: Children in age group 6 months to 5 years old of NFP clients and graduates	32	32
Plovdiv	Group 2: Children in age group 6 months to 5 years old of comparison sample of mothers from the neighborhoods where NFP operates	101	101
Plovdiv	Group 3: Children in age group 6 months to 5 years old of comparison sample of mothers from the general population	100	100

3.2 Description of the data

Two interviews were conducted with each respondent: a mother's questionnaire and a child assessment – the Ages and Stages Questionnaire (ASQ-3). The ASQ-3 questionnaires were administered on the same day and directly after the mother's questionnaires, to accommodate the preferences of respondents.

Description of mother's questionnaire

A tailor-made Knowledge, Attitudes and Practices (KAP) survey was designed to capture data across the domains of the program. The detailed questionnaire on the mother collected information on demographics, education and employment, geographic mobility, social networks (family, household, community), maternal well-being including mental health, pregnancy-related questions, child rearing knowledge, attitudes, and practices such as parental engagement activities (singing, reading, etc. with the child), child feeding practices, access and use of child-related public services, and experiences with the NFP program. The KAP survey also included questions on the child's birthweight and gestational age.

Three pre-existing instruments were integrated into the mother's questionnaire: an assessment of depression (PHQ-9), an instrument for capturing an individual's sense of mastery and control over their life outcomes (Pearlin scale), and an instrument measuring loneliness and social isolation.

The Patient Health Questionnaire (PHQ-9)
This nine-item questionnaire is a standard tool for measuring depression. The tool is also utilized within the NFP program, to observe mental wellbeing and signal mental health challenges. For each of the nine items, respondents are asked to indicate how often they have been bothered by it over the past two weeks on a scale from 0 (not at all) to 3 (nearly every day).

Pearlin mastery and control
The 7 Question Pearlin Mastery Scale captures the extent to which someone regards his/her life-chances as under their own control. Most statements are formulated in the negative, two in the positive. For instance: 'There is really no way I can solve some of the problems I have.' Or: 'I can do just about anything I really set my mind to do'. Low levels of this sense of mastery and control have been associated with mental health challenges and general ill-health. High levels of mastery and control can function as mediators between stress factors and various health outcomes.

Three-item loneliness and isolation scale

These standardized questions explore how often respondents have a friend to turn to, feel left out, or feel isolated from others. The questions were scored on a scale from one to three (where 'Hardly ever' =1, 'Sometimes' =2, and 'Often' =3).

Description of the child assessment

ASQ Questionnaires

The instrument selected to measure child development is the Ages and Stages Questionnaire (ASQ-3). Two types of questionnaires have been used, the regular ASQ-3 and the ASQ screening tool for social and emotional development (ASQ-SE). The ASQ screeners were filled out by an interviewer,[4] based on responses provided by the mother and observations of the child. The interviewers were prepared through a training by trainers from the foundation Karin Dom.

The validity of ASQ-3 has been studied extensively. Psychometric studies based on a normative sample of more than 18,000 questionnaires show high reliability, internal consistency, sensitivity, and specificity. ASQ-3 is cited by countless articles as an accurate, cost-effective, and parent-friendly instrument for screening and monitoring of young children.

The ASQ-3 screens the developmental performance of children between 1 month and 5 years of age. There are different versions of the questionnaire available for the various age groups. There are 21 versions of the ASQ-3 survey in total, 18 of which have been used for the current study. For the age groups up to 2 years of age, the ASQ-3 versions are spaced 2 months apart, for the age groups between 2 and 3 years of age, the versions are 3 months apart and for the final age groups (>3 years, up to 5 years of age) the versions are 6 months apart. The questions are tailored to the age intervals and the average skill level expected among children of the respective age intervals. For instance, for 6 months of age, a communication question may be: "Does your baby make sounds like 'da', 'ga', 'ka', and 'ba'?" and for 24 months of age a communication question may be: "Does your child correctly use at least two words like 'me', 'I', 'mine', and 'you'?".

There are 5 developmental areas screened through ASQ-3: communication, gross motor, fine motor, problem solving and personal-social. Each area is measured through 6 questions, with three response options: "yes", "sometimes", "not yet". The communication area includes questions around interaction with the parent/caregiver and language development (for example "When your baby wants something, does he tell you by pointing to it?" and "Does your child say eight or more words in addition to "Mama" and "Dada"?). Questions around problem solving explore for instance whether a child can repeat a parent/caregiver's steps to take a crumb out of a bottle or scribbles with a crayon. Questions around personal and social development capture for instance how a child plays with toys, whether they seek help to solve a problem, or whether a child mimics activities (for example: "Does your child copy the activities you do, such as wipe up a spill, sweep, shave, or comb hair?").

An additional 'overall' section (consisting of 4 to 10 questions) aims to capture parents' estimation of the quality of skill (e.g. "Does your baby use both hands equally well?") and elicit parent concerns about their child's development in a certain areas (e.g. "Do you have concerns about your baby's vision?" or "Do you think your child walks, runs, and climbs like other toddlers his age?").

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[4] In a few cases (approximately 10) among the general population sample, the screeners were filled out by the mothers directly.

The screening tool is developed to be completed by parents/caregivers, but can also be administered by a professional who guides the parent/caregiver through the survey. The surveys result in an indication of whether the child's development is "on track" or behind for its age (in which case the child might be referred to an intervention). Low scores on ASQ-3 are cause for concern.

ASQ-SE questionnaires

Validity, reliability, and utility studies were conducted on ASQ-SE internationally to accurately determine the psychometric properties of the screening instrument. The results support the ability of ASQ-SE to discriminate between children with social-emotional delays and those who appear to be developing typically in social-emotional areas.

For the ASQ-SE a total of 9 versions exist, and 8 were used in this study (for the age intervals from 8 months to 5 years). Each questionnaire contains 16-36 items to assess 7 key social-emotional domains: self-regulation, compliance, adaptive functioning, autonomy, affect, social-communication, and interaction with people. In contrast to the regular ASQ questionnaires, the questions in the ASQ-SE are not divided into subdomains. The separate questions are scored and summed to calculate one total score. For these questionnaires, the response options are: 'often or always', 'sometimes', and 'rarely or never'. Moreover, each question has an additional box that parents can check if an area (the behavior of the child in that area) is a concern to them. Three 'overall questions' gauge parents general concerns or impressions (for example: "Does anything about your baby worry you?"). High scores on ASQ-SE are cause for concern.

For the scoring, norms based on the USA context were utilized. While new norms are currently being developed for the Bulgarian context, these weren't yet available at the time of this study. To make the ASQ-3 and ASQ-SE questionnaires standardized and comparable across ages/versions, we divided the percentage of points scored on each ASQ-3 domain by the total possible points that could have been scored; this differed depending on the survey instrument. This resulted in a "percent of maximum possible ASQ points" variable that we used as an outcome. This continuous variable also provided more variation to analyze, compared to the blunter binary development outcome categories of "on track" and "refer." Furthermore, this also made it possible to calculate and compare an average across all five ASQ-3 domains.

Finally, ASQ-SE is usually coded so that a lower score is "better," representing more on-track development. In the following models, we reverse-coded the ASQ-SE so that higher scores would be "better" (this matches the coding of the ASQ-3 domains, in which a higher score is also "better"). We then re-totaled the score and excluded the "check if this is a concern" points (usually, these receive 5 points and are included in the total ASQ-SE score). With this, we then calculated a "percent of maximum possible ASQ-SE points" variable.

4. Comparing Roma non-NFP sample with the General Population

4.1 Demographic- and Socio-Economic Background Characteristics

The Roma sample has a considerably lower level of education and is poorer.

In this section, we compare the demographic and socio-economic background characteristics between the comparison sample of (mostly) ethnic Roma mothers living in the same neighborhoods as the NFP participants ("Roma mothers"), and mothers from the general population ("general population mothers") in the same two cities (Plovdiv and Sofia).

First, about two-thirds (67%) of both samples reside in Sofia, with the remainder one-third in Plovdiv. The Roma sample has a much lower level of education (only 11% completed secondary education compared with 99% of the general population sample). Further, whereas the Roma mothers speak a variety of primary languages at home (42% Bulgarian, 40% Romany, and 18% Turkish), 99% of the general population sample speaks Bulgarian. Further, 82% of the Roma mothers report being full-time homemakers (looking after the home/children/relatives) or on formal parental leave, compared with 42% of the general population sample. 91% of the Roma mothers live with a partner, compared with 98% of the general population mothers.

The Roma sample is also considerably poorer: Between 29%-61%[5] of Roma mothers report living in households that fall below the poverty threshold criteria of having at least BGN 400 (Euro 204) per month per family member, compared with just 2% of the general population mothers. 12% lack running water at home and 26% lack a toilet inside the house, compared to none of the general population mothers. 55% heat their homes with wood/coal stove, compared to 6% of the general population mothers. Hunger, however, is fortunately uncommon, with 4% of Roma mothers reporting that someone living in the home goes to bed hungry, compared to 1% of the general population mothers.

Roma mothers are both shorter in height and lighter in weight; the medians are, resp., 160 cm versus 167 cm and 55kg versus 60kg.

Finally, the Roma sample is also much younger (median age of 22 years compared with 32 years for the general population sample). However, it should be noted that the difference in age results from the sampling approach, as Roma mothers were selected to be similar to NFP participants, and were selected based on their age and the age of their child (we kindly ask you to refer to chapter 3.1 for more information).

4.2 Child Outcomes ASQ (child development)

Children of Roma mothers have, on average, lower child development outcomes than children of mothers from the general population as measured by the ASQ-3 and ASQ-SE assessments, although this varies by domain. The gaps in average assessment scores are biggest in the Fine Motor and Problem Solving domains, followed by Communication, Personal-Social (ASQ-3), and

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[5] The 61% upper bound figure includes 32% of respondents who report 'I don't know' to the question: "As far as you know, does every member of your household have at least BGN 400 per month?".

Social-Emotional (ASQ-SE) domains. The gap is smallest in the Gross Motor skills domain. Roma children are most at risk to be in the refer zone for the Social-Emotional domain.

The average ages of the children are very similar, with the children in the Roma first-time mother sample being only marginally older than the children in the general population first-time mothers sample (3.0 years versus 2.9 years). Across the five ASQ-3 domains – communication, gross motor, fine motor, problem solving, and personal-social - children of Roma mothers score on average 73% of the maximum possible points. This is 9.2 percentage points lower than the general population, meaning their development is less likely to be "on track" for their age. The gap is bigger in some ASQ-3 domains than others: for example, Roma children on average score 14.5 percentage points lower in the "Fine Motor" domain (61.2% vs 75.6%) and 13.2 percentage points lower in the "Problem Solving" domain (71.2% vs 84.4%) than children in the general population. On the other hand, differences in Gross Motor skills (81.2% vs 82.4%) are very small, with the gaps in Communication (76.5% vs 86.9%) and Personal-Social (74.9% vs 81.7%) in between. The gap in the ASQ Social-Emotional assessment (83.8% vs 89.4%) is similar to the gap in the Personal-Social domain.

The table shows that across the five domains of the ASQ-3, between 8% (communication) and 22% (fine motor skills) of children of Roma mothers have a development score that warrants referral. This compares to 1% and 8% of children in the general population sample, respectively. For the ASQ Socio-Emotional test, as many as 23% of Roma children are in the referral category compared with 4% of children in the general population.

Finally, in terms of birthweight, we find that the Roma children are lighter on average – 3,006 grams vs. 3,262 grams, and more likely to experience low birthweight (below 2,500 grams): 12% of Roma children are born with low birthweight, compared to 4% of children in the general population sample. The gestational ages are nearly identical between the two groups.

Child Development Outcomes

Outcome name	Avg – children of Roma mothers (not NFP)	Avg – children of General Population mothers	F-test of difference
Communication (% of max possible pts)	76.5	86.9	***
Gross Motor (% of max possible pts)	81.2	82.4	
Fine Motor (% of max possible pts)	61.2	75.6	***
Problem Solving (% of max possible pts)	71.2	84.4	***
Personal-Social (% of max possible pts)	74.9	81.7	***
Average of ASQ-3 Domains (% of max possible pts)	73.0	82.2	***
Social-Emotional (% of max possible pts)	83.8	89.4	***
Communication (Refer zone)	8%	1%	***
Gross Motor (Refer zone)	13%	11%	
Fine Motor (Refer zone)	22%	8%	***
Problem Solving (Refer zone)	16%	4%	***
Personal-Social (Refer zone)	13%	6%	***
Social-Emotional (Refer zone)	23%	4%	***
Birthweight (grams)	3,006	3,262	***
Low birthweight (<2500 g)	12%	4%	***

Gestational Age (duration of pregnancy - weeks)	39.5	39.2	*

The table shows the average Ages and Stages Questionnaire (ASQ) scores for the children from both samples. Because the ASQ questionnaire varies depending on the age of the child, the average score reported in the table below is calculated as either (1) the percentage of the maximum possible points in that ASQ domain for that age-specific ASQ test, or (2) whether the score is below an ASQ specific threshold that would indicate the child scores in the so-called 'referral zone'. F-test: *** (p-value<0.01), ** (p-value<0.05), * (p-value<0.1).

4.3 Maternal Outcomes

Family Planning

Roma mothers are considerably less likely on average to name different methods of contraception compared to mothers in the general population, with the gaps in naming birth control pills and IUDs being the largest.

Respondents were asked an open-ended question "*What are some ways to protect yourself from getting pregnant?*" By far, the most common form named by Roma mothers are condoms: 66% mention them versus 74% among the general population. However, fewer than one-third named any of the other methods: 28% mentions birth control pills (vs 60%), 26% mentions IUDs (vs 59%), 12% mentions interrupted intercourse (vs 32%), 1% mentions family planning (vs 18%), and 0% mention emergency contraception (vs 19%).

Finally, when mothers are asked how long they would want to wait after the birth of their last child to have another child, the vast majority of both groups (92% vs 98%) report at least two years.[6]

	Avg - Roma mothers (not NFP)	Avg - Mothers General Population	F-test of difference
Methods of contraception: Condom	66%	74%	**
Methods of contraception: Birth control pills	28%	60%	***
Methods of contraception: IUD	26%	59%	***
Methods of contraception: Interrupted intercourse	12%	32%	***
Methods of contraception: Family planning	1%	18%	***
Methods of contraception: Emergency contraception	0%	19%	***
Methods of contraception: I don't know	6%	1%	***
Pregnancy spacing: wait at least 2 years after birth of last child	92%	98%	***

Pregnancy

Knowledge about factors affecting the baby's well-being during pregnancy is lower among Roma mothers than among mothers from the general population. During pregnancy, Roma mothers

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[6] When asked "If you were going to have another child, how many years would you (want to) wait?," many mothers responded with "I don't plan to have any more children" (45% of general population mothers, 29% of Roma mothers, 18% of NFP clients). In the tables and models in this report, these responses are excluded and only those who gave an answer in years are analyzed.

report eating nutritious foods at lower frequencies and are more likely to smoke. The shares consuming alcohol during pregnancy are modest and similar across both groups.

First, in assessing knowledge about pregnancy, significantly fewer Roma mothers (74% vs 96%) report correctly that babies can hear while developing inside the mother, and fewer Roma mothers (77% vs 98%) report correctly that their physical and emotional state affects the baby during pregnancy. With regards to diet during pregnancy, Roma mothers report lower frequency consumption of vegetables, fruit, meat, fish, and dairy, while reporting a higher frequency consumption of beans and grains, compared to the general population (in summary table below, on a scale of 0-3, '0' is *never*, '1' is *1-2 times a week,* '2' is *3 or more times a week,* and '3' is *daily*).

With regards to smoking, nearly half (46%) of Roma mothers and one third (33%) of mothers from the general population smoked *before* pregnancy. A larger share of Roma mothers report smoking *during* their first pregnancy (28% vs 12%) and smoke more cigarettes if they do (7.37 vs 6.11 cigarettes per day on average). The share of mothers consuming alcohol during pregnancy is nearly the same among both groups (8% vs 9%). However, Roma mothers who consumed alcohol during pregnancy report consuming significantly fewer drinks per week than mothers from the general population (1.56 vs 2.34 drinks per week on average).

	Avg - Roma mothers (not NFP)	Avg - Mothers General Population	F-test of difference
Yes: babies can hear while they are inside you	74%	96%	***
Yes: your physical/emotional state affects the baby during pregnancy	77%	98%	***
Diet during first pregnancy: how regularly ate vegetables	2.05	2.59	***
Diet during first pregnancy: how regularly ate fruit	2.01	2.65	***
Diet during first pregnancy: how regularly ate meat	1.78	2.18	***
Diet during first pregnancy: how regularly ate fish	1.27	1.88	***
Diet during first pregnancy: how regularly ate eggs	2.00	2.11	
Diet during first pregnancy: how regularly ate beans	2.34	2.00	***
Diet during first pregnancy: how regularly ate dairy	2.36	2.63	***
Diet during first pregnancy: how regularly ate grains	2.58	2.4	***
Smoked before first pregnancy	46%	33%	***
Cigarettes per day before first pregnancy	12.67	13.59	
Smoked during first pregnancy	28%	12%	***
Cigarettes per day during first pregnancy	7.37	6.11	
Consumed alcohol during first pregnancy	8%	9%	
Drinks per week during first pregnancy	1.56	2.34	***

There is a significant gap in health insurance during pregnancy, and while the frequency of prenatal check-ups is generally high, Roma mothers attend less than the general population, and a sizeable

proportion does not meet the national benchmark. Both groups of mothers differ in the reported services used during pregnancy, and Roma mothers report knowing less about what to expect during childbirth than mothers in the general population.

Health insurance during pregnancy is not universal among Roma mothers: 77% report having been insured, compared to 100% of mothers in the general population. On average, Roma mothers feel comfortable contacting a GP with questions about the pregnancy, albeit with some hesitations ('3' is 'Neither uncomfortable nor comfortable' and '4' is 'Rather comfortable'), and the vast majority – 95% – had their first pregnancy monitored by a GP, obstetrician, or midwife. Prenatal check-ups are also very common, but on average, Roma mothers attend 3.31 fewer prenatal check-ups during pregnancy than mothers in the general population (9.60 vs 12.91). Roma mothers are less likely to meet the Bulgarian benchmark of 8 check-ups (74% meet this versus 96% of the general population mothers).

The survey also asked mothers about the services used during pregnancy. Mothers from the general population are significantly more likely to use school for parents and support services for children (including day center, baby kitchen, special therapy for child development), while Roma mothers are more likely to report using financial support.

Finally, Roma mothers are significantly *less* likely to report experiencing complications during pregnancy (5% vs 10%). Roma mothers report knowing less about what to expect during childbirth compared to mothers in the general population. On a scale from 1 to 5, ('3' is "I knew some things", '4' is "I knew most things", and '5' is "I knew everything") Roma mothers report 3.08 on average versus 3.69 for mothers from the general population.

	Avg - Roma mothers (not NFP)	Avg - Mothers General Population	F-test of difference
Health insurance during first pregnancy	77%	100%	***
Comfort with contacting your GP about pregnancy	3.84	4.33	***
First pregnancy monitored by GP/Obstetrician/Midwife	95%	100%	***
Number of prenatal checkups during pregnancy	9.60	12.91	***
Met prenatal checkups benchmark: BG standard (8)	74%	96%	***
Services used during pregnancy: state/municipality service	21%	27%	*
Services used during pregnancy: financial support	45%	24%	***
Services used during pregnancy: school for parents	1%	17%	***
Services used during pregnancy: home visiting nurse/midwife	5%	10%	**
Services used during pregnancy: psychological support	2%	3%	
Services used during pregnancy: support services for kids	9%	31%	***
Services used during pregnancy: crisis intervention/center	0%	0%	
Services used during pregnancy: education/job services	2%	1%	
Experienced complications during pregnancy/delivery	5%	10%	**
Experienced complications that worried you	4%	13%	***
(if yes) Did you see a medical professional?	73%	97%	***
Before you went to the hospital to deliver your baby, how much did you know about what to expect during childbirth?	3.08	3.69	***

Post-childbirth

Roma mothers and mothers from the general population report similar, favorable preferences to vaccines for the baby, though Roma mothers are less likely to correctly answer that baby well visits should occur monthly during the first 6 months. The duration of breastfeeding is similar between the two groups, though Roma mothers introduce their child to solids slightly earlier. When asked whether mandatory vaccines are good or bad for the baby, both groups are supportive – 4.25 vs 4.32 ('4' being '*good*' and '5' being '*very good*'). However, a significantly smaller proportion of Roma mothers correctly answer that baby well visits should occur monthly in the first 6 months (85% of Roma mothers answer correctly, compared to 98% of mothers in the general population). In terms of breastfeeding, the average length of time is similar between the two groups (around at least 4.2-4.3 months), and is below the 6 months WHO recommendation.[7] Roma mothers introduce their child to solids slightly earlier (at 5.14 months compared to 5.37 months for the general population).

	Avg - Roma mothers (not NFP)	Avg - Mothers General Population	F-test of difference
How often should you go on baby well visits in first 6 months (% correct answer of "Monthly")	85%	98%	***
Do you think mandatory vaccines are good or bad for baby	4.25	4.32	
How long breastfed first child (min. months) - *mothers w/ kids age 2 or older*	4.19	4.30	
Age introduced to solids (months)	5.14	5.37	***

Infancy and early childhood

There are several indicators that point to young children of Roma mothers being in more vulnerable situations than children of mothers in the general population. This includes a large gap in mothers having health insurance, higher frequency of children taken to the emergency room in the first year of life, higher rate of mothers smoking, significantly higher scores on average on a loneliness scale, and lower scores on a Pearlin scale assessing sense of control over one's life outcomes.

In Bulgaria, the government provides health insurance support for everyone up to the age of 18. While 77% of Roma mothers reported having health insurance during their first pregnancy, only 41% of Roma mothers older than 18 report having health insurance currently, compared with nearly 100% of mothers from the general population. 82% report being registered themselves with a GP in their current city (compared to 99% of mothers in the general population), while 96% of their children are registered (compared to 99% of children in the general population). On average, mothers feel comfortable contacting the GP about the child raising questions, while mothers in the general

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[7] Average period of breastfeeding represents a minimum or lower bound on number of months, so the actual average number of months may be higher. The question asked was: "How many months do/did you breastfeed your first child?" and data was collected in categorical format ("less than 3 months," "less than 6 months," "more than 6 months," "more than 12 months"). This was recoded to numeric to represent the lower bound of the category: "Less than 3 months" = 0, "Less than 6 months" = 3, "More than 6 months" = 6, "More than 12 months" = 12. An average was taken from this recoded numeric variable.

population report feeling slightly more comfortable with this (3.94 vs. 4.4, where '4' is 'Rather comfortable').

The study asked two questions about hospitalization. First, mothers were asked how many times, in the first year of their baby's life, was their baby taken to an emergency room, walk-in clinic, or had an ambulance called because of an injury or concern that the baby swallowed something harmful. The same question was also asked with a slight variation, about how many times the baby was admitted to the hospital (spending at least one night there) because of the same issues in the first year of its life. On average, in the first year of their life, babies of Roma mothers were taken to the emergency room or walk-in clinic 0.23 times, which is more than three times the frequency for babies of mothers in the general population (0.07 times). They were also admitted to the hospital to spend at least one night there 0.25 times, or more than 8 times more frequently than babies in the general population (0.03 times).

	Avg - Roma mothers (not NFP)	Avg - Mothers General Population	F-test of difference
Health insurance currently	43%	99%	***
Health insurance currently - *mothers age 18+*	41%	99%	***
Registered with GP in current city - mother	82%	99%	***
Registered with GP in current city - child	96%	99%	**
Comfort with contacting child's GP about child raising	3.94	4.4	***
Number of times taken to ER or Walk-In Clinic	0.23	0.07	***
Number of times admitted to hospital (spent at least 1 night)	0.25	0.03	***

Another health risk indicator, maternal smoking, shows that rates of smoking before and after the pregnancy are nearly identical and very high, resp. 46% and 49% among Roma mothers, and considerably higher than among mothers from the general population (33% and 27%, respectively).

Several questions in this study aimed to assess mothers' current wellbeing, in terms of depression symptoms, loneliness, and feeling of mastery and control over one's life.

The PHQ-9 survey was used to assess symptoms of depression, and results in a score ranging from 0 to 27, with a higher score indicating more severe depression symptoms. On average, both groups scored in the "no to minimal depression" category, with Roma mothers not scoring significantly differently on the scale compared to mothers in the general population.

A 3-question loneliness and social isolation scale was also used, ranging from 3 to 9, with a higher score indicating higher risk of loneliness and social isolation. On average, both groups scored in the "low risk" category (below 4); however, the average for Roma mothers was significantly higher (3.90) and closer to the cut-off for the next category ("moderate risk") than for mothers in the general population (3.49).

The 7-question Pearlin scale measures the extent to which someone feels their life chances are under their personal control. The scale ranges from 7 to 28, with a higher score indicating greater feelings of life chances being under one's control. On average, compared to the general population, Roma

mothers score 3.51 points lower on this scale, a significant difference, indicating they feel their life chances are less in their control.

Finally, mothers were asked whether they have a goal or plan for additional schooling, or a goal or plan related to work in the next two years (seek work, change job, etc.). Recall that education completion rates were very low among the sample of Roma mothers. Only a small percentage, 17%, of Roma mothers report having a goal or plan for additional schooling, nearly identical to that of mothers from the general population (16%). However, Roma mothers are significantly less likely to report having a goal or plan related to work than mothers in the general population (33% vs. 49%).

	Avg - Roma mothers (not NFP)	Avg - Mothers General Population	F-test of difference
Smoke currently	49%	27%	***
Cigarettes per day, currently	13.02	13.98	
Depression scale (PHQ-9)	2.02	1.81	
Loneliness scale	3.90	3.49	***
Mastery/control (Pearlin scale)	18.53	22.04	***
Goal or plan for additional schooling	17%	16%	
Goal or plan for a job within next 2 years (seek work, change job, etc.)	33%	49%	***

Fathers can naturally provide an important contribution to child development, both directly through interactions with the child, and indirectly, for example by sharing household tasks. The survey asked a few questions about the involvement of and relationship with the biological father. Mothers were asked "in the past month, how often did the biological father spend time with the baby/child? (playing or taking care of the baby)", and answers options ranged from "*less than weekly"* to "*(almost) daily"*. In both groups, the mothers report that the biological fathers spend, on average, between "*several times a week"* ('3') and "*(almost) daily"* ('4') playing or taking care of the child, with Roma fathers reported to spend slightly less time on average than fathers from the general population: 3.62 vs 3.82. To assess dynamics within the mother's relationship with her partner, mothers were asked how they respond when their opinion is different from their partner. Roma mothers were much more likely (49.6% vs 2.7%) to report "*I usually step back,"* and much less likely (35.1% vs 76.7%) to report "*We usually discuss"*. There was no large difference in how often mothers reported "*I usually stand my ground"* (15.2% vs 20.6%).

	Avg - Roma mothers (not NFP)	Avg - Mothers General Population	F-test of difference
Time with biological father in past month	3.62	3.82	***
Response when opinion diff. from partner: I usually step back	50%	3%	***
Response when opinion diff. from partner: We usually discuss	35%	77%	***
Response when opinion diff. from partner: I usually stand my ground	15%	21%	*

Early stimulation through parenting activities plays an essential role in child development. Roma mothers report substantially lower frequencies when it comes to reading books to their children, telling stories, naming, counting, and drawing, as well as playing with toys. Rates of singing songs and going outside with children are similar between both groups, while the amount of screen time is slightly higher for Roma children.

Mothers were asked whether in the past three days, they or any family member older than 15 engaged in various early stimulation activities with the youngest child. On average, children of Roma mothers are reported to experience significantly less of several early stimulation activities in the past three days compared with children from the general population, in particular: being read books (46% vs 90%), being told stories (62% vs 89%), and naming, counting, drawing (55% vs 81%). Differences are smaller in terms of playing with toys with the child (82% vs 93%). There are no differences when it comes to singing songs (84% versus 83%) and going outside (98% vs 99%).

Mothers were asked how many hours per day their child spends with screens; answers were categorical and could range from 0 ("*doesn't watch TV, telephone, tablet, etc."*) to 3 ("*more than 2 hours per day").* On average, children of Roma mothers are reported to spend slightly more time in front of screens per day, though both groups report an answer between '1' (*"Less than one hour"*) and '2' ("*1-2 hours per day"*).

Finally, maternity leave in Bulgaria is two years (with an unpaid optional third year), and this is the year children are usually enrolled in kindergartens. However, the proportion of children older than two years who currently attend formal day care or kindergarten is strikingly and significantly lower among children of Roma mothers compared to children in the general population (15% vs. 75%).

	Avg - Roma mothers (not NFP)	Avg - Mothers General Population	F-test of difference
Activities in past 3 days: read books	46%	90%	***
Activities in past 3 days: tell stories	62%	89%	***
Activities in past 3 days: sing songs	84%	83%	
Activities in past 3 days: go outside	98%	99%	
Activities in past 3 days: play with toys	82%	93%	***
Activities in past 3 days: name, count draw	55%	81%	***
Amount of screen time per day (TV, phone, tablet)	1.73	1.37	***
Child currently goes to formal daycare or kindergarten	11%	53%	***
Child currently goes to formal daycare or kindergarten (*child age 2 or older*)	15%	75%	***

5. Assessment of the impact of the NFP Program: Comparing NFP participants with first-time young mothers from the same neighborhoods

5.1 Impact Assessment Methodology

To estimate the effects of the NFP program on various child- and maternal-level outcomes, we used ordinary least squares regression models to compare outcomes for NFP clients and their children with outcomes of Roma first-time young mothers who did not participate in NFP and live in the same neighborhoods (groups 1 and 2).

To reduce omitted variable bias, these regressions control for background characteristics that may determine both participation in the NFP program itself as well as outcomes of interest, independent of participation in the NFP program. For example, even though the mothers in both groups come from the same neighborhoods and had their first child within the same 2017-2021 period (ensured by the sampling strategy), it could be that NFP participants still differ from non-participants in their level of education or housing conditions.

However, caution is warranted in interpreting the findings as causal as there still might be *un*observed characteristics that we cannot control for in our estimations, but also affect both participation in NFP and the outcomes of interest. As such, the results below provide an indication of where the effects of the NFP program may be concentrated.

In all regression analyses reported below, we used the same set of control variables:

- City (Sofia vs. Plovdiv)
- Mother's age in years completed
- Mother's education level (completed secondary level of education or higher vs. did not complete secondary)
- Primary language spoken at home (Bulgarian vs. Romany/Turkish/Other)
- Whether home has a separate room for the mother and the child (and the mother's partner)
- Whether there is a latrine/toilet inside the home
- Sources of heating usually used at home: AC/electrical
- Sources of heating usually used at home: Wood/coal stove
- Fixed effects for all ASQ-3 survey instruments (which effectively also act as children's age fixed effects)[8]
- Whether the mother smoked before the first pregnancy

The above control variables were selected from a wider set of controls that were initially included. We narrowed down the list of control variables to focus on those controls that were statistically significant determinants of mother- and child-level outcomes. Further, when comparing the mean values of these

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[8] The average age of the children of NFP participants is 3.05 years compared with 3.01 years of the minority comparison sample.
The ASQ-Social Emotional survey instrument was used as fixed effects when analyzing ASQ-Social Emotional outcome variables. ASQ-3 was used for all other outcomes.

control variables between the NFP and non-NFP mothers, some are also significantly different between the two groups, supporting their inclusion as controls. For example, while highest education levels are very similar, a higher proportion of NFP mothers speaks Bulgarian at home and is more likely to have a latrine and electrical heating.

Control Variables	Avg – NFP mothers	Avg – Roma mothers (Not NFP)	Test for difference
City: Sofia (instead of Plovdiv)	80%	67%	***
Mother's age	20.6	21.3	***
Highest level of education: secondary or above	13%	11%	
Primary language at home: Bulgarian	63%	42%	***
Do you have a separate room for you and the child (and your partner)? Yes	74%	71%	
Do you have latrine/toilet inside the home? Yes	90%	74%	***
Sources of heating usually use: AC / other electrical source	75%	59%	***
Sources of heating usually use: Wood/coal stove	33%	55%	***
Smoked before first pregnancy	40%	46%	

*** p-value<0.01

5.2 Children's Outcomes

The sample of children of mothers who participate in the NFP program ("NFP children") score significantly higher on the ASQ-3 and ASQ-Social-Emotional (ASQ-SE) assessments after controlling for the background characteristics, indicating their development is more likely to be on track for their age. On average, NFP children score nearly the same across ASQ-3 domains as children from the general population (81.4 versus 82.2 percent of the maximum possible score), and considerably higher than children from non-NFP Roma mothers (73.0%). According to the estimation results, 3.30 percentage points (p<0.01) of the gap between NFP and non-NFP Roma children cannot be explained by differences in background characteristics, suggesting that the NFP program may be raising ASQ scores. When looking at the estimation results by domain, NFP children score between 1.46 percentage points higher on "Communication" (not statistically significant) to 5.98 percentage points (p<0.01) higher on "Problem Solving" when compared to children of Roma moms who did not participate in NFP. The results are statistically significant for three out of five domains: Gross Motor, Fine Motor and Problem Solving.

Results on the separate ASQ-SE assessment are similar to the overall ASQ results: on average, NFP children score similarly to children from the general population (88.5 versus 89.4 percent of the maximum possible score), and 2.77 percentage points (p<0.01) higher than non-NFP Roma children, after controlling for background characteristics.

When it comes to the likelihood that children's scores fall in the 'refer zone' for the five ASQ-3 domains and the ASQ-SE assessment, the estimate of the impact of the NFP program is largest and significant for the child's social-emotional development: NFP children here score nearly the same as children from the general population (5% fall into the 'refer zone' compared to 4% of general population). When controlling for background characteristics, NFP children are much less likely – by 11.4 percentage points (p<0.01) – than non-NFP Roma children to be in the 'refer zone' on the ASQ-SE. Out of the five ASQ-3 domains, the estimated impact of the NFP program is (only) significant for the Problem Solving domain, where background characteristics are unable to explain 7.7 percentage points (p<0.05) of the 12 percentage points lower likelihood of NFP children to be in the 'refer zone' for this domain, compared to non-NFP Roma children.

The regression estimation results show no significant differences between NFP and non-NFP Roma children when it comes to birth weight and gestational age.

Outcome name	NFP Coefficient (NFP vs. Roma mothers)		SE	p-value	Avg – NFP mothers	Avg – Roma mothers	N
Average of ASQ-3 Domains (% of max possible pts)	3.30	***	1.220	0.0071	81.4	73.0	462
Communication (% of max possible pts)	1.46		1.565	0.3514	82.5	76.5	462
Gross Motor (% of max possible pts)	2.97	*	1.575	0.0597	88.4	81.2	462
Fine Motor (% of max possible pts)	3.95	*	2.019	0.0512	72.1	61.2	462
Problem Solving (% of max possible pts)	5.98	***	1.737	0.0006	81.3	71.2	462
Personal-Social (% of max possible pts)	2.14		1.530	0.1622	82.5	74.9	462
ASQ Social-Emotional (% of max possible pts)	2.77	***	0.762	0.0003	88.5	83.8	462
Communication (Refer zone)	-0.7%		0.025	0.7932	4%	8%	462
Gross Motor (Refer zone)	-3.3%		0.029	0.2559	4%	13%	462
Fine Motor (Refer zone)	-1.3%		0.034	0.6901	13%	22%	462
Problem Solving (Refer zone)	-7.7%	**	0.031	0.0124	4%	16%	462
Personal-Social (Refer zone)	-3.2%		0.029	0.2704	4%	13%	462
Social-Emotional (Refer zone)	-11.4%	***	0.036	0.0016	5%	23%	462
Birthweight (grams)	-51.79		54.302	0.3408	2996.6	3006.2	462
Low birthweight (<2500 g)	0.8%		0.034	0.8133	11%	12%	462
Gestational Age (duration of pregnancy - weeks)	-0.06		0.161	0.7144	39.4	39.5	462

Finally, based on the survey of mothers, when it comes to the languages that the child can comfortably speak or understand, the regression analyses find that mothers of children who participate in NFP are 5 percentage points (p<0.1) more likely to report that their child speaks or understands Bulgarian than children from the Roma comparison sample (as with all other estimations, *after* controlling for primary language spoken at home). Meanwhile, there is no statistically significant difference found on the child's comfort speaking or understanding Romany or Turkish.

	NFP Coefficient (NFP vs. Roma mothers)		Standard Error	P-value	Avg - NFP mothers	Avg - Roma mothers	N
Child comfortably speaks/understands: Bulgarian	0.050	*	0.029	0.0893	83%	63%	462
Child comfortably speaks/understands: Romany	-0.057		0.047	0.2261	52%	60%	462
Child comfortably speaks/understands: Turkish	0.008		0.027	0.7836	11%	18%	462

We find that the child development results (as measured by ASQ-3 and ASQ-SE) depend on the language spoken at home, with scores being particularly higher among children of NFP mothers who speak Romany or Turkish at home.

We explored this by additionally including an interaction term between the NFP group dummy variable and a variable for whether Bulgarian is the primary language spoken at home (alongside including both variables without their interaction – results available upon request). This interaction term is statistically significant ($p < 0.05$) and negative: when comparing Roma children who speak Bulgarian as the primary language at home, children in NFP score 1.23 points higher on average across ASQ-3 domains than non-NFP children. When comparing Roma children who do not speak Bulgarian as the primary language at home, the effect is much larger: children in NFP score 6.03 points higher on average across ASQ-3 domains. In other words, the regression analysis indicates that the increase in ASQ-3 scores between NFP and non-NFP Roma children is larger among children who do not speak Bulgarian at home. This suggests that positive NFP program impacts may be concentrated among children speaking languages *other* than Bulgarian at home (i.e. Romany, Turkish, etc.).

The same trend is evident when we look at ASQ-SE score. When an interaction between NFP group and Bulgarian language is included, it is also statistically significant ($p < 0.05$) and negative. When comparing Roma children who do *not* speak Bulgarian as the primary language at home, children in NFP score 4.90 points higher on average on ASQ-SE. When looking at Roma children who do speak Bulgarian as the primary language at home, children in NFP also score higher, but only by 1.17 points on average.

5.3 (Expecting) Mother's Outcomes

Next, we report on maternal outcomes from the survey of NFP mothers and mothers from the comparison sample of first-time mothers from the same neighborhoods.

Family Planning

The vast majority of non-NFP Roma mothers (92%) report wanting to wait at least two years after the birth of the last child before their next pregnancy. While the NFP curriculum teaches mothers that waiting at least two years is healthiest, there does not seem to be evidence that Roma mothers who participate in NFP are even more likely to do so; the difference is small and not statistically significant.

The NFP nurses provide the mothers with information about family planning. The regression results indicate that the NFP program may be closing gaps in contraception knowledge. Specifically, on average, mothers who participate in NFP are 17 percentage points more likely to name birth control

pills (p<0.01) and 30 percentage points more likely to name IUDs (p<0.01) compared to Roma mothers who do not participate in NFP, always after controlling for background characteristics. Mothers in NFP are also 6.1 percentage points less likely to mention interrupted intercourse as a form of contraception (p<0.1) and 3.4 percentage points less likely to report not knowing any ways of protecting themselves from pregnancy (p<0.1).

	NFP Coefficient (NFP vs. Roma mothers)		Standard Error	P-value	Avg - NFP mothers	Avg - Roma mothers	N
Methods of contraception: Condom	-0.040		0.045	0.3770	55%	66%	462
Methods of contraception: Birth control pills	0.170	***	0.048	0.0004	52%	28%	462
Methods of contraception: IUD	0.303	***	0.047	0.0000	64%	26%	462
Methods of contraception: Interrupted intercourse	-0.061	*	0.032	0.0598	8%	12%	462
Methods of contraception: Family planning	-0.006		0.012	0.6123	1%	1%	462
Methods of contraception: Emergency contraception	0.006		0.008	0.4783	1%	0%	462
Methods of contraception: I don't know	-0.034	*	0.020	0.0948	1%	6%	462
Pregnancy spacing: wait at least 2 years after birth of last child?	-0.013		0.035	0.7127	92%	92%	344

Pregnancy Related Outcomes

Nurses in the NFP program provide the (expecting) mothers with information about the fetus, nutrition, and the risks of smoking and drinking during pregnancy. The results are mixed.

Estimation results indicate that the NFP participants generally demonstrate greater knowledge about the fetus, again after controlling for background characteristics. When compared to Roma mothers not in NFP, mothers in NFP are 11 percentage points (p<0.01) more likely to correctly report that babies can hear while inside them, and 9.6 percentage points (p<0.01) more likely to correctly report that their physical and emotional state affects the baby during pregnancy.

With regards to diet, however, NFP mothers report eating vegetables, fruit, meat, eggs, beans, dairy, and grains significantly (p-values range from <0.01 to <0.1) *less* frequently during pregnancy than non-NFP Roma mothers. Fish is the exception, where there is no significant difference. This result is surprising since the program provides information about nutrition. A possible explanation may be that NFP clients have become more aware of what they generally eat as a result of the regular conversations with NFP nurses, and might thus make a more realistic estimation than mothers who did not take part in the program. Either way, there is no indication that the program may be *improving* nutritional outcomes during pregnancy. However, as mothers are generally poor, it may not be surprising that they cannot afford more expensive foods.

Finally, there is no evidence from the regression analysis that mothers in NFP are less likely to smoke or to consume alcohol during pregnancy compared to Roma mothers not in the NFP program.

	NFP Coefficient (NFP vs. Roma mothers)		Standard Error	P-value	Avg - NFP mothers	Avg - Roma mothers	N
Yes: babies can hear while they are inside you	0.110	***	0.038	0.0042	87%	74%	462
Yes: your physical/emotional state affects the baby during pregnancy	0.096	***	0.036	0.0080	90%	77%	462
Diet during first pregnancy: how regularly ate:							
Vegetables	-0.183	**	0.083	0.0286	2.04	2.05	462
Fruit	-0.209	**	0.084	0.0137	1.99	2.01	462
Meat	-0.241	***	0.084	0.0043	1.69	1.78	462
Fish	-0.108		0.096	0.2637	1.33	1.27	462
Eggs	-0.278	***	0.087	0.0015	1.86	2.00	462
Beans	-0.267	***	0.075	0.0004	2.12	2.34	462
Dairy	-0.252	***	0.072	0.0005	2.23	2.36	462
Grains	-0.116	*	0.070	0.0961	2.51	2.58	462
Smoked during first pregnancy	-0.035		0.035	0.3143	18%	28%	462
Cigarettes per day during first pregnancy	-1.284		1.407	0.3641	5.52	7.37	113
Consumed alcohol during first pregnancy	-0.006		0.026	0.8036	4%	8%	462
Drinks per week during first pregnancy	-0.258		0.556	0.6563	1.29	1.56	32

The next set of regression analyses explore outcomes related to health insurance during pregnancy, check-ups, and more generally, services used during pregnancy, as well as experiences of complications.

First, NFP mothers are 5.5 percentage points more likely to have health insurance during pregnancy than the comparison group of Roma mothers, but this is not statistically significant.

Second, NFP mother are less likely to report feeling comfortable contacting their GP about their pregnancy (p<0.01), which may reflect some substitution between NFP nurses and regular GPs. In fact, there is no evidence that mothers in the NFP program attend more prenatal check-ups compared to the comparison group of Roma mothers; however, it is important to keep in mind that NFP nurses already monitor the pregnancies on a very frequent basis. Recall that the frequency of prenatal check-ups is generally high, but lower than the general population, and a sizeable proportion of Roma mothers (26%) does not meet the national benchmark of 8 check-ups.

The regression analysis shows that mothers in NFP are 5.6 percentage points more likely to meet the national benchmark, but this is not statistically significant. They are 8.6 percentage points (p<0.05) *less* likely to have had 12 prenatal check-ups. Together, this indicates that among the Roma comparison sample there is a higher proportion of women with a *very high* frequency of visits. Note that a very high frequency could be a reflection of pregnant mothers experiencing complications that require regular check-ups.

Third, when it comes to various kinds of services used during pregnancy, there are few significant differences. NFP mothers report being 94 percentage points (p<0.01) more likely to have been supported by a home visiting nurse/midwife than Roma mothers from the comparison sample, and 30 percentage points more likely to have received psychological support (p<0.01) (likely by the same visiting nurses).[9] As discussed further below, NFP mothers are significantly less likely to display symptoms of depression and loneliness. Further, they are 16 percentage point (p<0.01) less likely to have received financial support.

Lastly, there are no significant differences in reporting complications during pregnancy, nor are NFP mothers significantly more likely to report knowing more about what to expect during childbirth when they went to the hospital to deliver their baby. On this latter point, one possible explanation is that having attained more knowledge about childbirth through the program, NFP moms could be more aware of the gaps in their knowledge and the complexity of the topic.

	NFP Coefficient (NFP vs. Roma mothers)		Standard Error	P-value	Avg - NFP mothers	Avg - Roma mothers	N
Health insurance during first pregnancy	0.055		0.041	0.1857	85%	77%	462
Comfort with contacting your GP about pregnancy	-0.246	***	0.085	0.0039	3.78	3.84	462
First pregnancy monitored by GP/Obstetrician/Midwife	0.014		0.019	0.4550	99%	95%	462
Number of prenatal checkups during pregnancy	-0.348		0.470	0.4586	9.91	9.60	456
Met prenatal checkups benchmark: BG standard (8)	0.056		0.040	0.1671	85%	74%	456
Services used during pregnancy:							
State/municipality service	-0.060		0.042	0.1489	14%	21%	430
Financial support	-0.156	***	0.049	0.0016	29%	45%	456
School for parents	-0.001		0.007	0.8625	0%	1%	453
Home visiting nurse/midwife	0.936	***	0.019	0.0000	100%	5%	460
Psychological support	0.297	***	0.031	0.0000	37%	2%	458
Support services for kids	-0.022		0.032	0.4991	11%	9%	456
Crisis intervention/center	0.000	NA	0.000	NA	0%	0%	457
Education/job services	0.008		0.016	0.6377	3%	2%	453
Experienced complications during pregnancy/delivery	0.011		0.023	0.6356	5%	5%	462
Experienced complications that worried you	0.035		0.022	0.1071	6%	4%	453
(if yes) Did you see a medical professional?	-0.225		0.702	0.7794	100%	73%	20

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[9] While NFP nurses do not provide psychological care, we believe respondents may perceive the home visits as a source of psychological support which explains why they report receiving this type of support more than others.

Before you went to the hospital to deliver your baby, how much did you know about what to expect during childbirth?	0.148	0.104	0.1574	3.13	3.08	462

Post Childbirth Outcomes

There is indication that the NFP program may have improved child feeding practices and knowledge about baby well visits in the first year of the baby's life.

First, 94% of mothers in NFP correctly report that baby well visits should occur monthly in the first 6 months, compared to only 85% of Roma mothers who did not participate in NFP. When controlling for background characteristics, mothers in NFP are significantly more likely to correctly report on the frequency of baby well visits in the first 6 months, by 9.7 percentage points more than Roma mothers in the comparison sample (p<0.01). When asked whether mandatory vaccines are good or bad for the baby (answers could range from 1 - "very bad," to 5 - "very good"), the regression results show no statistical difference when comparing responses of Roma mothers in NFP to those of Roma mothers not in NFP.

Importantly, mothers in NFP breastfed their first child for at least 0.79 months longer than the comparison group of Roma mothers (p<0.1). They also report introducing solids 0.39 months later than the comparison sample of Roma mothers (p<0.01).

	NFP Coefficient (NFP vs. Roma mothers)		Standard Error	P-value	Avg - NFP mothers	Avg - Roma mothers	N
How often should you go on baby well visits in first 6 months (% correct answer of "monthly")	0.097	***	0.032	0.0026	94%	85%	462
Do you think mandatory vaccines are good or bad for baby	0.011		0.090	0.9008	4.28	4.25	413
How long breastfed first child (min. months) - *mothers w/ kids age 2 or older*	0.791	*	0.473	0.0958	5.94	4.19	321
Age introduced to solids (months)	0.387	***	0.118	0.0011	5.55	5.14	462

Early Childhood Parenting Outcomes

There is also indication that the NFP program may have improved post-childbirth parenting outcomes more broadly. The first set of outcomes relates to access to and use of health services.

First, NFP mothers ages 18 and above, who – being adults – are no longer automatically eligible for free health insurance, are 12 percentage points more likely (p<0.05) to report currently having health insurance than the Roma comparison sample. Given that 41% of the latter reports having health insurance, this represents an increase of more than one quarter. The regression analyses further show no statistically significant differences in the likelihood that the mother or the child is registered with a general practitioner in the city in which they live.

As with questions relating to pregnancy, NFP mothers do report (p<0.05) being slightly less comfortable contacting their GP with questions about child raising, again suggesting that some substitution may be happening between the GP and the NFP nurse.

As mentioned on page 29, the study asked two questions about the use of hospital services. These questions are often used as indicators of child abuse or neglect, or as indicators of unsafe and challenging living conditions. The program provides clients with information about supportive parenting practices and about how best to safeguard the child and make the home environment less dangerous. This could possibly reduce the frequency of incidences that lead to a medical concern warranting a hospital visit. As mentioned earlier, mothers were asked how many times, in the first year of their baby's life, was their baby taken to an emergency room, walk-in clinic, or had an ambulance called because of an injury or concern that the baby swallowed something harmful. The same question was also asked with a slight variation, about how many times the baby was admitted to the hospital (spending at least one night there) because of the same issues in the first year of its life.

The regression analyses find that NFP mothers report fewer incidences of taking their child to the ER or walk-in clinic, and fewer incidences of hospital admissions, but these differences are not statistically significant. However, statistically significant results would be rare with such low sample sizes, as these events were so infrequent across the groups (with average occurrences far below 1 event[10]).

	NFP Coefficient (NFP vs. Roma mothers)		Standard Error	P-value	Avg - NFP mothers	Avg - Roma mothers	N
Health insurance currently	0.108	**	0.051	0.0361	61%	43%	462
Health insurance currently - *mothers age 18+*	0.123	**	0.052	0.0185	60%	41%	430
Registered with GP in current city - mother	0.035		0.037	0.3396	89%	82%	462
Registered with GP in current city - child	-0.010		0.019	0.5754	97%	96%	462
Comfort with contacting child's GP about child raising	-0.165	**	0.080	0.0387	3.94	3.94	462

[10] In addition to the regression data, these summary statistics provide an indication of frequency, based on how frequently "0 times" occurred in each group:
 Number of times taken to ER or walk-in clinic:
-   NFP: 144/159 (90.57%) report 0 times to ER
-   Not NFP: 255/303 (84.16%) report 0 times to ER
-   General Population: 288/307 (93.8%) report 0 times to ER

Number of times admitted to hospital:
-   NFP: 147/159 (92.45%) report 0 times night in hospital
-   Not NFP: 262/303 (86.47%) report 0 times night in hospital
-   General Population: 300/307 (97.72%) report 0 times night in hospital

Number of times taken to ER or Walk-In Clinic	-0.047	0.063	0.4580	0.18	0.23	462
Number of times admitted to hospital (spent at least 1 night)	-0.105	0.077	0.1750	0.14	0.25	462

Next, there is no evidence from the regression analyses that the NFP program reduced the likelihood of smoking after giving birth. Conditional on smoking, NFP mothers smoke 1.4 cigarettes per day fewer than the comparison group of Roma mothers, but this is not quite statistically significant at conventional levels ($p<0.14$).

There is, however, some evidence suggesting that participation in the NFP program may improve both depression symptoms and feelings of loneliness and social isolation. This would be consistent with the design of the NFP, where nurses are trained to recognize symptoms of depression and refer accordingly to health professionals. Mothers who participate in NFP score around half a point less (-0.48) on the PHQ-9 assessment of depression ($p<0.1$) and -0.25 points less on the loneliness and social isolation scale ($p<0.1$), possibly related to the finding above that NFP mothers report receiving more psychological support during pregnancy.

Finally, there is no evidence from the regression analysis that mothers who participate in NFP report different feelings of mastery or control over their life chances than Roma mothers who do not participate in NFP. This may reflect the context in which these first-time mothers find themselves, as very young mothers with little education and living in economically vulnerable situations, over which the NFP program itself has little influence. Similarly, there is also no evidence that mothers who participate in NFP are more likely to have a goal or plan for additional schooling, or related to work. Even when the sample is limited to mothers who have not completed a secondary level of education, or mothers whose children are above age 2 (so are less likely to be on maternity leave), there are no statistically significant differences between mothers in NFP and Roma mothers not in NFP.

	NFP Coefficient (NFP vs. Roma mothers)		Standard Error	P-value	Avg - NFP mothers	Avg - Roma mothers	N
Smoke currently	-0.008		0.032	0.7943	45%	49%	462
Cigarettes per day, currently	-1.431		0.956	0.1359	10.31	13.02	218
Depression scale (PHQ-9)	-0.480	*	0.264	0.0695	1.22	2.02	462
Loneliness scale	-0.245	*	0.125	0.0502	3.53	3.90	462
Mastery/control (Pearlin scale)	-0.307		0.339	0.3669	19.04	18.53	462
Goal or plan for additional schooling	-0.061		0.039	0.1178	13%	17%	462
Goal of plan for a job within next 2 years (seek work, change job, etc.)	0.012		0.048	0.8055	33%	33%	462

Next, while there is no evidence that children of NFP mothers spend more time with their biological fathers, the regression analyses indicate that NFP mothers are 16 percentage points more likely to report entering into discussion with their partner when they differ in opinion ($p<0.01$) instead of standing their ground ($p<0.01$), compared to the comparison sample of Roma mothers. There is no

evidence that mothers in NFP differ from Roma mothers not in NFP in terms of reporting "I usually step back" when opinions differ from their partner.

	NFP Coefficient (NFP vs. Roma mothers)		Standard Error	P-value	Avg - NFP mothers	Avg - Roma mothers	N
Time with biological father in past month	-0.010		0.089	0.9136	3.64	3.62	462
Response when opinion diff. from partner: I usually step back	-0.037		0.052	0.4774	41%	50%	421
Response when opinion diff. from partner: We usually discuss	0.157	***	0.053	0.0030	53%	35%	421
Response when opinion diff. from partner: I usually stand my ground	-0.121	***	0.035	0.0007	6%	15%	421

Finally, there is encouraging evidence from the regression analyses that the NFP program may result in more parental engagement practices with the child, which may explain the higher ASQ-3 developmental results observed above. Mothers who participate in NFP are 23 percentage points (p<0.01) more likely to read books, 17 percentage points (p<0.01) more likely to tell stories, 16 percentage points (p<0.01) more likely to name, count, and draw, and 8 percentage points more likely to play with toys with their child (p<0.01). Conversely, NFP children spend significantly less time in front of screens than children from the Roma comparison sample (p<0.1). There is no evidence that the NFP increased singing songs with the child or going outside, but both activities are already very common among Roma children. Finally, there is no evidence from the regression analysis that the NFP program helps to close the gap in attending formal daycare or kindergarten, also not when restricting the sample to children aged 2 years and older.

	NFP Coefficient (NFP vs. Roma mothers)		Standard Error	P-value	Avg - NFP mothers	Avg - Roma mothers	N
Activities in past 3 days: read books	0.231	***	0.046	0.0000	78%	46%	451
Activities in past 3 days: tell stories	0.171	***	0.041	0.0000	87%	62%	460
Activities in past 3 days: sing songs	0.036		0.032	0.2673	94%	84%	459
Activities in past 3 days: go outside	0.018		0.011	0.1082	100%	98%	462
Activities in past 3 days: play with toys	0.078	***	0.028	0.0061	97%	82%	460
Activities in past 3 days: name, count draw	0.160	***	0.042	0.0001	81%	55%	447
Amount of screen time per day (TV, phone, tablet)	-0.162	*	0.091	0.0767	1.58	1.73	454
Child currently goes to formal daycare or kindergarten	0.014		0.032	0.6691	11%	11%	462
Child currently goes to formal daycare or kindergarten *(child age 2 or older)*	-0.002		0.045	0.9564	15%	15%	325

6. Clients' experiences of the NFP program

Clients in the NFP were also asked how they experienced the program, with positive responses overall. All NFP clients interviewed for the evaluation study responded to these questions.

Clients' motivations to sign up for the program

Clients were asked "What motivated you to sign up for the program?" and their answers were coded to themes. Answers could have multiple themes. The most mentioned motivations for signing up for the program were:

- Receiving parenting and pregnancy support/advice (30% mentioned),
- Meetings with the nurse - good attitude, care, providing examinations (28% mentioned),
- Learning new things (14% mentioned)
- Ensuring peace of mind/security for the health of the pregnant woman/the child (7.5% mentioned)
- The program was recommended to me (by health mediators/friends) (7.5% mentioned)
- To learn how to take better care of the baby (3.1% mentioned)
- Out of curiosity/interest (3.1% mentioned)

11 respondents (6.9%) indicated that they didn't know what their motivation was.

Clients' satisfaction with the program

Clients were also asked "How did you experience the program (positive/negative)? Why?" and answers again were coded to themes. Overall, 158 out of 159 clients indicated they were satisfied with the program (in general or about a particular element within the program). More specifically, 133 clients (84%) indicated that they had a positive experience and were very satisfied with the program in general. 10 interviewees were satisfied in particular with the advice, guidance and the valuable information the program offered them, 9 were satisfied in particular because of the constant support of the visiting nurse. 1 interviewee was satisfied because of the gifts. One interviewee reported a negative experience.

Most valued elements of the program

Interviewed clients emphasized the 'advice, support and contact with the nurses' as the most valued element of the program (30% mentioned). Other valuable elements mentioned included:

- The approach to the child (I was taught how to look after/raise my child) (21% mentioned)
- The attitude, attention and care towards me and the baby (14% mentioned)
- Everything (13% mentioned)
- Learning new things, information presentation (6.9% mentioned)
- The health and proper development of the child (6.3% mentioned)
- The friendship with the nurse (2.5% mentioned)
- The results (in general) (1.9% mentioned)

7 respondents (4.4%) indicated that they didn't know what element they valued most about the program.

Recommending the program to others

The majority of clients (83%) would recommend the program to others.

Would you recommend the program to others?	N=159
Yes	132 (83%)
No	1 (0.6%)
I don't know	26 (16%)

7. Interest in NFP among Roma mothers and mothers in the general population

Mothers who did not participate in NFP (both Roma mothers, and mothers in the general population) were asked about their familiarity with the program and their interest in it. Their responses demonstrate that few mothers had heard about the program, but there seems to be a wide interest in a program such as the NFP.

All respondents in the evaluation study (N=606) who did not participate in NFP provided answers to the four questions in this section.

Question	Yes	No	I don't know
Have you ever been offered a home-visiting program for your pregnancy or your child?	52 (8.6%)	520 (86%)	34 (5.6%)
Do you know if such programs are offered in your city?	180 (30%)*	48 (7.9%)*	378 (62%)
Do you think that home-visiting services could be useful for mothers and children?	511 (84%)	46 (7.6%)	49 (8.1%)
Would you sign up for a home visiting service if it was offered to you?	341 (56%)	109 (18%)	156 (26%)

*For the second question the response options were: 'yes they are available', 'no, they are not offered', and 'I don't know'.

8. Discussion and concluding remarks

This study was designed to evaluate the Nurse Family Partnership (NFP) program after six years of implementation in Bulgaria. The NFP is a community health program designed to support vulnerable families in Bulgaria, which has been implemented since 2016. Detailed data on mother- and child outcomes was collected between May and July 2022 in Plovdiv and Sofia, Bulgaria, among three groups of first-time mothers: 159 NFP clients in (mostly) Roma communities; 301 first-time mothers in the same Roma communities not participating in NFP who also had their first child when they were below the age of 22; and, 305 first-time mothers among the general Bulgarian population.
A comparison of children of the Roma first-time young mothers with first-time mothers from the general population, shows that the former have, on average, lower child development outcomes than children of mothers from the general population. As measured by the ASQ and ASQ-SE assessments, children of minority mothers score on average 73% of the maximum possible points, which is 9.2 percentage points lower than the general population. The gaps are biggest in the Fine Motor and Problem Solving domains, followed by Communication, Personal-Social (ASQ), and Social-Emotional (ASQ-SE) domains. In terms of birthweight, we find that the minority children are significantly lighter – 3006 grams vs 3262 grams, and more likely to experience low birthweight (below

2,500 grams): 12% of minority children fall in this category compared with 4% of children in the general population sample.

A comparison between the young Roma first-time mothers and those from the general population shows considerable gaps in knowledge, attitudes, and child development practices before, during, and after the pregnancy in some, but not all areas. For example, there are large gaps in family planning knowledge of birth control pills and IUDs, higher likelihood of smoking during pregnancy, and lower rates of health insurance. In some areas, gaps between Roma mothers and mothers in the general population continue to persist post-pregnancy. For example, there is a large gap in health insurance access post-birth, higher frequency of children taken to the emergency room, higher rates of mother's smoking, higher risk of feeling lonely and social isolation, and lower likelihood of feeling in control of one's life chances. Roma mothers also report substantially lower frequencies when it comes to reading books to their children, telling stories, naming, counting, and drawing, as well as playing toys. Rates of singing songs and children spending time outside are similar between both groups, while the amount of screen time is slightly higher for Roma children compared to the general population. Roma mothers are less likely to know that baby well visits should occur monthly in the first 6 months of the baby's life. Both groups of mothers report similar favorable preferences toward mandatory vaccines for their baby, near universal monitoring of the pregnancy by a GP/ Obstetrician / Midwife, and similar duration of breastfeeding.

The impact assessment results in this report provide an indication of where the effects of the NFP program may be concentrated. The impact assessment relied on the comparison of NFP clients with similar aged first-time mothers from the same neighborhoods, controlling for background characteristics. While designed to reduce the risk of omitted variable bias, it cannot be ruled out, and caution is therefore warranted in interpreting the findings as causal.

In terms of child development outcomes, the sample of children from NFP mothers score significantly higher on the ASQ child development test, especially in the Problem Solving, Gross Motor and Fine Motor domains, after controlling for background characteristics. We also find that the child development results (as measured by ASQ) depend on the language spoken at home, with the ASQ scores being particularly higher among children of NFP mothers who speak Romany or Turkish at home, even after controlling for primary language spoken at home.

With regards to mother's outcomes, NFP mothers tend to have improved knowledge, attitude, and practices when it comes to child development. Compared to Roma young first-time mothers from the same neighborhoods, and controlling for background characteristics, NFP mothers demonstrate greater knowledge of family planning, have improved child feeding practices in the first year of the baby's life, including longer breastfeeding, are more likely to have health insurance for themselves, and they have improved post-childbirth parenting outcomes more broadly, particularly around early stimulation parental engagement activities.

These findings are encouraging. Naturally, this evaluation raises several questions. For example:

What might explain why some intended outcomes were not significant, and what can be done to strengthen such areas? As mentioned before, there are areas where findings did not indicate improvement through NFP, for example, in improving birthweight, improving diet, reducing smoking, comfort in contacting the GP about the pregnancy, supporting greater preschool participation, and raising feelings of self-efficacy around life's chances. In interpreting the findings, it is important to note that the program is only in its sixth year of implementation, and for certain program areas, it may take longer before intended outcomes become visible. Moreover, mothers in the NFP client group are at

different stages of the program, which means that some may not have gone through all the modules included in the NFP program. This may for instance affect the findings around goal setting and self-efficacy –because these modules are offered in later stages of the program. Finally, there may be variables such as environmental factors, or structural barriers that were not observed or controlled for in this study, that may (co-)determine outcomes of interest.

What can be done to support young Roma women and men living in vulnerable conditions to delay their first pregnancies, and first complete at least a secondary school education? The positive indications of the NFP program on child development outcomes suggest that the program may help provide the foundation for the next generation of young men and women to have improved educational outcomes. In addition, the positive indications on family planning knowledge indicate that the gap in family planning knowledge, in particular around birth control and IUDs, among young Roma women can be closed. Because the NFP is designed to reach vulnerable women once they are pregnant, closing this knowledge gap among girls and young women *before* their first pregnancy would require outreach that goes beyond the NFP, for example through school- and community-based outreach to young men and women.

What complementary public programs could further improve child- and mother-level outcomes? The NFP is designed to create a safe space to allow for coaching and guidance, built on trusted relations between nurses and vulnerable young mothers. Which public programs could complement such nurse-client interactions? One domain might be programs aimed at addressing knowledge and awareness among young men and women, vulnerable ones especially, around family planning, pregnancy, and child development. For example, school- and or community based programs informing adolescents, young adults, and (expecting) parents about family planning methods, risky behaviors around pregnancy, accessing health insurance, creating a safe home environment, feeding practices, and the importance of early stimulation parenting practices.

These questions point to additional areas of exploration that can inform what mix of cost-effective policies can best support vulnerable children and their parents to achieve improved child development outcomes, and reduce the numerous inequalities found by this analysis.

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