The long term and intergenerational effects of a school construction program in Indonesia

*Preliminary Draft in Progress**

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Abstract

The impacts of social interventions may persist in the long-term, and this, in turn, may affect the intergenerational transmission of human capital. We analyze the effects of increasing access to education on the long-term health of the "first generation" and the intergenerational effects on human capital outcomes of their children in a middle-income country. We exploit the rollout of a large-scale school building project across Indonesian districts between 1974 and 1979 and link the program to longitudinal data from the Indonesian Family Life Survey. We find persistent effects on several dimensions of health about 40 years after the initial program implementation. Also, we find improved health outcomes for the children of the exposed women, but not men. We explore potential mechanisms and selection concerns.

Keywords: Intergenerational transmission of human capital, education, adult well-being

JEL Codes: J13, O15, I38

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1 Introduction

Intergenerational mobility remains a major policy concern. A large empirical evidence has documented the strong and large intergenerational persistence of socio-economic status, with evidence of even less mobility in developing than developed countries (Behrman et al., 2003; Birdsall and Graham, 2000; Black and Devereux, 2010; Corak, 2006; Solon, 1999, 2002). Most of the evidence about intergenerational associations are correlational and little is known about whether those associations can be affected by social policies. We analyze the effects of a policy change on the intergenerational transmission of human capital in Indonesia.

Social interventions that enhance childhood environments have the potential to improve the transmission of human capital across generations since such interventions have persistent effects on adult wellbeing.[1] One of the most widely implemented policies to address this concern is to improve school access of children in poor households. Most of the evidence on the long-term effects of school access policies focus on the educational and labor market outcomes of those exposed, "the first generation" (Aaronson et al., 2017; Duflo, 2001). However, little is known about whether these polices affect other dimensions of human capital (Wantchekon et al., 2014). In addition, even less is known on whether the beneficial impacts persist into the next generation, "the second generation". We analyze the effects of increasing access to education on the long-term health of the "first generation" and the intergenerational effects on human capital outcomes of their children in a middle-income country.

We study these questions in the context of a massive school construction program in Indonesia— known as the INPRES program. Between 1974 and 1978, 61,000 elementary schools were constructed, doubling the existing stock of schools, thus making schools available to children where none or few had existed before. Our study builds upon earlier studies that have analyzed the effects of this program on "the first generation". Duflo (2001), Duflo (2004) and Breierova and Duflo (2004) show the medium-term effects of the program on education, fertility and labor-market outcomes, while Martinez-Bravo (2017) documented the impacts on the local governance and public good provision in Indonesia's main island. These studies serve as a "first stage" evidence to motivate an examination of further impacts on the long-term wellbeing of the "first-generation", and the spillover on the human capital outcomes of the "second generation".

Following these prior studies, we exploit variation in the program rollout across Indonesian districts between 1974 and 1979 and link the program to longitudinal data from the

[1] A vast literature in economics has documented the long-term effects of different types of social interventions on human capital outcomes, mainly in high-income countries (Aaronson et al., 2017; Bailey and Goodman-Bacon, 2015; Currie and Gruber, 1996a,b; Deming, 2009; Havnes and Mogstad, 2011; Hoynes et al., 2016; Miller and Wherry, 2018; Parker and Vogl, 2018; Rossin-Slater and Wüst, 2015).

Indonesian Family Life Survey, which includes 5 waves over 20 years (1993-2014). This rich dataset allows us to evaluate the long-term outcomes of individuals who were exposed to the program, and examine whether adults who have access to the program in childhood have children with better human capital outcomes. There are several pathways through which better parental human capital (due to their own exposure to INPRES) may translate into improvements in health and education outcomes of the next generation: changes in family resources, better health and human capital investments, and changes in fertility decisions, among others. Therefore, we will examine these potential channels based on the available data.

We begin by showing the first-order effects on the education of both men and women of the "first generation". We then examine the program effects on several measures of adult health. We find that individuals exposed to the school construction program have better self-reported health status, physical functioning and mental health between ages 40 and 50. We will also analyze additional health and adult cognitive outcomes.

We then examine the intergenerational effects on children's health and find that maternal access to INPRES elementary schools reduce the stunting rates of her children, whereas no effects are found from father's exposure. We will explore other children's health and education outcomes and examine potential mechanisms. The evidence of whether program effects persist and transmit to the next generation is highly policy relevant as current debates about the funding for such social programs may underestimate their benefits.

The remainder of the paper is organized as follows. Section 2 provides an overview of the program, Section 3 describes the data. Section 4 describes the methods used to estimate the program effects on the first generation and the long-term effects. Sections 5 describes the methods and results on the second generation. Section 6 presents robustness checks. Section 7 concludes with policy implications.

2 Background

The Indonesian government under Suharto administered development programs under the 'Presidential Instructions' program, or INPRES (*Instruksi Presiden*). The INPRES program was funded by revenue generated by the oil boom in the 1970s (Duflo, 2001). The INPRES program operated at the province, district, and village levels and was categorized into education, health, environmental development, and road development (Tadjoeddin and Chowdhury, 2017). The education program focused solely on developing primary education.

The INPRES Primary School (*Sekolah Dasar* INPRES, or SD INPRES) program was was launched after Suharto signed the Presidential Instructions No. 10 in 1973, with the

goal of increasing equity in access to basic education. The SD INPRES program began its implementation in 1974 and targeted places with low primary school enrollment (Duflo, 2001). This was followed by further expansion in 1978-79, after Suharto signed the Presidential Instructions No. 3. By 1980, the SD INPRES program constructed over 61,000 primary schools, increasing the number of schools available by 2 schools per 1,000 children (Duflo, 2001). This makes this program one of the fastest primary school construction programs (World Bank, 1990). These new schools were staffed with teachers and introduced improvements to classroom spacing, school equipment (e.g., books, libraries), and adequate sanitation.

Other programs that were implemented at the time included a water and sanitation program. Following Duflo (2001), we include the program as a control variable in our analysis. In the 1980s, the 'Midwife in the Village' program was rolled out, and this program may be complementary to the earlier INPRES program, and may act as one channel in intergenerational human capital transmission.

The long-term effects of the INPRES program will inform other social interventions in Indonesia as well as other low and middle income countries since recent social interventions in low and middle income countries have focused on community-based programs. In Indonesia, such programs include the Kecamatan Development Project (KDP) and Program Nasional Pemberdayaan Masyarakat (PNPM). These programs seek to empower local communities in deciding resource allocation, including on investments in infrastructure such as schools, as well as human capital investment such as teacher training.

3 Data

This paper uses data from the Indonesian Family Life Survey (IFLS), a longitudinal household survey that is representative of approximately 83 percent of the Indonesian population in 1993. The first wave of the survey (IFLS1) was conducted in 1993, the second wave (IFLS2) in 1997, the third wave (IFLS3) in 2000, the fourth wave (IFLS4) in 2007, and the fifth wave (IFLS5) in 2014. Indonesia is administratively divided into provinces, districts (regencies or cities), sub-districts, and villages in rural areas or townships in urban areas. The IFLS over sampled urban areas and rural areas outside of the main island of Java. IFLS1 included 7,224 households residing in 13 of Indonesia's 26 provinces in 1993. These households resided in approximately 200 districts, which corresponded to 321 enumeration areas in 312 communities. A community is defined as a village in rural areas and a township in urban areas. Subsequent waves of the survey sought to re-interview all households in IFLS1, as well as any households that had split-off. The IFLS contains rich information

on individual, household, and community characteristics. Household characteristics include household size, household expenditure, and asset ownership. Individual characteristics include age, education, marital status, employment, as well as complete pregnancy history for women between the ages of 15 and 49. The IFLS collects relevant outcomes for this study.

Long-term Outcomes Adult respondents were asked to report their physical health through a series of questions on overall health status and physical function. Good self-reported health takes the value one if a respondent reported his or her self status as 'very healthy' or 'healthy'. We also include the number of days a respondent missed his or her activities in the past 4 weeks prior to the survey.

Respondents were also asked to report difficulties in their physical ability in daily activity. The items include: carrying a heavy load, drawing a pail of water from a well, walking for 1 and 5 kilometers, bowing (squatting or kneeling), walking across the room, standing up from sitting on the floor and chair, reaching one's arms above one's shoulders, and picking up a small coin from a table. Each item includes three possible responses: easily, with difficulty, and unable to do the task. We create an indicator for 'difficult' or 'unable', and sum the items, and as an alternative, we create an index of difficulties using principal component analysis. Similarly, respondents were asked to report difficulties in instrumental activities of daily living (IADL). We create a similar measure to capture their limitations. The IADL measure includes: shopping for personal needs, preparing hot meals, taking medicine, doing household chores, shopping for groceries, and managing one's money. Each item includes 4 possible responses: easily, with difficulty, can do the task with help, and unable to do the task.

Respondents were asked to report their mental health through a series of 10 questions on how frequently they experienced symptoms of depression. The items include being bothered by things, having trouble concentrating, feeling depressed, feeling like everything was an effort, feeling hopeful about the future, feeling fearful, having restless sleep, feeling happy, lonely, and unable to get going. Each item includes 4 possible responses: rarely or none in the past week, 1-2 days, 3-4 days, 5-7 days.[2] We use principal component analysis to create a mental health index, and as an alternative, we create a z-score of mental health index based on the mental health index for each gender.

The following anthropometric measures were taken for adults: blood pressure, height, and weight. We calculate BMI (Body Mass index) using the person's weight (in kilograms) divided by height (in meter) squared, and define overweight as BMI higher than 25. We define hypertension as systolic pressure of greater than 140 or diastolic pressure of greater

[2]We recode feeling hopeful about the future and feeling happy to reflect the negative symptoms.

than 90 at the time of the measurement, if a respondent reported hypertension as one of his or her chronic conditions, or if a respondent reported taking medication for hypertension.

The IFLS also includes health care utilization, which could explain the health behavior associated with health outcomes. We exclude this outcome due to the low incidence of preventive care in developing countries, including Indonesia (Dupas, 2011). In our sample, only 8% of respondents reported obtaining at least one general health check-up in the 5 years prior to the survey.

Intergenerational Outcomes Respondents born between 1950 and 1972, "the first generation", have children who were born between 1975 and 2006, which make up the "second generation". Given the timing of the IFLS survey years and the wide range of birth years of the 'second generation', the oldest of second generation is 18 in 1993 in IFLS1 and the youngest are 8 in 2014 in IFLS5. Therefore, we focus on children aged between 8 and 18 in each wave of the survey. For children in this age group, the IFLS collects height and weight. We calculate height for age z-score using the WHO reference data.[3] Stunting takes the value one if a child's height for age more than two standard deviations below the mean.

INPRES Exposure variable We combine the INPRES construction record (Duflo, 2001) and the IFLS. We focus on adults born between 1950 and 1972, the first generation, and their children, the second generation.

For the first generation, the IFLS asks these respondents over the age of 15 their place of birth in the wave in which they first join the survey. In 2000, IFLS3 asks all respondents over the age of 15 their place of birth. We combine both sources of information to obtain the respondents' province and district of birth. Adults born in the 1960s and 1970s are exposed to INPRES if they were born in a district that received the INPRES program.

For the second generation, we obtain children's place of birth based on the mothers' migration history. The IFLS asks respondents over the age of 15 their entire migration history, which includes the timing and district of each move. This allows us to use the mother's migration history to identify the district where the mother was living at the time of the child's birth.

[3]We use the 2007 WHO growth chart, which is applicable to children between 0 and 19 years of age.

4 The First Generation

4.1 Estimation Strategy

In the first part of the paper, we estimate the long-term effects of the INPRES massive elementary school construction program in Indonesia forty years later. Following Duflo (2001), we use a natural experiment design that exploits two sources of variation: 1) cohort variation by comparing respondents who were older than primary school age at the start of the INPRES construction in 1974 (born between 1950-1962) to those who were under 12 in 1974 (born between 1963-1972); and 2) geographic variation from the district of birth by exploiting the geographic intensity in the number of schools built across districts, which was determined by the enrollment rates in 1971 (prior to the program).

We estimate the following equation:

$$y_{idt} = \beta(exposed_t \times INPRES_d) + \sum_t (P_d \times \tau_t)\delta_t + X_{idt}\gamma + \alpha_d + \tau_t + \epsilon_{idt} \quad (1)$$

where y_{idt} is the outcome of interest for individual i born in district d in year t. $exposed_t$ is a dummy variable equal to 1 if individual i was born between 1972 and 1962 and thus was exposed to the INPRES school construction. $INPRES_d$ captures the intensity of the program: the number of schools (per 1000 school-aged children) built in birth district d during the school construction program. $\alpha_d$andτ_t are district and year-of-birth fixed effects. $P_d \times \tau_t$ captures birth-year fixed effects interacted with the following district-level covariates: the number of school-aged children in the district in 1971 (before the start of the program), the enrollment rate of the district in 1971 and the exposure of the district to another INPRES program: a water and sanitation program. These interactions control for the factors underlying the allocation of the INPRES school program and for other programs that could confound the program effects. X_{idt} is a set of individuals characteristics: ethnicity (Javanese indicator[4]) and month of birth fixed effects. Standard errors are clustered at the district of birth level. β measures the effect of one school built per 1,000. We estimate the models separately by gender.

4.2 Long-term Effects

We begin by replicating the effect of exposure to the INPRES program on education (Table 1). We find that men and women exposed to the INPRES program are more likely to complete primary school, the margin intended to be affected by the intervention. We then

[4]The Javanese are the largest ethnic group in Indonesia and our analyzed sample

estimate the long-term effects of exposure to the program forty years later on adult health as a measure of well-being.

We find that men and women who were exposed to the INPRES program have better self-reported health (Table 3). Specifically, one school per 1,000 children improves self-reported health between 3.6 and 3.9 percentage points for both men and women who were exposed to the program. We also find a 0.4 to 0.6 day reduction in the number of days a respondent missed daily activities for both men and women. We also analyze men and women's physical functioning markers in Table 4. We find evidence fewer difficulties in performing daily activities for exposed men, but not for women. In spite of improved self-reported health and better physical functioning, we find no significant effect in hypertension for neither men nor women (Table 5). We find an increase in the incidence of being overweight among men, but not women.

We also analyze the effects of the program on mental health as an additional marker of well-being in adulthood (Table 6). Our outcomes of interest include the number of symptoms and an index of all the questions to capture respondents' mental health status. We find that women exposed to INPRES are less likely to report symptoms of depression, but the effect is not significant for men. Taken together, those exposed to the program have better self-reported physical and mental health, which suggests the link between improved education and health. These health markers have been shown to be highly correlated with adult mortality (Idler and Benyamini, 1997).

Heterogeneity We explore heterogeneous treatment effects by respondents' childhood conditions in order to understand the types of children more affected by the INPRES school construction intervention. We leverage that the IFLS (wave 5 in 2014) asked adult respondents a series of retrospective questions on household conditions when they were 12 years old. We used their childhood household size, the number of rooms in their residence, the availability of electricity, pipe water, and toilet. We use principal component analysis to create an index using these items, and create an indicator for those with above and below median values of the childhood socio-economic status.

We estimate 1 on male and female from low and high childhood SES. For men, we find no significant evidence of heterogeneity in high school completion by childhood socio-economic status (Table 2). Although the estimates are noisy, the coefficient is larger for men from low SES. Consequently, we find no significant evidence of heterogeneity in self-reported health (Table 7).

We repeat the analysis for women and find that women from low childhood SES who were exposed to INPRES are more likely to complete primary education (Table 1). This

heterogeneity persists in women's long-term health outcomes. Women with low childhood SES who were exposed to INPRES are 6 percentage point more likely to have high self-reported health status and 0.8 fewer days missed. In contrast, women with high childhood SES did not experience improvements in their adult health from exposure to INPRES. This pattern of results seems reasonable as the INPRES school construction program improved access to primary school which is more likely to be binding for low SES families. Since women from lower SES are more likely to benefit from the program, we explore this further in the intergenerational effects of the program.

5 The Second Generation

5.1 Estimation Strategy

In the second part of the analysis, we estimate the effects of parental exposure to the INPRES school construction program on children's human capital. The longitudinal feature of the IFLS as well as the fact that it follows split-off households allows us to match parents with children and get information on parental INPRES exposure. We estimate a similar equation as follows:

$$y_{idtw} = \beta(ParentExposed_t \times INPRES_d) + \sum_t (P_d \times \tau_t)\delta_t + X_{idt}\gamma + \alpha_d + \tau_t + \theta_w + \epsilon_{idtw} \quad (2)$$

where y_{itdw} is the outcome of interest (eg. height-for-age) measured in wave w for child i whose mother/father was born in district d in year t. The interaction $ParentExposed_t \times INPRES_d$ captures parental exposure to the INPRES school construction program determined by parental district and year of birth. X_{idt} is a set of child's characteristics: gender, birth order, and year and month of birth dummies. α_d and τ_t are parent's district and year-of-birth fixed effects. θ_w controls for wave fixed-effects. The rest of the variables are as defined above. Standard errors are clustered at the parent's district of birth level. We estimate the models separately for mother's and father's INPRES exposure.

5.2 Intergenerational effects

We find a reduction in stunting rates among children born to women who were exposed to the INPRES program, which is consistent with estimated increase in height-for-age among children born to exposed mothers (Table 8). Children born to mothers exposed to INPRES school construction program (one school per children) are 3 percentage points less likely to

be stunted, which corresponds to 10% of the mean. We find no significant effect among children born to men who were exposed to the INPRES program. This is consistent with earlier work that finds an effect on infant mortality among children born to women who were exposed to the INPRES program, but not men (Breierova and Duflo, 2004). Lastly, Table 8 column 5 shows that the intergenerational effects of maternal access to INPRES are robust to adding father exposure.

Heterogeneity We explore heterogeneity by maternal childhood socio-economic status. We use maternal exposure to INPRES and her socio-economic status at age 12 as described in Section 4. Consistent with our evidence of female long-term effects, we find that the intergenerational effects of maternal exposure are stronger for children born to mothers with low childhood SES.

5.3 Potential mechanisms

In progress

6 Robustness

6.1 Selection concerns

Migration in the first generation We explore the possibility of the first generation migrating, which could confound the effect of the program and exposure to their new community. We create an indicator that takes the value one if the adult respondent's district of birth is different from the respondent's current district of residence and estimate equation 1. We find that exposure to the INPRES program has no significant effect on migration.

Migration in the second generation We explore the possibility of parents migrating to a potentially better community before the birth of the child. If this were true, the children for whom we have information on the midwifery program may be a selected sample. We create an indicator that takes the value one if the mother's district of birth is different from the child's district of birth and estimate equation 2. We find that maternal exposure to the INPRES program has no significant effect on migration before the birth of her child. Therefore, children in our analyzed sample were largely born in an IFLS district and we are able to identify maternal exposure to the midwifery program.

7 Conclusion

Next steps We will explore mechanisms behind these effects. In particular, we will explore impacts on fertility, marital stability and parents' human capital investments in their children such as breastfeeding and kindergarten attendance. Furthermore, we will examine the interactions of parental exposure to INPRES school with other social programs as individuals may be exposed to multiple interventions across their life-cycle, which also can elucidate other pathways behind the intergenerational effects. In particular, the link between maternal exposure to INPRES and the midwifery program may explain the effect on children's health. While the IFLS provides us with a rich data set, the small sample might lead to concerns with statistical power. Therefore, we will also use the intercensal survey to estimate the long-term and intergenerational effects of the INPRES program. We will also perform validity checks of the empirical strategy and robustness checks.

References

Aaronson, D., B. Mazumder, and M. Stinson (2017). The intergenerational effects of the rosenwald schools.

Bailey, M. J. and A. Goodman-Bacon (2015). The war on poverty's experiment in public medicine: Community health centers and the mortality of older americans. *American Economic Review 105*(3), 1067–1104.

Behrman, J. R., A. Gaviria, and M. Székely (2003). *Who's in and who's out: Social exclusion in Latin America*. IDB.

Birdsall, N. and C. Graham (2000). *New markets, new opportunities?: Economic and social mobility in a changing world*. Brookings Institution Press.

Black, S. E. and P. J. Devereux (2010). Recent developments in intergenerational mobility. Technical report, National Bureau of Economic Research.

Breierova, L. and E. Duflo (2004). The impact of education on fertility and child mortality: Do fathers really matter less than mothers?

Corak, M. (2006). Do poor children become poor adults? lessons from a cross-country comparison of generational earnings mobility. In *Dynamics of inequality and poverty*, pp. 143–188. Emerald Group Publishing Limited.

Currie, J. and J. Gruber (1996a). Health insurance eligibility, utilization of medical care, and child health. *The Quarterly Journal of Economics 111*(2), 431–466.

Currie, J. and J. Gruber (1996b). Saving babies: the efficacy and cost of recent changes in the medicaid eligibility of pregnant women. *Journal of political Economy 104*(6), 1263–1296.

Deming, D. (2009). Early childhood intervention and life-cycle skill development: Evidence from head start. *American Economic Journal: Applied Economics 1*(3), 111–34.

Duflo, E. (2001). Schooling and labor market consequences of school construction in indonesia: Evidence from an unusual policy experiment. *American economic review 91*(4), 795–813.

Duflo, E. (2004). The medium run effects of educational expansion: Evidence from a large school construction program in indonesia. *Journal of Development Economics 74*(1), 163–197.

Dupas, P. (2011). Health behavior in developing countries. *Annu. Rev. Econ. 3*(1), 425–449.

Havnes, T. and M. Mogstad (2011). No child left behind: Subsidized child care and children's long-run outcomes. *American Economic Journal: Economic Policy 3*(2), 97–129.

Hoynes, H., D. W. Schanzenbach, and D. Almond (2016). Long-run impacts of childhood access to the safety net. *American Economic Review 106*(4), 903–34.

Idler, E. L. and Y. Benyamini (1997). Self-rated health and mortality: a review of twenty-seven community studies. *Journal of health and social behavior*, 21–37.

Indonesia, S. National population and family planning board, ministry of health, and icf international."indonesia demographic and health survey 2012." dhs, august 2013.

Martinez-Bravo, M. (2017). The local political economy effects of school construction in indonesia. *American Economic Journal: Applied Economics 9*(2), 256–89.

Miller, S. and L. R. Wherry (2018). The long-term effects of early life medicaid coverage. *Journal of Human Resources*, 0816_8173R1.

Parker, S. W. and T. Vogl (2018). Do conditional cash transfers improve economic outcomes in the next generation? evidence from mexico. Technical report, National Bureau of Economic Research.

Rossin-Slater, M. and M. Wüst (2015). Are different early investments complements or substitutes? long-run and intergenerational evidence from denmark. Technical report, Citeseer.

Solon, G. (1999). Intergenerational mobility in the labor market. In *Handbook of labor economics*, Volume 3, pp. 1761–1800. Elsevier.

Solon, G. (2002). Cross-country differences in intergenerational earnings mobility. *Journal of Economic Perspectives 16*(3), 59–66.

Tadjoeddin, M. Z. and A. Chowdhury (2017). *Employment and Re-industrialisation in Post Soeharto Indonesia*. Springer.

Wantchekon, L., M. Klašnja, and N. Novta (2014). Education and human capital externalities: evidence from colonial benin. *The Quarterly Journal of Economics 130*(2), 703–757.

World Bank (1990). Indonesia: Strategy for a sustained reduction in poverty.

Tables and Figures

Table 1: Replication: Education

	(1)	(2)
	Male	Female
Born between 1963-1972	0.032**	0.028*
X INPRES	(0.014)	(0.015)
Observations	5,253	4,958
R-squared	0.213	0.284
Y-mean	0.73	0.64

Notes: FE: year of birthx1971 enrollment, year of birthx1971 number of children, year of birthxwater sanitation program, Muslim, Javanese, month of birth Robust standard errors in parentheses clustered at the district of birth *** p<0.01, ** p<0.05, * p<0.1

Table 2: Heterogeneity by childhood socio-economic status

	(1) Full sample	(2) Non-missing index	(3) Low index	(4) High index
Panel A. Male				
Born between 1963-1972	0.032**	0.023	0.021	0.008
X INPRES	(0.014)	(0.018)	(0.029)	(0.021)
Observations	5,253	3,515	1,984	1,531
R-squared	0.213	0.249	0.289	0.301
Panel B. Female				
Born between 1963-1972	0.028*	0.044**	0.061**	0.040
X INPRES	(0.015)	(0.019)	(0.027)	(0.025)
Observations	4,958	3,655	1,883	1,772
R-squared	0.284	0.300	0.332	0.310

Notes: Childhood socio-economic status index is created using principal component analysis based on respondents' household size, the number of rooms in their residence, the availability of electricity, pipe water, and toilet when they were 12 years old. Low SES takes the value one if the respondent's childhood SES index is below the median. See Table 3 for covariates. Robust standard errors clustered at district of birth. Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 3: Long-term outcomes: Self-reported health

	(1)	(2)	(3)	(4)
	Self-report: healthy		Days missed activities	
	Male	Female	Male	Female
Born between 1963-1972	0.036**	0.039**	-0.398**	-0.563**
X INPRES	(0.015)	(0.018)	(0.192)	(0.222)
Observations	4,434	4,723	4,428	4,718
R-squared	0.124	0.106	0.101	0.098
Y-mean	0.76	0.69	2.38	3.13

Notes: Healthy takes the value one if a respondent reports being 'Very healthy' or 'Healthy' (cols. 1 and 2). The number of days a respondent missed his or her activities in the past 4 weeks prior to the survey (cols. 3 and 4). District, year of birth, month of birth fixed effects included. Birth-year interacted with: the number of school-aged children in the district in 1971 (before the start of the program), the enrollment rate of the district in 1971 and the exposure of the district to another INPRES program: a water and sanitation program. Robust standard errors clustered at district of birth. Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 4: Long-term outcomes: Physical limitations

	(1)	(2)	(3)	(4)
	Standardized values of physical functioning		Standardized values of IADL	
	Male	Female	Male	Female
Born between 1963-1972	-0.063*	-0.049	-0.011*	-0.005
X INPRES	(0.034)	(0.075)	(0.006)	(0.009)
Observations	4,433	4,720	4,434	4,720
R-squared	0.108	0.169	0.133	0.186
Y-mean	0, SD=1		0, SD=1	

Notes: Standardized values of physical functioning and and instrumental activities of daily living (IADL) are created based on principal component analysis. Physical functioning includes carrying a heavy load, drawing a pail of water from a well, walking for 1 and 5 kilometers, bowing (squatting or kneeling), walking across the room, standing up from sitting on the floor and chair, reaching one's arms above one's shoulders, and picking up a small coin from a table. IADLs include shopping for personal needs, preparing hot meals, taking medicine, doing household chores, shopping for groceries, and managing one's money. See Table 3 for covariates. Robust standard errors clustered at district of birth. Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 5: Long-term outcomes: Measured health outcomes

	(1)	(2)	(3)	(4)
	High blood pressure		High BMI	
	Male	Female	Male	Female
Born between 1963-1972	0.025	0.008	0.043***	0.006
X INPRES	(0.017)	(0.022)	(0.015)	(0.019)
Observations	4,266	4,676	4,169	4,320
R-squared	0.128	0.116	0.100	0.099
Y-mean	0.14	0.27	0.29	0.53

Notes: Hypertension defined as systolic pressure of greater than 140 or diastolic pressure of greater than 90 at the time of the measurement, if a respondent reported hypertension as one of his or her chronic conditions, or if a respondent reported taking medication for hypertension. High BMI takes the value one if BMI is higher than 25. See Table 3 for covariates. Robust standard errors clustered at district of birth. Significance: *** p < 0.01, ** p < 0.05, * p < 0.10.

Table 6: Long-term outcomes: Mental health

	(1)	(2)	(3)	(4)
	Index (Standardized values)		Index (sum of items)	
	Male	Female	Male	Female
Born between 1963-1972	-0.050	-0.098*	-0.200	-0.392*
X INPRES	(0.046)	(0.051)	(0.202)	(0.234)
Observations	4,105	4,511	4,105	4,511
R-squared	0.106	0.112	0.111	0.109
Y-mean	0.106	0.114	0.103	0.111

Notes: Items include being bothered by things, having trouble concentrating, feeling depressed, feeling like everything was an effort, feeling hopeful about the future, feeling fearful, having restless sleep, feeling happy, lonely, and unable to get going. See Table 3 for covariates. Robust standard errors clustered at district of birth. Significance: *** p < 0.01, ** p < 0.05, * p < 0.10.

Table 7: Heterogeneity by childhood socio-economic status

	(1)	(2)	(3)	(4)
	Self-report: healthy		Days missed activities	
	Low index	High index	Low index	High index
Panel A. Male				
Born between 1963-1972	0.022	0.026	-0.176	-0.278
X INPRES	(0.018)	(0.027)	(0.268)	(0.275)
Observations	2,410	1,687	2,409	1,687
R-squared	0.162	0.226	0.151	0.211
Panel B. Female				
Born between 1963-1972	0.062***	-0.001	-0.791**	0.137
X INPRES	(0.022)	(0.026)	(0.372)	(0.303)
Observations	2,523	1,977	2,523	1,976
R-squared	0.160	0.176	0.153	0.179

Notes: Childhood socio-economic status index is created using principal component analysis based on respondents' household size, the number of rooms in their residence, the availability of electricity, pipe water, and toilet when they were 12 years old. Low SES takes the value one if the respondent's childhood SES index is below the median. See Table 3 for covariates. Robust standard errors clustered at district of birth. Significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 8: Intergenerational outcomes: Health

	(1)	(2)	(3)	(4)	(5)	(6)
	Height for age			Stunted		
Mother Born between 1963-1972	0.048*		-0.028**		-0.028**	
X INPRES	(0.029)		(0.011)		(0.012)	
Father Born between 1963-1972		-0.012		-0.006	-0.002	
X INPRES		(0.030)		(0.010)	(0.007)	
Observations	15,264	14,260	15,264	14,260	15,264	
R-squared	0.198	0.183	0.152	0.145	0.213	
Y-mean	-1.67	-1.64	0.37	0.36		

Notes: Sample corresponds to children born to first generation Inpres individuals. Covariates include the following FE: parent year of birthx1971 enrollment, parent year of birthx1971 number of children, parent year of birthxwater sanitation program, child's gender, birth order, year and month of birth dummies, urban, ethnicity, and religion. Robust standard errors in parentheses clustered at the parent's district of birth

Table 9: Intergenerational outcomes: Heterogeneity by maternal childhood SES

	(1)	(2)	(3)	(4)
	Stunted	Stunted	Stunted	Stunted
	Orig.	No miss	Low SES	High SES
Mother Born between 1963-1972	-0.028**	-0.030**	-0.039**	-0.018
X INPRES	(0.011)	(0.014)	(0.019)	(0.023)
Observations	15,264	12,393	6,626	5,767
R-squared	0.152	0.164	0.212	0.216

Notes: Heterogeneity by Childhood socio-economic status index is created using principal component analysis based on respondents' household size, the number of rooms in their residence, the availability of electricity, pipe water, and toilet when they were 12 years old. Low SES takes the value one if the respondent's childhood SES index is below the median. See Table **??** for covariates. Robust standard errors clustered at district of birth. Significance: *** p < 0.01, ** p < 0.05, * p < 0.10.