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FINAL REPORT

THE IMPACT OF PROGESA ON HEALTH

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EXECUTIVE SUMMARY

In this paper, we investigate the impact of a unique anti-poverty program in Mexico on health. The program, PROGRESA, combines a traditional cash transfer program with financial incentives for families to invest in the human capital (health, education and nutrition). Program benefits include cash transfers that are disbursed conditional on the household engaging in a set of behaviors designed to improve health and nutrition. The family only receives the cash transfer if: (i) every family member accepts preventive health services; (ii) children age 0-5 and lactating mothers attend nutrition monitoring clinics where their growth is measured, they obtain nutrition supplements, and they receive education on nutrition and hygiene; and (iii) pregnant women visit clinics to obtain prenatal care, nutritional supplements, and health education.

Our analysis takes advantage of a controlled randomized design. In 1998, 506 of the 50,000 PROGRESA villages were randomly assigned to control and treatment groups. Eligible households in treatment villages received benefits immediately, while benefits for eligible households in control villages were postponed until after the year 2000. A pre-intervention baseline survey of approximately 19,000 households with over 95,000 individuals and four follow-up surveys (at six month intervals) of the same households were conducted over the two-year experimental period.

We find that the program significantly increased utilization of public health clinics for preventive care including prenatal care, child nutrition monitoring, and adult checkups. The program also lowered the number of inpatient hospitalizations, which is consistent with the hypothesis that PROGESA lowered the incidence of severe illness. Moreover, there was no reduction in the utilization of private providers, suggesting that the increase in utilization at public clinics was not substituting public care for private care.

More importantly we find a significant improvement in the health of both children and adults. Specifically, we find that PROGRESA children 0-5 have a 12 percent lower incidence of illness than non-PROGESA children. We also found that PROGRESA adults were significantly healthier. Prime age PROGRESA adults (18-50) had a significant reduction in the number of days of difficulty with daily activities due to illness and a significant increase in the number of kilometers able to walk without getting tired. Specially, PRORGRESA beneficiaries have 19 percent fewer days of difficulty due to illness than non-PROGRESA individuals, and are able to walk about 7.5 percent more without getting tired. For those over 50, PROGRESA beneficiaries have significantly fewer days of difficulty with daily activities, days incapacitated, and days in bed due to illness than do non-beneficiaries. Moreover, they are able to walk more kilometers with out getting tired. Specifically, PROGRESA beneficiaries has 19 percent fewer days of difficulty with daily activities, 17 percent fewer days incapacitated, 22 percent fewer days in bed, and are able to walk about 7 percent more than non-beneficiaries.

FINAL REPORT: THE IMPACT OF PROGRESA ON HEALTH

Paul Gertler

1. INTRODUCTION

One of the greatest tragedies of extreme poverty is its intergenerational transmission. The health and nutrition of children is of tremendous importance not only because of concern over their immediate welfare, but also because health and nutrition in the formative years significantly improves their physical and cognitive development.[1] In particular, healthier and better-nourished children start school earlier[2], receive more years of schooling, and do better in school.[3] In addition, healthier adults with better cognitive ability have substantially higher wages.[4] In the words of Nobel Laureate Amartya Sen, children from poor families enter adulthood without "the basic capabilities" necessary to enjoy an acceptable quality of life and to take advantage of labor market opportunities to pull themselves out of poverty (Sen, 1999).

In this paper, we investigate the impact of a unique anti-poverty program in Mexico on the health of young children. The program, PROGRESA, combines a traditional cash transfer program with financial incentives for families to invest in the human capital (health, education and nutrition) of their children. PROGRESA is a national program adopted in 1997 and is aimed at improving the educational, health and nutritional status of poor children. Today, PROGRESA covers approximately 2.6 million families, which is about one-third of rural families, or ten percent of families in Mexico. The program operates in almost 50,000 rural villages in 31 states. PROGRESA's budget is about US$800 million or 0.2% of GDP. The PROGRESA model is extremely popular and is in the process of being adopted by Argentina, Colombia, Honduras, and Nicaragua (PROGRESA, 1999).

Program benefits include cash transfers that are disbursed conditional on the household engaging in a set of behaviors designed to improve health and nutrition. The family only receives the cash transfer if: (i) every family member accepts preventive health services; (ii) children age 0-5 and lactating mothers attend nutrition monitoring clinics where their growth is measured, they obtain nutrition supplements, and they receive education on nutrition and hygiene; and (iii) pregnant women visit clinics to obtain prenatal care, nutritional supplements, and health education. An

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[1] See, for example, Haas *et al*, 1996; Grantham-McGregor 1998; Martorell 1995 and 1999; Martorell, Khan and Schroeder 1994; and Martorell, Riveria and Kaplowitz 1989.

[2] See, for example, Alderman *et al*, 2000; Glewwe and Jacoby, 1995; and Glewwe, Jacoby and King 2000.

[3] See, for example, Behrman, 1993; Jamison, 1986; Leslie and Jamison 1990; Moock and Leslie, 1986; and Pollitt , 1990.

[4] See, for example, Alderman *et al*, 1996; Boissiere, Knight and Sabot, 1985, Glewwe, 1996; Lavy, Spratt and Leboucher, 1997; Behrmans Deolalikar 1989; Deolalikar, 1988; Haddad and Bouis 1991; Strauss 1986; Thomas and Strauss 1997.

additional cash transfer is given to households with school age children if the children are enrolled and attend school. The size of the cash transfer is large, corresponding on average to about one-third of household income for the beneficiary families. Another unique feature of the program is that the cash transfers are given to the mother of the family, a strategy designed to target the funds within the household to improving the children's education and nutrition.

Our analysis takes advantage of a controlled randomized design. In 1998, 506 of the 50,000 PROGRESA villages were randomly assigned to control and treatment groups. Eligible households in treatment villages received benefits immediately, while benefits for eligible households in control villages were postponed until after the year 2000. A pre-intervention baseline survey of approximately 19,000 households with over 95,000 individuals and four follow-up surveys (at six month intervals) of the same households were conducted over the two-year experimental period.

2. THE INTERVENTION

PROGRESA is designed to overcome the problems in the traditional approaches to improving child health and nutrition: income transfers and the direct provision of medical and nutrition services**.**

Income transfers can raise the children's health if the primary cause of poor health in children is the liquidity constraint faced by the parents. Income transfers loosen this constraint and allow parents to allocate their resources to the child's most pressing needs (e.g. nutritious food), which differ widely among families and among children within a family. Providing purchasing power also permits parents to choose a high-quality provider of goods and services. However, parents may not understand the benefits of some health interventions and coupled with competing priorities, they many not use the cash transfers for its intended purpose, investment in child health and nutrition.

There is limited evidence from developing nations on this topic. Duflo (2000) finds that extremely large transfers to grandparents in South Africa improved grandchildren's health and nutrition. In the United States, however, cash welfare does not appear to raise child health – although non-random selection into welfare reduces our confidence in this result (Currie 1995). More generally, in low-income countries the effect of incomes on child outcomes remains controversial[5].

The other approach to improving child health and nutrition is through the direct provision of free health care and nutrition interventions. Unlike cash transfers, direct provision may better target the intervention to child health. The downsides can include crowding out of other parental expenditures on the child and low program take-up rates. Indeed, prenatal care and nutrition

[5] See, for example, Alderman (1986, 1993), Behrman and Deolalikar (1987, 1988), Behrman, Foster and Rosenzweig (1997), Bouis (1994), Bouis and Haddad (1992), Strauss and Thomas (1995, 1998), and Subramanian and Deaton (1996).

monitoring and supplementation programs only benefits those women and children who actually have access to, and attend, prenatal care visits. For example, low-income women in the U.S. often did not take advantage of free prenatal care programs (Cook *et al*., 1999 and York *et al*., 1999). While there have been a large number of government run nutrition programs targeted to poor populations in developing countries, there has been little formal evaluation of the impact on health outcomes (WHO/UNICEF/IFPRI, 2000). The results of those that have been rigorously studied are, at best, mixed. One of the biggest problems is the overall low take-up, of which families in greatest need have the lowest take-up rates.

PROGRESA combines the two strategies by relaxing budget constraints with a cash transfer, but using that transfer as an incentive to increase take-up rates in the direct provision of programs. The combination of these separate strategies creates the possibility of large complementarities since the subsidy is conditional on participating in the health care program. In such a fashion, the cash transfer can both alleviate liquidity constraints and raise take-up rates for prenatal care and nutrition programs.

Incentive Structure

Program activities are aimed at improving the educational, health and nutritional status of children living in extreme poverty[6]. PROGRESA's benefits are structured in a novel way such that the income transfers not only increase financial resources to the household but also provide incentives to participate in the other program activities. For mothers, the cash transfer is conditional on participating in four sets of activities to promote family health and nutrition:

- Nutritional supplements for children age 0-2 and for pregnant and lactating women;
- Growth monitoring from conception till 5 years of age;
- Preventive medical care including prenatal care, well baby care and immunizations, and adult preventive visits to clinics; and
- Health, hygiene and nutrition habits education programs.

Benefits

The size of the cash transfer is large, corresponding to about a 25 percent average increase in income of households living in extreme poverty. A unique feature of the program is that the cash transfers are given to the mother of the family, under the belief that the cash will be invested in more food and other productive purposes. In fact, Hoddinott and Skoufios (2000) found that 70 percent of the cash transfer has been used to increase food availability in the household both in terms of quantity (calories) and quality (richer in protein and micronutrients).

[6] PROGRESA promotes school attendance and educational performance by providing cash grants for each child enrolled in school in grades 3 through 9 who achieves minimum attendance during the school year. Schultz (2000) finds that the PROGRESA educational grants significantly increase enrollment at both the primary and secondary levels.

Because the determinants of an individual's health over their lifetime begin *in utero*, PROGERSA is designed to improve the health of children starting at conception. The cash transfer is also used as an incentive to get family members to participate in additional behaviors that improve health and nutrition including obtaining prenatal care, participating in maternal and child nutrition programs, and taking children for well-baby care.

The interventions are designed to first lower the number of low birth weight (LBW) babies. LBW may be due either to premature delivery or to the infant being small for gestational age due to intrauterine growth retardation (IUGR). LBW babies are at substantially higher risk of neonatal and infant mortality, severe diarrhea, and pneumonia (Ashworth, 1998 and McIntire *et al* 1999). LBW also has significant long-term consequences on body size, composition and muscle strength. While there is potential for some LBW newborns to catch up during the first two years of life, a healthy environment is typically not enough to compensate for prenatal growth retardation. In fact, surviving LBW infants tend to be about 5 centimeters shorter, 5 kilograms lighter and significantly weaker in adulthood.[7] There is also a greater risk of neurological dysfunction, hyperactivity, clumsiness and poor school performance (Goldenberg *et al*, 1998), poor cognitive development (Grantham-McGregor 1998), and impaired immune function.[8]

Both IUGR and premature delivery are associated with poor maternal nutrition prior to and during pregnancy and illness during pregnancy. The nutritional determinants of LBW include inadequate maternal nutrition before conception, short maternal stature, and poor nutrition during pregnancy, which usually corresponds to a low gestational weight gain (Miller and Merritt, 1979; Prada and Tsang, 1998) and the poor intake of protein, calories, and micro-nutrients including folate, iron, calcium, vitamins A and D, magnesium and zinc.[9] Maternal diseases, especially diarrhea, intestinal parasitosis, pre-eclampsia, and respiratory infections also have an association with LBW.[10] Access to prenatal care that includes necessary nutritional supplements provides the most effective means to prevent, diagnose, and treat many of the problems listed above in a timely fashion in order to improve fetal growth.[11]

Low birth weight babies are more likely to become malnourished children and are more susceptible to illness and disease. Even infants born with adequate birth weight may become malnourished if inappropriate, inadequate or insufficient foods are provided in early childhood. Indeed, stunting and wasting are major problems in the developing world as over 32 percent of children under age 5 are stunted and 9.4 percent are wasted (WHO, 2000). Micronutrient deficiency is also a major concern among young children (Johnston, 1998). For example, iron deficiency affects approximately 42 percent of preschool children and 56 percent of school age children in the developing world (WHO, 2000). The functional consequences of iron deficiency

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[7] Lagerstrom *et al*, 1994; Martorell, 1998; Wiliams *et al*, 1992; Westwood, *et al* 1983.

[8] Chandra *et al*, 1977; Victoria, *et al*. 1988; Carter and Gill 1994; Godfrey *et al* 1994; Philips *et al* 1993.

[9] de Onis *et al* 1998; Huffman *et al*, 1999; Ramakrashnan and Neufeld, in press.

[10] Kramer, 1987 and 1998; McGregor *et al* 1983, Foster-Rosales, 2000.

[11] Kambarami *et al*, 1999, Alexander *et al*, 1996, Leveno *et al*., 1985, and Kogan *et al* 1994.

include impaired psychomotor development and coordination, low scholastic achievement, and decreased physical activity (Politt, 1997).

PROGRESA tries to minimize LBW and child health and nutrition problems by tying the cash transfers to participating in nutrition programs, preventive medical care, and education programs Children and pregnant and lactating women are required to participate in growth monitoring programs where they receive supplements equivalent to 100 percent of recommended daily micronutrient requirements and 20 percent of recommended protein. Each month pregnant and lactating women and children age 4-24 months are given enough supplements for one dose per day. Children age 25-60 months who are found to be malnourished during the growth monitoring visits also receive the supplements.

In addition, the cash transfer is conditional on all family members obtaining preventive health care visits. Pregnant women are required to have 5 prenatal care visits starting in their first trimester. Children less than 24 months are required to visit the clinic every 2 months for growth monitoring, immunizations, and well baby care. Conventional wisdom is that growth monitoring has a high payoff because it increases parents' awareness that their children suffer from malnutrition at an early stage before long-run damage can set in. Children between 24 and 60 months are required to visit every 3 months for growth monitoring, well-child care, and immunizations. Lactating women are required to have 2 visits a year where their nutrition is monitored and they obtain family planning information and they have physical checkups.

Other adolescents and adults are required to visit clinics once a year for physical checkups. During these checkups special attention is paid to family planning, the detection and treatment of parasites, the detection and treatment of arterial hypertension and diabetes mellitus, and the detection and treatment of cervical cancer. The visits also include education about health habits, hygiene accident prevention, and first aid treatment.

Finally, all adult family members must also participate in regular meetings at which health, hygiene, and nutrition issues and best practices are discussed. Physicians and nurses, specially trained in these topics, conduct these sessions.

Eligibility and Take-up

The program selected eligible households in two stages. In the first stage, poor communities were determined based on an index of the proportion of households living in poverty, population density, and access to health and education facilities. In the second stage, PROGRESA conducted a census of households in each poor community to collect socio-economic information. This information was used to identify eligible households based on a proxy means test, which was a function of the socio-economic characteristics. Households did not have to apply, but rather were informed whether they were eligible. By using door-to-door methods to inform households about eligibility, PROGESSA achieved a take-up rate of 97 percent[12].

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[12] Skoufias, Davis, and Behrman (1999) provide a detailed description of the targeting procedures and demonstrate that *PROGRESA* did a good job of separating poor households from non-poor households.

3. EXPERIMENTAL DESIGN

There are two key factors that make this study design especially rigorous: (1) random assignment of localities into treatment and controls; and (2) panel data on households and their members before the intervention of the program and every 6 months throughout the two year experimental period. Thus, we are able to employ a difference-in-difference estimator that compares the change in PROGRESA-eligible households before and after PROGRESA in the outcome of interest with the corresponding change in PROGRESA-eligible households in non-PROGRESA localities. This estimator controls for characteristics that do not change over time within treatment and control localities, as well as for characteristics that change over time and are common to control and treatment areas. We also account for differences in observable characteristics of individuals, households and localities that change over time.

The fundamental problem in the evaluation of any social program is the fact that the households participating in the program cannot be simultaneously observed in the alternative state of no treatment. For a proper evaluation of the impact of a program, it is necessary to observe a group of households that are similar to beneficiary households in every respect but do not benefit from the program. In the case of PROGRESA, where evaluation was conceived from the beginning as part of the design of the program, the solution to this evaluation problem is achieved by random assignment of localities into treatment and control groups. From a set of rural communities in the same geographic region, localities were randomly selected for participation in PROGRESA (treatment localities) while the rest were introduced into the program 2 or more years later (control localities). As the randomization was adequately done (Behrman and Todd, 1999), there is only a small known probability that the differences between treatment and control groups are due to unobserved factors. As a consequence, researchers can infer whether the changes observed in individual outcomes in health and nutritional status are due to the program or other factors.

A sample of 506 of the 50,000 eligible PROGRESA communities (matched on the initial index level of community poverty) were chosen to participate in the experiment, with each community randomly assigned to a treatment or control group. The experimental communities are located in the seven states that were among the first states to receive PROGRESA, including Guerrero, Hidalgo, Michoacán, Puebla, Querétero, San Luis Potosi, and Veracruz. In total, 506 localities -- 320 treatment localities and 185 control localities -- comprise the experiment. The treatment and control groups had statistically indistinguishable characteristics, such as age, education and income (Behrman and Todd, 1999), which suggests that randomization of localities into control and treatment groups were successfully implemented.

In the summer of 1998, all eligible households living in treatment localities were offered PROGRESA and almost all (97%) enrolled in the program. In localities assigned to the control group, none of the households received PROGRESA benefits nor were they informed that PROGRESA would provide benefits to them at a later date. Most of the control communities were incorporated into PROGRESA in the summer of 2000, approximately two years after the treatment group.

In November 1997, PROGRESA conducted a survey of the socio-economic conditions of rural Mexican households in the experimental communities to determine which households would be eligible for benefits. Using PROGRESA's beneficiary selection methods (a proxy means test), households were classified as eligible and non-eligible for participation in the program in both treatment and control communities. On average 78% of the households in an experimental locality were classified as eligible for program benefits. A random sample of about 19,000 households was chosen from PROGRESA eligible households in control and treatment localities.

PROGRESA then conducted a baseline survey in March 1998 before the initiation of benefits in May 1998. The rest of the four evaluation surveys were conducted in six-month intervals after beneficiary households started receiving benefits from PROGRESA. A number of core questions about the demographic composition of households and their socio-economic status were applied in each round of the survey. These core questions were accompanied by a varying set of questionnaires in each round. These supplemental surveys asked about family background, schooling, health and nutritional status, healthcare utilization, consumption of food and non-food items, income, the allocation of time of household members in various work and productive activities. The baseline sample includes 112,319 individuals from 18,795 households in 506 experimental communities. Approximately, 60 percent of the sample comes from treatment areas and 40 percent from control

To check the success of the randomization in balancing control and treatment groups, we present descriptive statistics in table 1 disaggregated by control and treatment groups. The sample consists of children age 0-5 at baseline, which is the sample used for the majority of the analysis. At baseline there is no difference in illness rates or number of visits to clinics for nutrition monitoring between control and treatment groups. There also is little difference in family demographics or economic status. Finally, there seems to be no difference in labor markets as the agricultural wages are the same across control and treatment localities. This analysis shows that the randomization adequately balanced the control and treatment groups on observed characteristics and therefore likely balanced the groups on unobserved characteristics as well.

4. UTILIZATION

In this section, we examine the impact of PROGRESA on health care utilization. At first blush, one would expect visits to public health clinics to rise for two reasons:

a. *Price Effect*. PROGRESA provided monetary transfers for nutrition that are tied to the verification that household members attended preventive visits in the public health clinics.
b. *Income Effect*. PROGRESA monetary transfers for nutrition could be used for purchasing medical care.

However, there are other reasons why we might not to see an increase in visits to public clinics. First, if PROGRESA's preventive interventions succeeded, then there should have been less illness, and therefore a lower demand for curative medical care. Another reason why we might not see an increase is that the number of public clinic visits by PROGRESA beneficiaries may have already outnumbered those required to obtain PROGRESA benefits.

A second issue is whether any increase in visits to public clinics comes from individuals substituting private providers visits for public clinic visits. Indeed, the impact on health outcomes is lower if it is a substitution of public provider care for private provider care rather than new utilization. In this case there is no new utilization. The effect on health, then, depends solely on the difference in quality between the public and private sectors, rather than the difference between the quality of public treatment and self-treatment (Hammer, 1997; Gertler and Hammer, 1998).

We begin this section by testing the hypothesis that there was an increase in visits to public clinics by PROGRESA beneficiaries. We then examine whether any increase in utilization at public clinics was new or just a substitution to public care from private care. We investigate this by examining the impact of PROGRESA on total utilization (i.e. visits to all provider types) and then disaggregating the impact by provider type (public clinic, public hospital, private provider). If we see that the total increase in utilization is the same as the increase in public clinics and there is no decrease in visits to private providers, then we reject the hypothesis that PROGRESA causes beneficiaries to substitute private care for public care. We then consider the hypothesis that PROGRESA reduced serious illness by examining whether inpatient visits to hospitals are lower for PROGESA beneficiaries.

Visits to Public Clinics

In order to receive the monetary transfers, PROGRESA beneficiaries have to visit public clinics for a series of preventive care services. This suggests that we should observe an increase in visits to public health clinics in PROGRESA areas. This is really a test of compliance of households with the criteria for receiving the monetary transfer.

To investigate this hypotheses, we first use data from the administrative records of public clinics operated by IMSS-Solidaridad. There are 3,541 clinics and the data includes monthly information from January 1996 to December 1998. This information is complimented by the records of PROGRESA on the number of beneficiary families incorporated to the Program every month in each clinic. About two-thirds of the clinics are in PROGRESA areas, with the remaining one-third operating in control areas.

Figure 1 graphs average daily visits to a public health clinic in PROGRESA and non-PROGESA localities by month over time. The visit rates in the control and treatment areas are almost identical until the fourth quarter of 1997, when PROGRESA was beginning to be introduced in a number of localities. Beginning in the fourth quarter of 1997, visit rates to clinics in PROGRESA localities are on average higher than in non-PROGRESA localities, and the difference grows over time as more PROGESA localities begin to provide benefits.

The corresponding average daily visit rates by treatment and control localities by year are presented in Table 2. In 1996, the year before PROGESA began, average visits to clinics were identical in control and treatment localities. However, in 1998, the first full year in which PROGRESA was operational in all treatment localities, visit rates to clinics in PROGESA communities were 12 percent higher than in clinics in control communities. This is consistent with the hypothesis that PROGESA increased utilization at public health clinics.

We measure the impact of PROGRESA on visits to public health clinics using a difference-in-difference estimator with facility-level panel data. The difference-in-difference specification compares the change (before and after PROGRESA) in visits per day in treatment localities with the corresponding change in control localities. By looking at the change over time, we are controlling for characteristics that do not change over time within control and treatment localities and for characteristics that change over time and are common to control and treatment areas. Thus, the difference-in-difference estimator controls for area specific characteristics and secular trends that might confound the estimated impact of PROGRESA on visits to public facilities.
The difference-in-difference model can be specified in regression form as:

$$Y_{it} = a_i + g_t + bT_i P_t + \sum_j f_j X_{it} + e_{it} \qquad (1)$$

The dependent variable is the visits per day in facility *i* and month *t*. The right hand side variables include a fixed effect for each clinic (a_i), a fixed effect for each month (g_t), and an interaction of a variable indicating whether the facility is in a treatment locality (T_i) and an indicator of whether it is the post-reform period (P_t). There are also a series of control variables (the *X*'s) that vary over time and across clinics. The clinic fixed-effects control for clinic specific factors that are fixed over time, and the month fixed-effects control for factors that vary over time but are common across all clinics—both treatment and control. The coefficient b is the difference-in-difference estimate of the impact of PROGRESA on visits.

The difference-in-difference model makes the counterfactual assumption that absent an intervention, visits to clinics in treatment localities would grow at the same rate as in the control localities. While this assumption is not directly testable, we can test whether the visits to clinics in the treatment localities and in the control localities were growing at the same rate in the pre-intervention period. If we do find comparable growth rates, it would suggest that our counterfactual assumption is likely to be correct, unless there were other interventions, contemporaneous with PROGESA, which were differentially implemented in treatment and control localities. We test this hypothesis and cannot reject the hypothesis that visits per day were growing at the same rate in control and treatment localities before the intervention.

In estimating the difference-in-difference model, we also want to control for changes in the size of the facilities' service areas and in the number of PROGRESA families in the service areas. Each facility has a service area that covers on average about 500 families. Table 3 reports the average number of families and PROGRESA families in service areas for clinics located in control and treatment localities. The unit of observation is a month, and the number of families is averaged over the 12 months within each year. Facilities in control areas have slightly larger service areas than clinics in treatment localities. PROGRESA began providing benefits in the last quarter 1997. Therefore, there are no PROGRESA beneficiaries in 1996, and only a few in 1997. In 1998, the first full year of PROGRESA, the number of PROGRESA families accounts for about one-fifth of the service area population.

We turn now to the difference-in-difference analyses to test if the mean number of daily visits differs between the pre- and post- intervention periods for PROGRESA and non-PROGRESA localities. These results are reported in the first two columns of Table 4. We estimate two versions of the model using different measures of T_i in equation (1). The first uses a dummy indicating whether the facility was located in a service area that had families receiving PROGRESA benefits and the second uses the number of families in the service area receiving PROGRESA benefits. The results indicate that PROGESA has a positive and significant effect on visits in both specifications. In the first specification, there were about 2.09 more visits per day to clinics in PROGRESA areas than in non-PROGRESA areas. Since PROGRESA beneficiaries comprise about one-fifth the total number of families in PROGRESA service areas, this result means that visits by PROGRESA families had to be about double the number of visits by non-PROGRESA families. In the second specification, areas with families in PROGRESA localities have about 11.49 more visits per PROGRESA family, or again more than double the number visits by non-PROGRESA families.

Visits By Provider Type

In this section we test the hypothesis that increased utilization of public clinics comes from individuals substituting public care for private care rather than new utilization. We investigate this by examining the impact of PROGRESA on total utilization (i.e. visits to all provider types) and then disaggregating the impact by provider type (public clinic, public hospital, private provider). If we see that the total increase in utilization is the same as the increase in public clinics and there is no decrease in visits to private providers, then we reject the hypothesis that PROGRESA causes beneficiaries to substitute private care for public care.

We also test the hypothesis that PROGRESA's prevention activities reduced illness and thereby the demand for curative care. In this case, total utilization (preventive plus curative) may have actually fallen. We test this hypothesis by examining whether the total visits and hospital inpatient visits are lower for PROGESA beneficiaries. The first test is a weak test in that total visits will be lower only if the reduction in curative visits due to people being healthier is greater than the increase in preventive visits. The second test is stronger in that hospitals do not provide preventive services. A reduction in visits to hospitals suggests that PROGRESA reduced serious illness.

We evaluate the impact of PROGRESA on visits to public and private providers using data from the third and fourth waves of the household surveys. Questions pertaining to health care utilization were not asked in the first two waves, so there is no pre-intervention baseline information. In the third and fourth waves, each individual was questioned regarding his or her health care utilization over the four weeks prior to the interview. The information collected included the number of times he visited a public hospital, a health center or clinic, a private hospital, a private doctor, a mid-wife, herbalist or traditional doctor, and a pharmacy. Table 6 presents the summary statistics on the utilization of a health care provider by the poor and non-poor in the treatment and control areas.

Overall, health care utilization of poor-rural Mexico is extremely low. On average, rural Mexicans make less than one visit to a medical provider per year. Overall they make about .65 visits per person per year. Disaggregating to the geographic area, we find a higher visit rate for the poor in the treatment areas than in the control areas. Most individuals in all age groups opt to receive treatment from standard health care institutions, with public institutions receiving more than double the visits of private doctors and private hospitals combined. Indeed, the majority of health care utilization occurs at public clinics for all age groups.

Now we turn to testing whether utilization is higher among PROGRESA eligible individuals in treatment areas by comparing mean visit rates across control and treatment regions controlling for socio-economic differences. Recall that while Behrmen and Todd (1999) could not reject the null hypothesis that the means of some socio-economic characteristics were equal across treatment and control localities, they did detect some significant differences when the comparison of means was conducted at the household level as opposed to the locality level. For this reason, we control for observed exogenous characteristics using multivariate regression.
We estimate the following equation on those eligible for PROGRESA benefits in control and treatment communities:

$$Y_i = a + bT_i + \sum_j f_j X_{ji} + e_i \qquad (2)$$

where Y_i is individual i's number of visits in the month prior to the survey, T_i is an indicator of whether the individual lives in a treatment locality—i.e. in which PROGRESA is available, and the X_i 's are individual and household controls. The controls include age, sex, and education. When the observation is the child, we use the education of the mother.

We estimate a number of different versions of equation (2). There are four dependent variables: total visits, public clinic visits, public hospital visits, and private provider visits. We estimate each of the four models separately for each age group. We repeat all of these controlling additionally for total household per capita income. This second set of models control for the income transfer part of PROGRESA by including total per capita income in the regression. In this case, the coefficient on the treatment dummy represents the effect of the other interventions—nutrition supplements and preventive care.

Table 6 presents the results. Each entry in Table 6 reports the estimated impact of PROGRESA from a different regression and includes the corresponding information from the total visits regression models. We only report the coefficient on the treatment dummy and on household per capita income. Each regression model additionally includes age, sex, and education as additional covariates.

The first row in Table 6 reports the effect of PROGRESA on total visits to all providers and the last 3 rows report the effects of PROGESA on visits to public clinics, hospitals and private providers, respectively. Within columns the coefficients in the last three rows sum to the coefficient in the first row. The standard errors and t-statistics are corrected for the fact that the sample was clustered.

We first check to see that the estimated impact on public clinic visits is consistent with those found in the facility level analysis. The second row in Table 6 reports the impact of PROGRESA on utilization of public clinics. While there seems to be no impact on children 0-2's utilization of public clinics, PROGRESA seems to have increased the utilization of all of the other age groups. Comparing the coefficients to baseline utilization suggests that PROGRESA increased utilization at public clinics by 30 to 50 percent. The orders of magnitude are consistent to those found in the facility level analysis. Moreover, there was no effect on the visits to public clinics of 0-2 year olds in the facility-level analysis.

We now consider the hypothesis that the increase in utilization at public clinics is in part a substitution out of the private sector. For 3-5 year olds and 6-17 years old, the total increase in total visits is equal to the increase at public clinics and there was no impact on private provider visits. Thus, this represents new utilization from PROGRESA's requirement for preventive checkups. For 18-50 year olds and for those over 50, the impact of PROGRESA on total visits is 50 percent and 20 percent less than the impact on visits to public clinics. However, there was no impact on visits to private providers. This suggests that the increase in utilization at public clinics was not from substitution out of the private sector for these groups, but rather new utilization for preventive purposes.

Now we turn to the hypothesis that PROGRESA lowers illness, which is reflected by reduced curative utilization. For 0-2 year olds, the point estimates suggests that total visits fell by 37 percent--albeit the estimate is not significantly different from zero. However, we do find a significant 58 percent reduction in hospital visits for this age group, suggesting a significant reduction in major illness. Similarly, we find a very large reduction in hospitalization for the over 50 group. This suggests that PROGRESA had a positive impact on health status. We will return to this issue explicitly later in section 4, where we examine the impact of PROGRESA on directly on measures of health outcomes.

Nutrition Monitoring Visits

In contrast to total health care utilization, the household survey did collect baseline (preintervention) information on children's visits to clinics for nutrition monitoring. Over the course of the year of the program, the size and composition of the households varies, with people entering and exiting the sample. Thus, to accurately evaluate the progress of the program by tracking the health of a child, the sample is restricted to those individuals present in all four waves, limiting the sample to approximately 15,000 children per a wave.

Table 7 presents the descriptive statistics for the population based survey. Children in treatment areas tend to be weighed more frequently than in control areas, and the difference is increasing over time.

Given the presence of the same group of children throughout the four waves, we are able to estimate difference-in-difference models accounting for individual fixed effects. The individual fixed effects control for individual, household and locality characteristics that are fixed over time. The difference-in-difference is estimated in regression format is as follows

$$Y_{it} = a_i + g_t + bT_iP_t + \sum_j f_j X_{it} + e_{it} \quad (3)$$

where Y_i is individual i's total number of nutrition monitoring visits to the month prior to the survey, a_i is an individual fixed effect, T_i is an indicator of whether the individual lives in a locality in which PROGRESA is available, P_t indicates the post intervention period, and the X_i 's are time varying individual and household controls. In this specification we have three post periods: 8 months, 15 months, and 20 months since the intervention was initiated. We estimate a separate difference-in-difference parameter for each post time period to test if the impact differs over the time.

The results of the difference-in-difference models are reported in Table 8. The first two columns report the results for infants age 0-2 and the last two columns reports the results for toddlers age 3-5. The second model for both age groups adds per capita income to try to separate the transfer income effect from the impact of the nutrition and preventive care. Included in the model, but not reported in the table, are individual fixed effects and dummies indicating the round of the observation. The coefficients reported are the interactions of dummy variables indicating the length of time since the intervention and whether the individual is eligible for PROGRESA benefits. The results indicate the growth monitoring visits increased between 30 to 60 percent for children age 0 to 2, and increased between 25 and 45 percent for children age 3 to 5. Conditioning on income did not affect the results.

5. HEALTH OUTCOMES

PROGRESA was designed as a method of improving the living standards of the segment of the Mexican population classified as poor. One means of this betterment is through investing in early childhood health care to combat the incidence of illness and improve nutritional status. For adults, the cash transfer is intended for families to use to purchase food and required preventive visits to higher quality facilities are intended to improvement health outcomes. In this section, we examine the impact of PROGRESA on health outcomes.

Child Health

We begin by examining the impact of PROGRESA on the probability that a mother reports that her child experienced an illness in the 4 weeks prior to the survey. There is some concern that such variables report illness with error. Specially, different individuals define illness differently, so what would be an illness for one family is not for another. We are able to control for this reporting bias. Assuming that the bias does not change across waves of the survey, the reporting bias can be treated as an individual fixed effect. Therefore, difference-in-difference estimates of the impact of PROGRESA on illness control for reporting bias.

Table 9 presents the summary statistics of the characteristics of the control and treatment areas. Across geographic areas, the poor children tend to get sick less and for fewer days than the non-poor, with the poor children in the treatment areas faring the best. The data in this table is pictured in Figure 2. Illness rates are the same in baseline period across control and treatment groups. Illness rates in both treatment and control areas fall over time. However, the illness rate falls faster in the treatment areas than in the control areas.

We estimate difference-in-difference models of the impact of PROGRESA on the probability of illness. The probability of illness models employ individual fixed effects since the individual is observed in all four rounds. In Models 1 and 3, we allow the difference in difference estimate to vary with length of time since the program was introduced. In Models 2 and 4, we impose the restriction that the impact was the same across periods. This hypothesis cannot be rejected for any of the models. Finally, in models 3 and 4 we control for household per capita income.

Table 10 reports the difference in difference results. We find that the impact of PROGRESA on the probability of a child getting ill is negative and significantly different from zero. PROGRESA lowered illness rates for beneficiaries age 0-2 by about 4.7 percentage points or 12 percent lower than baseline illness. PROGRESA lowered illness rates for beneficiaries age 3-5 years old 3.2 percentage points or 11 percent lower than baseline. We also find that the addition of income does not change the result, suggesting that PROGRESA's impact on child health is not directly through the cash transfers.

Adolescent and Adult Health Status

While little of PROGRESA was targeting to improving adult health, there is reason to believe that adult health might improve as well. First, adults were required to obtain one preventive health care visit per year. Second, the 70 percent of the income transfer was used to increase food availability in the household both in terms of quantity —calories — and quality—richer in protein and micronutrients (Hoddinott and Skoufias, 2000).

Health status is directly related to nutritional intake. Adequate energy intakes are essential for maintaining health and productivity. Long term deprivation leads to chronic energy deficiency (CED), defined as 'a steady state at which a person is in energy balance although at a 'cost' either in terms of risk to health or as an impairment of function and health' (James, Ferro-Luzzi, and Waterlow 1988 p. 969). CED has been associated with a greater risk of illness, and lower physical activity levels[13].

In the last two rounds of the survey, adolescents and adults were asked a series of questions regarding their health status. All individuals 18 and above where asked how many kilometers

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[13] See, for example, Deolalikar 1988; Durnin 1994; Ferro-Luzzi *et al.* 1992; Garcia and Kennedy 1994; Immink and Viteri 1981; Kennedy and Garcia 1994; Kusin, Kardjati, and Renqvist 1994.

that were able to walk without getting tired, and The following questions were asked of individuals 6 and older.

> *In the past 4 weeks, how many days did you have difficulty performing daily tasks (such as going to work, doing housework, going to school, caring for your children) due to illness?*
> *In the past 4 weeks, how many days were you not able to perform daily tasks (such as going to work, doing housework, going to school, caring for your children) due to illness?*
> *In the past 4 weeks, how many days were you in bed due to illness?*

The means and standard deviations for these variables are presented in Table 11. Note that the days lost due to illness increases with age and the differential between control and treatment groups also increases with age.

Since the health status questions we not asked in the baseline, but rather only in waves 3 and 4, we are unable to estimate the model by differences-in-differences. Rather we estimate equation (2), where the dependent variables are the health status measures and the independent variables are a dummy indicating whether the individual was in a PROGRESA village as well as the age, sex and education of the individual.

Table 12 reports the results of the estimation. As in the earlier tables, we only report the coefficient on the treatment variable for each model. We find no effect of PROGRESA on individuals age 6-17. This is not surprising since this is generally a healthy group to start with. However, for the age group (18-50) we find a significant reduction in the number of days of difficulty with daily activities due to illness and a significant increase in the number of kilometers able to walk without getting tired. Specially, PROGRESA beneficiaries have 19 percent fewer days of difficulty due to illness than non-PROGRESA individuals, and are able to walk about 7.5 percent more without getting tired. For those over 50, PROGRESA beneficiaries have significantly fewer days of difficulty with daily activities, days incapacitated, and days in bed due to illness than do non-beneficiaries. Moreover, they are able to walk more kilometers without getting tired. Specifically, PROGRESA beneficiaries has 19 percent fewer days of difficulty with daily activities, 17 percent fewer days incapacitated, 22 percent fewer days in bed, and are able to walk about 7 percent more than non-beneficiaries.

6. SUMMARY AND CONCLUSIONS

In this paper, we investigated the impact of PROGRESA on health. PROGRESA combines a traditional cash transfer program with financial incentives for families to invest in the human capital of their children. Program benefits include cash transfers that are disbursed conditional on the household engaging in a set of behaviors designed to improve health and nutrition. The family only receives the cash transfer if: (i) every family member accepts preventive health services; (ii) children age 0-5 and lactating mothers attend nutrition monitoring clinics where their growth is measured, they obtain nutrition supplements, and they receive education on nutrition and hygiene; and (iii) pregnant women visit clinics to obtain prenatal care, nutritional supplements, and health education. An additional cash transfer is given to households with school age children if the children are enrolled and attend school. The size of the cash transfer is large, corresponding on average to about one-third of household income for the beneficiary families. Another unique feature of the program is that the cash transfers are given to the mother of the family, a strategy designed to target the funds within the household to improving her children's education and nutrition.

Our analysis takes advantage of a controlled randomized design. In 1998, 506 of the 50,000 PROGRESA villages were randomly assigned to control and treatment groups. Eligible households in treatment villages received benefits immediately, while benefits for eligible households in control villages were postponed until after the year 2000. A pre-intervention baseline survey of approximately 19,000 households with over 95,000 individuals and four follow-up surveys (at six month intervals) of the same households were conducted over the two-year experimental period.

We find that the utilization of public health clinics increased faster in PROGRESA villages than in control areas relative to control villages. In addition, we also find an increase in nutrition monitoring visits. This is not surprising given that households must go to public clinics for preventive care and nutrition monitoring. At the same, however, the utilization of public hospitals fell. This is consistent with the hypothesis that PROGESA's incentives for preventive care and nutrition improved health and lowered the incidence of severe illness. Moreover, there was no reduction in the utilization of private providers, suggesting that the increase in utilization at public clinics was not substituting public care for private care.

We also found a significant improvement in the health of PROGRESA beneficiaries—both children and adults. Specifically, we find that PROGRESA children 0-5 have a 12 percent lower incidence of illness than non-PROGESA children. In addition, PROGRESA children's weight for height, a measure of wasting and short-term health, significantly improved.

We also found that PROGRESA adults were significantly healthier. Prime age PROGRESA adults (18-50) had a significant reduction in the number of days of difficulty with daily activities due to illness and a significant increase in the number of kilometers able to walk without getting tired. Specially, PRORGRESA beneficiaries have 19 percent fewer days of difficulty due to illness than non-PROGRESA individuals, and are able to walk about 7.5 percent more without getting tired. For those over 50, PROGRESA beneficiaries have significantly fewer days of difficulty with daily activities, days incapacitated, and days in bed due to illness than do non-beneficiaries. Moreover, they are able to walk more kilometers with out getting tired. Specifically, PROGRESA beneficiaries has 19 percent fewer days of difficulty with daily activities, 17 percent fewer days incapacitated, 22 percent fewer days in bed, and are able to walk about 7 percent more than non-beneficiaries.

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Table 1— Descriptive Statistics at Baseline for Children Age 0-5

	Treatment		Control	
	Mean	St. Dev.	Mean	St. Dev.
Ill last month (=1)	0.306	(0.461)	0.298	(0.458)
Nutritional Monitoring Visits Last Month	0.219	(0.217)	0.219	(0.206)
Age	2.753	(1.667)	2.746	(1.701)
Male (=1)	0.394	(0.489)	0.376	(0.484)
Father's Years of Schooling	1.111	(1.093)	1.050	(1.086)
Mother's Year's of Schooling	1.047	(1.056)	1.016	(1.079)
Number of Siblings	1.996	(1.881)	1.783	(1.831)
Eldest Child (=1)	0.916	(0.277)	0.930	(0.256)
Labor & Non-labor Income	4.939	(0.896)	5.094	(0.814)
Non-labor Income	2.883	(1.152)	2.898	(1.157)
Male Agricultural Wage	23.658	(7.573)	23.556	(6.935)
Female Agricultural Wage	20.984	(7.184)	21.044	(6.807)

Table 2— Total Daily Consultations Per Clinic Means and (Standard Deviations)

	NON-PROGRESA Localities	PROGRESA Localities	OVERALL
1996	9.13	9.11	9.12
	(8.25)	(7.98)	(8.06)
1997	10.35	10.75	10.63
	(9.14)	(9.10)	(9.12)
1998	11.48	12.84	12.41
	(9.80)	(11.32)	(10.88)
OVERALL	10.32	10.9	10.72
	(9.13)	(9.69)	(9.52)

Notes: Authors calculations from the IMMS Solidad administrative records.

Table 3— Number of Families in Clinic Service Area Means and (Standard Deviations)

	# of Families in NON-PROGRESA Localities	# of Families in PROGRESA Localities	# of PROGRESA Families in PROGRESA Localities
1996	544.3	498.0	----
	(433.4)	(326.4)	
1997	544.9	494.1	4.83
	(424.9)	(324.7)	(360.1)
1998	553.4	496.8	98.49
	(443.7)	(348.5)	(144.09)
OVERALL	547.5	496.3	34.55
	(434.1)	(334.4)	(97.30)

Notes: Author's calculations from the IMMS Solidad administrative records.

Table 4 — Difference-in-Difference Estimates of Impact of PROGRESA **on Total Daily Consultations Per Clinic**

	1996-1998 Sample		1988 Only	
Independent Variable	Model (1)	Model (2)	Model (1)	Model (2)
PROGRESA (=1)	2.09	---	1.35	
	(0.067)		(0.134)	
Share of Families in Clinic's Service Area who are PROGRESA Beneficiaries	---	11.49		8.47
		(0.251)		(0.537)
Total Number of Families in Clinic's Service Area	2.30	2.24	3.46	3.35
	(0.198)	(0.197)	(0.631)	(0.629)
F-Statistics For Clinic Fixed Effects	46.54	46.93	11.52	11.46
	(P=0.00)	(P=0.00)	P=0.00	P=0.00
F-Statistics For Month Fixed Effects	122.02	135.36	20.77	19.49
	(P=0.00)	(P=0.00)	P=0.00	P=0.00
Sample Size	126,665	126,665	42,306	42,306

Notes: Standard errors in parentheses.

Table 5— Means and Standard Deviations of Visits to Medical Care Providers

Age	Sample	Mean Visits Per Month								Sample Size
		Total Visits		Public Clinics		Hospitals (Inpatient)		Private Providers		
< 3	PROGRESA	.081	(1.42)	.066	(1.41)	.012	(0.09)	.003	(0.13)	5,110
	Non-PROGRESA	.115	(1.62)	.079	(1.58)	.011	(0.03)	.025	(0.27)	4,110
3 to 5	PROGRESA	.097	(1.29)	.075	(1.27)	.005	(0.10)	.017	(0.18)	6,443
	Non-PROGRESA	.068	(0.41)	.046	(0.33)	.004	(0.13)	.018	(0.21)	5,717
6 to 17	PROGRESA	.041	(1.05)	.034	(1.05)	.002	(0.07)	.005	(0.10)	28,526
	Non-PROGRESA	.027	(0.68)	.017	(0.64)	.001	(0.05)	.008	(0.21)	25,259
18 t0 50	PROGRESA	.071	(0.95)	.050	(0.91)	.005	(0.11)	.016	(0.26)	26,702
	Non-PROGRESA	.071	(0.95)	.050	(0.91)	.005	(0.11)	.016	(0.26)	26,702
> 51	PROGRESA	0.139	(1.47)	0.095	(1.33)	0.006	(0.11)	0.038	(0.49)	6,927
	Non-PROGRESA	0.139	(1.47)	0.095	(1.33)	0.006	(0.11)	0.038	(0.49)	6,927

Notes: Standard errors in parentheses.

Table 6—Difference-in-Difference Estimates of PROGRESA Program Impact on Health Care Utilization by Age and Provider

Dependent Variable	Independent Variable	Age 0-2		Age 3-5		Age 6-17		Age 18-50		Age 51+	
Total Visits	Treatment	-0.029	-0.032	0.033	0.027	0.015	0.016	0.007	0.011	0.037	0.038
		(-0.887)	(-0.871)	(1.695)	(1.439)	(1.653)	(1.893)	(0.655)	(1.019)	(1.819)	(1.845)
	Income		0.002		0.006		-0.001		-0.004		0.000
			(0.459)		(1.258)		(-0.299)		(-1.669)		(-0.147)
Public Clinic Visits	Treatment	-0.010	-0.011	0.032	0.027	0.017	0.015	0.014	0.015	0.045	0.045
		(-0.297)	(-0.314)	(1.655)	(1.487)	(1.905)	(1.858)	(1.674)	(1.624)	(2.451)	(2.471)
	Income		0.001		0.005		0.001		-0.001		0.000
			(0.350)		(1.100)		(0.913)		(-0.792)		(-0.016)
Public Hospital Visits	Treatment	-0.007	-0.008	0.001	0.001	0.001	0.001	-0.006	-0.004	-0.006	-0.007
		(-2.081)	(-2.086)	(0.300)	(0.350)	(1.776)	(1.794)	(-1.319)	(-0.894)	(-2.339)	(-2.225)
	Income		0.001		0.000		0.000		-0.001		0.001
			(0.651)		(-0.462)		(-0.365)		(-0.707)		(0.751)
Private Provider Visits	Treatment	-0.012	-0.012	0.000	-0.001	-0.003	-0.001	-0.001	0.001	-0.001	0.000
		(-2.500)	(-2.246)	(0.094)	(-0.194)	(-1.847)	(-0.664)	(-0.479)	(0.182)	(-0.179)	(-0.016)
	Income		0.000		0.001		-0.002		-0.002		-0.001
			(0.080)		(0.790)		(-1.478)		(-1.360)		(-0.586)
Sample Size		9,212	9,212	12,160	12,160	53,785	53,785	53,090	53,090	15,399	15,399

Notes: This table reports the coefficients and t-statistics for regression models for different age groups, where the numbers of visits to specific provider types are the dependent variables. Two models are estimated for each age group/ provider type. One where the main variable of interest is a treatment variable indicating whether the individual lives eligible for PROGRESA, and a second where income per capita is added. All of the models control for a number of variables not reported here. The controls include age, sex, and education for adults. For children the controls include the age and education of the mother and father, the number of siblings, the sex of the child, and whether the child is the eldest sibling. Robust Standard errors accounting for intra-cluster correlation due to stratified random sampling were used to compute the t-statistics.

Table 7— Mean Child Growth Monitoring Visits

		PROGRESA	**Non-**PROGRESA
Age 0-2	Baseline	0.219 (0.217)	0.216 (0.212)
	8 months Post Baseline	0.281 (0.206)	0.241 (0.242)
	15 months Post Baseline	0.596 (0.339)	0.411 (0.345)
	20 months Post Baseline	0.258 (0.382)	0.190 (0.319)
	Sample Size	5,420	2,148
Age 3-5	Baseline	0.221 (0.219)	0.222 (0.229)
	8 months Post Baseline	0.267 (0.223)	0.218 (0.234)
	15 months Post Baseline	0.433 (0.377)	0.309 (0.337)
	20 months Post Baseline	0.001 (0.037)	0.000 (0.000)
	Sample Size	11,322	4,050

Notes: Standard errors in parentheses.

Table 8— Difference-in-Difference Estimates of PROGRESA Impact on Nutrition Visits

	Age 0-2		Age 3-5	
8 months Post Baseline	0.056 (3.660)	0.054 (3.375)	0.052 (5.583)	0.052 (5.322)
15 months Post Baseline	0.135 (8.863)	0.133 (7.819)	0.097 (10.466)	0.097 (9.438)
20 months Post Baseline	0.071 (4.408)	0.069 (3.883)	-0.003 (-0.263)	-0.003 (-0.250)
Log (Income Per Capita)		0.001 (0.327)		0.000 (0.021)
Sample Size	9707	9707	19885	19885

Notes: T-statistics are reported in the parentheses. Included in the model, but not reported in the table, are individual fixed effects and dummies indicating the round of the observation.

Table 9 — Child Illness Rates by Age and Treatment/Control

		PROGRESA	NON-PROGRESA
Age 0-2	Baseline	0.402	0.406
	8 months Post Baseline	0.284	0.366
	15 months Post Baseline	0.193	0.241
	20 months Post Baseline	0.194	0.246
	Sample Size	5445	2171
Age 3-5	Baseline	0.280	0.263
	8 months Post Baseline	0.206	0.270
	15 months Post Baseline	0.127	0.161
	20 months Post Baseline	0.097	0.127
	Sample Size	11370	4066

Table 10 — Difference-in-Difference Estimates of PROGRESA Program Impact on Children's Incidence of Illness

Independent Variable	Age 0-2 at Baseline				Age 3-5 at Baseline			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
(8 Months Post Baseline) X (PROGRESA Beneficiary)	-0.041 (-1.689)		-0.036 (-1.432)		-0.030 (-2.026)		-0.038 (-2.456)	
(15 Months Post Baseline) X (PROGRESA Beneficiary)	-0.068 (-2.828)		-0.062 (-2.300)		-0.042 (-2.841)		-0.054 (-3.313)	
(20 Months Post Baseline) X (PROGRESA Beneficiary)	-0.039 (-1.632)		-0.033 (-1.407)		-0.021 (-1.749)		-0.032 (-1.918)	
(Pooled Post Baseline) X (PROGRESA Beneficiary)		-0.047 (-2.368)		-0.044 (-1.820)		-0.032 (-2.591)		-0.041 (-3.044)
Household Income Per Capita			-0.002 (-0.559)	-0.002 (-0.651)			0.003 (1.136)	0.003 (1.130)
Sample Size	9,748	9,748	9,748	9,748	19,939	19,939	19,939	19,939

Notes: This table reports the coefficients and t-statistics for difference-in-difference regression models of the impact of PROGRESA on the incidence of illness for different age groups. Included in the model, but not reported, are individual fixed effects, and dummies indicating the round of the observation. The coefficients reported are the interactions of dummy variables indicating the length of time since the intervention and whether the individual is eligible for PROGRESA benefits. Four models are estimated for each age group/ health status measure. One where the main variables of interest are treatment variables mentioned just above, and a second where income per capita is added. Both of these models are re-estimated pooling the treatment effect across the three post-baseline waves. Pooling could not be rejected at the .01 level in all of the models.

Table 11— Means and Standard Deviations of Health Status Measures

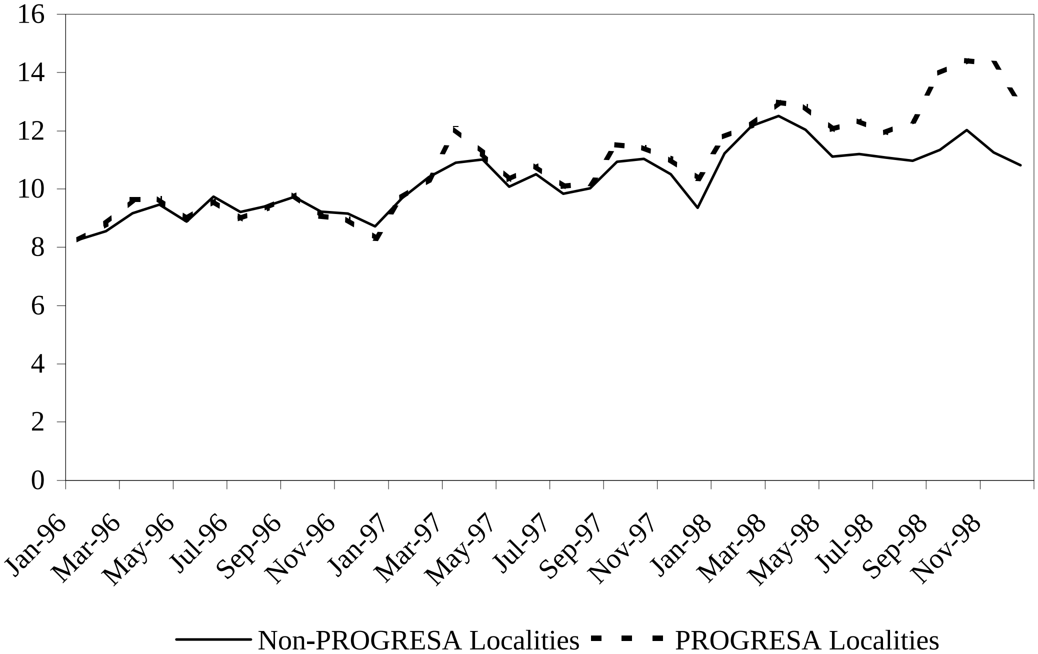
	Age 6-17		Age 18-50		Age 51+	
	PROGRESA	Non-PROGRESA	PROGRESA	Non-PROGRESA	PROGRESA	Non-PROGRESA
Days of Difficulty with Daily Activities Due to Illness	0.084 (1.266)	0.087 (1.164)	0.287 (2.496)	0.347 (2.756)	1.875 (6.648)	2.271 (7.274)
Days Incapacitated Due to Illness in Last 4 Weeks	0.081 (1.321)	0.071 (1.107)	0.248 (2.348)	0.288 (2.506)	1.601 (6.106)	1.961 (6.783)
Days in Bed Due to Illness in Last 4 Weeks	0.043 (0.901)	0.045 (0.854)	0.172 (1.894)	0.185 (1.970)	1.089 (5.124)	1.355 (5.630)
Kilometers Can Walk Without Getting Tired			5.497 (4.056)	5.085 (3.474)	3.273 (3.180)	3.018 (3.361)
Sample Size	28,526	25,259	26,702	26,388	6,927	8,472

Table 12— Estimates of PROGRESA Program Impact on Adult Health by Age

Dependent Variable	Age 6-17	Age 18-50	Age 51+
Days of Difficulty with Daily Activities Due to Illness in Last 4 Weeks	-0.002 (-0.105)	-0.055 (-1.641)	-0.360 (-2.477)
Days Incapacitated Due to Illness in Last 4 Weeks	0.012 (0.816)	-0.034 (-1.194)	-0.330 (-2.512)
Days in Bed Due to Illness in Last 4 Weeks	-0.001 (-0.099)	-0.010 (-0.469)	-0.243 (-2.128)
Number of Kilometers Can Walk Without Getting Tired		0.405 (3.401)	0.225 (2.304)
Sample Size	53,785	53,090	15,399

Notes: This table reports the coefficients and t-statistics for regression models for different age groups. Two models are estimated for each age group/ health status measure. One where the main variable of interest is a treatment variable indicating whether the individual lives eligible for PROGRESA, and a second where income per capita is added. All of the models control for a number of variables not reported here. The controls include age, sex, and education. The full regression results are reported in the appendix. The models are estimated by GLS accounting for intra-cluster correlation due to stratified random sampling and multiple observations because we pooled two rounds of the survey.

Figure 1— Daily Visits to Public Clinics



Source: Based on author's calculations from IMSS-Solidad administrative records.

Figure 2a — Incidence of Illness For 0-2 Year Olds

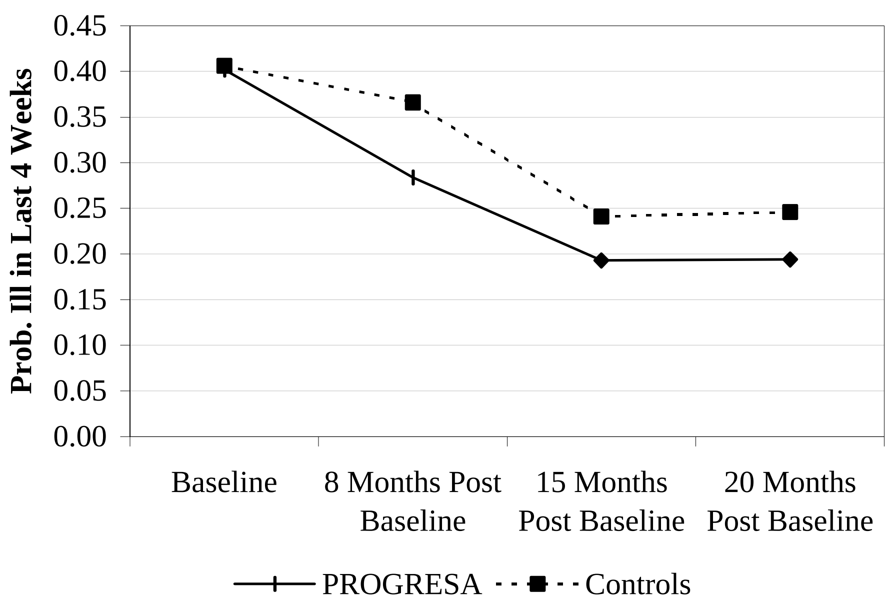
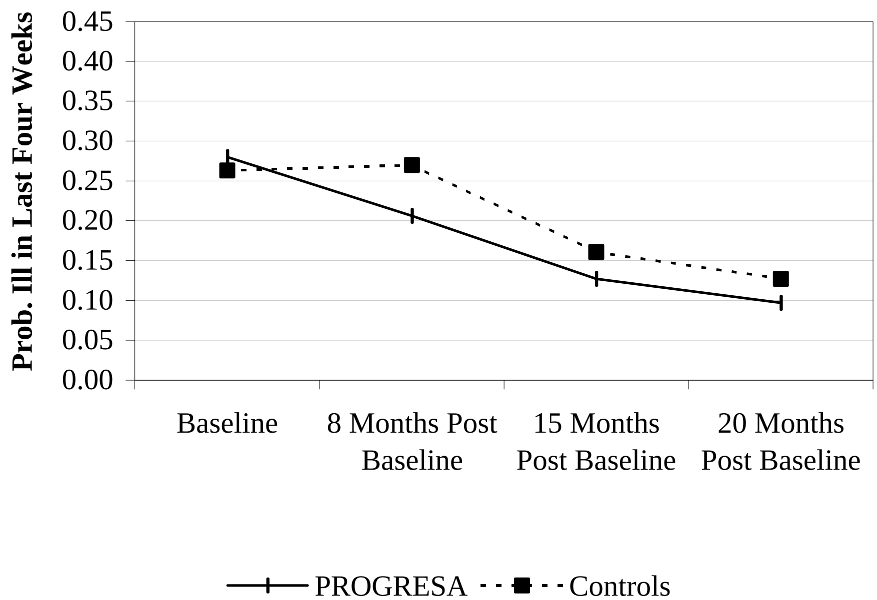


Figure 2b — Incidence of Illness For 3-5 Years Olds



health expenditures, there remains a significant challenge in balancing the need for promoting public health, controlling noncommunicable diseases, and improving population health in these emerging economies.â€¢BRICS nations have a great potential for embracing a public health agenda aimed at promoting physical activity and healthy lifestyles as part of the BRICS public health policies in order to improve population health and reduce the.Â Please cite this article as: Mihajlo Jakovljevic et al., The impact of health expenditures on public health in BRICS nations, Journal of Sport and Health Science (2019), https://doi.org/. 10.1016/j.jshs.2019.09.002. Available online at www.sciencedirect.com. This summary is part of the SIM Evaluation Final Report, which offers more detailed background, results, and implications from the analyses led by the University of Washington (UW) SIM Evaluation Team, in collaboration with our evaluation partners at the Center for Community Health Evaluation (CCHE) of the Kaiser Permanente Washington Health Research Institute and the Research and Data Analysis (RDA) Division of the.Â Improved data systems to monitor and evaluate practicesâ€™ progress are needed to effectively assess the impact of interventions such as the Hub. Hub Implications and Key Take-Aways. The Hub evaluation has several implications for future practice and policy Science for Environment Policy In-depth Report: Soil Contamination: Impacts on Human Health. Report produced for the European Commission DG Environment, September 2013. Available at: http://ec.europa.eu/science-environment-policy.Â In-depth Reports are a feature of the service which provide comprehensive overviews of scientific research relevant to a specific policy area. In addition to In-depth Reports, Science for Environment Policy also publishes a weekly News Alert which is delivered by email to subscribers and provides accessible summaries of key scientific studies. Exploring the impact of COVID-19 through excess mortality, its impact on vulnerable populations and progress towards global health goals.Â With the latest COVID-19 deaths reported to WHO now exceeding 3.3 million, based on the estimates produced for 2020, we are likely facing a significant undercount of total deaths directly and indirectly attributed to COVID-19. The term â€œexcess deathsâ€ describes deaths beyond what would have been expected under â€œnormalâ€ conditions. It captures not only confirmed deaths, but also COVID-19 deaths that were not correctly diagnosed and reported as well as deaths attributable to the overall crisis conditions. This provides a more comprehensive and accurate measure when compared with confirmed COVID-19 deaths alone.