The Critical Role of Health and Nutrition in Supporting Development

Health matters for development: Healthier children learn better and are more likely to stay in school. Healthier adults live longer and are more productive.

Recent decades have seen advances in health care and in the availability of food. Yet poor health and nutrition persist as major hurdles to development. Half the world’s population lacks access to basic health services, and every year nearly 100 million people in developing countries are pushed into extreme poverty because of health expenses. According to the World Health Organization’s World Health Statistics 2018, nearly 15,000 children under age five die every day. Malnutrition remains a chronic problem even in countries where food is abundant.

Health and nutrition are at the center of the World Bank Group’s longstanding strategic support for human capital development. This includes the World Bank’s recently launched Human Capital Project, designed to help developing countries increase their investments in people. And over the period 2000–16 the World Bank invested $35 billion in health and nutrition initiatives while doubling its average annual lending to the sector from $1.3 billion to $2.6 billion.

The importance of such efforts is underscored by World Bank research. Mounting evidence shows that without investments in health countries cannot sustain economic growth, prepare their workforce for the more highly skilled jobs of the future, or compete effectively in the global economy.

Building on previous issues covering such topics as education, skill development, and jobs, this issue of the Research Digest features recent World Bank studies that highlight the role of health and nutrition in building human capital and alleviating poverty. One study shows that childhood stunting caused by malnutrition lowers per capita income in developing countries by an average of 7 percent. Another study shows that malaria testing and treatment can increase the productivity of adult agricultural workers by as much as 25 percent. Yet another finds that the distribution of bed nets in Tanzania improved public trust in policy makers—spotlighting a crucial factor in the successful take-up of health and other development programs.

Other studies featured in this issue highlight innovative approaches to improving children’s nutrition status as well as diagnosing and treating preventable threats to maternal and child health. And the last two offer insights into overcoming financial and infrastructure challenges in improving access to health care.

Continued progress on health and nutrition in developing countries will require concerted and collective efforts that are inclusive of the poorest populations and adequately supported by the stakeholders—donors, policy makers, and the public. It also calls for more research to support programs focusing on such issues as universal health coverage, early childhood development, and the management of pandemics. For its part, World Bank research will continue to provide rigorous analysis and insights aimed at helping countries improve access to quality health care and eliminate malnutrition.
The Income Losses from Childhood Stunting—and the Returns to Nutrition Programs Aimed at Reducing It

**New estimates show that childhood stunting, through its effects on today’s workforce, lowers per capita income in developing countries by an average of 7 percent**

An estimated 150 million children under age five—one in five worldwide—are stunted (with a height-for-age more than 2 standard deviations below the median for a healthy reference population). As has been extensively documented, stunting in childhood is associated with adverse outcomes throughout the life cycle. The undernourishment and disease that cause stunting may impair brain development, leading to lower cognitive and socioemotional skills, lower levels of educational attainment, and thus lower incomes.

How large is the aggregate cost at a societal level? And how big are the potential rates of return to health and nutrition interventions to reduce stunting? A recent study by Galasso and Wagstaff tackles these questions.

The authors use a development accounting framework, common in studies that account for some or all of the sources of differences across countries in per capita income, to model how childhood stunting affects income in adulthood. They rely on micro-econometric estimates and factor in the effects of childhood stunting on adult wages through their effects on years of schooling, cognitive skills, and height in adulthood, parsing out the relative contribution of each set of returns to avoid double counting. They use this setup to perform two calculations, the first for all developing countries, the second for the 34 developing countries that together account for 90 percent of the world’s stunted children.

The first exercise looks at how much lower a country’s per capita income is today as a result of some of its workers having been stunted in childhood. This is a backward-looking exercise asking, in effect, what the costs are today of not having eliminated stunting in the past.

The authors estimate the median age of today’s workers using the distribution of the current adult population by country. Drawing on the Joint Malnutrition Estimate database prepared by UNICEF, the World Health Organization, and the World Bank, they take as the average rate of under-five stunting the rate in the year in which the median-age worker was two years old. They then apply their development accounting methodology to compute the country-specific income penalty associated with childhood stunting among today’s workers.

The results show that the income penalty from some of today’s workers having been stunted in childhood averages 7 percent of GDP per capita. The estimates vary significantly across countries and regions, with the largest average penalties in Sub-Saharan Africa and South Asia—around 10 percent of GDP per capita.

The prevalence of stunting declines with economic growth, at an estimated rate of 1.5 percent a year, though not fast enough to reach the Sustainable Development Goals target of a 40 percent reduction by 2025. Programs that tackle the most proximate determinants of stunting—that help provide adequate nutrient intake (in utero and after birth) and that reduce exposure to disease—have the potential to significantly accelerate this decline.

The second, forward-looking exercise looks at the potential rate of return from such programs, aimed at reducing stunting among today’s children. The authors rely on the estimated costs and estimated impact of a package of 10 nutrition and health interventions (including salt iodization, different forms of supplementation during pregnancy and in childhood, complementary nutrition education, and management of severe acute malnutrition). They use their framework to estimate the net present values of the costs and benefits of scaling up this package of interventions to 90 percent coverage over a 10-year horizon in the 34 developing countries accounting for 90 percent of stunted children.

The results show an internal rate of return of doing so that averages 17 percent, and a benefit-to-cost ratio averaging 15 to 1. The internal rate of return varies significantly across regions. It is highest in East Asia and the Pacific (24 percent), reflecting the low per capita program cost, the high rate of return to education, the high initial GDP per capita, and the high GDP growth rate. And it is lowest in Sub-Saharan Africa (15 percent), reflecting the high per capita program cost, the relatively low initial GDP per capita, and the relatively low GDP growth rate, offset in part by the relatively high rate of return to education. The estimates are robust to sensitivity analysis that doubles the program costs or that halves the estimated benefits from the reduction in stunting.

Overall, the exercise is likely to represent a lower bound on the returns: a more complete cost-benefit analysis would capture the intrinsic value associated with the lower child mortality that would result from the nutrition and health programs, as well as the externalities and potential other channels of social returns that arise from human capital.

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Measuring Physical Activity to Investigate the Link between Health and Productivity

Treating Nigerian sugarcane cutters for malaria leads to a shift from sedentary to physically active time of about 90 minutes per workday

Productivity is a key determinant of economic growth, but measuring it at the level of individual workers remains a challenge. Economists consider worker effort to be unobservable, and for good reason. For physically demanding occupations, however, direct measures of physical activity may serve as a valid proxy for productivity. If so, new wearable technologies that record physical movement—accelerometers—might provide individual measures of productivity in settings where it would otherwise be unknown.

This possibility is probed in a recent study by Akogun, Dillon, Friedman, Prasann, and Serneels. In addition, the study builds on an earlier one that estimates the productivity costs of adult malaria infection (Dillon, Friedman, and Serneels, “Health Information, Treatment, and Worker Productivity: Experimental Evidence from Malaria Testing and Treatment among Nigerian Sugarcane Cutters,” Policy Research Working Paper 7120, World Bank, 2014). Both focus on a large sugarcane plantation in Nigeria.

This setting is particularly suited to investigating the relationship between labor productivity and physical activity because the output of the workforce is directly measurable. Workers cut stalks of cane, measured to a standardized size, and are paid on a piece-rate basis. Both the plantation and the worker keep careful track of the quantity of cane cut, so the productivity of the workday is clearly observed. Finally, workers are transported in and out of the plantation, so all are on-site for the same number of hours each day of work.

A random subset of workers was assigned belt-mounted accelerometers to wear for a six-week span over the study period. Accelerometers record physical movement across the three spatial dimensions and, in reporting, typically aggregate the numeric counts into minute-level aggregates of four levels of activity: sedentary and lightly, fairly, and very active. In addition to recording physical activity, the study tested each worker for malaria and prescribed effective treatment for those found to be malaria positive. The testing was rolled out over time, with the order of testing randomized across workers. This enabled the study to explore not only the link between physical activity and work output but also the influence of malaria on physical activity and productivity.

As would be expected, the level of physical activity in a day is strongly associated with the worker’s decision on whether to work that day. An additional hour of light activity increases the probability of a day of work by 10 percentage points, moderate activity by 7.5 percentage points, and heavy activity by 6 percentage points. Conditional on working, moderate physical activity is the level most associated with earnings. Because the algorithm used by the accelerometer to calibrate physical activity as heavy is akin to intense physical exercise, the association of cane cutting with light and moderate activity appears sensible. All told, the study calculates that about 60 percent of the activity association with earnings is driven by the extensive margin (that is, by supplying labor or showing up for work) and 40 percent by more intense activity.

Following the earlier study, the authors then estimate the impact of simply being offered malaria testing and treatment, the impact of being tested, found to be positive for malaria, and treated for the disease, and the impact of being tested but found not to be infected. Overall, testing leads to a shift from light to moderate activity. Conditional on working, the effects are stronger, with a similar shift out of light activity to moderate or heavy activity on the order of 0.8 hours per workday. This shift in turn is linked to a 25 percent increase in output.

For those tested and found to be malaria positive, the shift out of sedentary and light activity (again conditional on working) is larger—about twice the estimated effect of simply being offered testing and treatment. Among malaria-positive workers, as expected, those treated for malaria show higher productivity than those not yet treated. But an effect is also identified for workers who test negative for malaria. Conditional on working, these healthy workers see a significant increase in active hours, largely from a decline in sedentary time. A healthy diagnosis appears to motivate workers to work harder and be more active, at least over the short run of the study period (a surprising finding first identified by the earlier study cited above).

One challenge confronting the study involves worker attrition and compliance with its protocols: of the 83 workers initially assigned devices to wear, 25 had lost them by the end of the study. (This attrition did not seem to lead to bias, as no observable variables predict the loss.) Such challenges with incorporating wearable devices into a survey are not uncommon; other studies have found up to 40 percent of individual-day data to be unusable. Clearly, further work on this issue is needed. But combining wearable technologies with multistopic surveys offers promising potential.

Tanzania’s distribution of bed nets, though designed to fight malaria, also led to a short-term boost in the popularity of local politicians

Many African countries have implemented public health programs in the past decade targeting major diseases such as HIV/AIDS and malaria. Numerous studies have examined the effect of these programs on health outcomes. But little is known about their effect on politics.

Indeed, how public programs affect politics has been a long-standing question in political economy. A critical assumption of democratic theory is that voters reward politicians who choose good policies and deliver beneficial programs. There is a large empirical literature, focused chiefly on developed countries, that examines whether voters reward politicians who deliver economic growth. In developing countries, however, many political economy models suggest that these accountability relationships are weaker. Causal evidence on the relationship between public programs and public opinion and voting is sparse. While an emerging literature shows that incumbent politicians sometimes benefit from the introduction of conditional cash transfer programs in Latin America and Southeast Asia, there has been little evidence on the political effects of health programs in Africa.

To fill this gap in the literature, a recent paper by Croke looks at a major health campaign in Tanzania, the 2010–11 Universal Coverage Campaign. This program distributed long-lasting insecticide-treated bed nets to every household in the country, for each sleeping space not already covered with a net. The bed net manufacturer and NGOs handled distribution and logistics. Ward and village executives identified and supervised four community volunteers in each village, who over a five-day period visited each home and registered each sleeping space. The volunteers issued coupons for each space that warranted a net, redeemable at the distribution point. More than 17 million nets were distributed, at a total cost of $96.4 million, financed primarily by the Global Fund to Fight AIDS, Tuberculosis and Malaria.

Estimating the effects of universal programs like this one is typically challenging—because there is no natural comparison group with which the program recipients can be compared. But the analysis in this case benefits from an unusual coincidence. Tanzania was fielding an unrelated national panel survey at the same time as the bed net campaign. This allows causal inference through a regression discontinuity design, in which respondents interviewed just before and just after bed net distribution are compared.

The survey team interviewed 3,200 households in 2010–11, with the survey visits randomized into an earlier cycle and a later one. Household members were asked their opinions about local public officials, and these opinions are used as the outcome variables for the study. Meanwhile, as the survey was taking place, the bed net distribution campaign was occurring in phases by zone, starting in southern Tanzania and reaching new zones every one to two months. Thus the study can exploit the variation in possession of a free bed net driven by whether the distribution campaign happened before or after an individual was surveyed. Households interviewed after the campaign were 30–40 percentage points more likely to own a treated bed net than those interviewed before the campaign.

Receipt of the free bed nets led to significant changes in recipients’ political opinions. Approval ratings for the village chairman, the ward councilor, the ward executive, and the local member of parliament increased by 7–13 percentage points, from base approval ratings of 70–80 percent. The effect was larger for households interviewed within 30 days of the bed net distribution, with the effect gradually fading over a period of several months. And it was strongest in districts with the highest prevalence of malaria.

These results are robust to alternative treatment bandwidths of 45, 60, 120, or 150 days as well as to the incorporation of statistical controls (for age, education, and household consumption) and zonal fixed effects. In addition, the analysis shows no effect from hypothetical “placebo” campaigns 100 or 200 days before or after the actual campaign, further suggesting that the findings are not spurious.

The study provides what is thought to be the first quasi-experimental evidence of the relationship between a malaria prevention program and public opinion in a developing country. Moreover, it shows a large effect on public opinion despite a relatively low program cost ($7.07 per delivered net in 2010). The results suggest that for some types of health programs there may be clear compatibility between the interests of political leaders and those of their constituents. In quantifying the political benefits of one such program in Tanzania, the study may point the way to a broader research agenda on the political returns to delivering lifesaving interventions. More work is needed to estimate the political benefits of other critical interventions, such as providing basic primary health care services or antiretroviral treatment for HIV/AIDS—interventions that are high on the global health agenda but too often underprovided in developing countries.

Investigating the Joint Effects of Parenting and Nutrition on Child Development

A study in rural Cambodia looks at the extent to which parenting can offset the adverse effects of poverty on children’s development

Children in poor families are more likely to experience early stunting, poor health, or lack of educational opportunities—and, as a result, less likely to achieve their developmental potential. Indeed, family poverty has been shown to have a wide range of negative effects on child development in many countries, with gradients in child development due to family wealth evident as early as four months of age and growing throughout childhood.

Developing effective interventions to reduce such inequalities requires understanding the mechanisms that account for the correlation between family wealth and child development. Yet these mechanisms remain imperfectly described. They likely include a range of factors, including health and nutrition as well as the quality of home environments. Perinatal health and nutrition conditions are known to affect later cognition. And parenting quality has been shown to have strong and long-term effects on child development. But less is known about how parenting may help compensate for disparities in development associated with poverty, particularly in low-income countries.

Parenting quality may be lower among families living in poverty—as a result of the stress of living without adequate economic resources and the concomitant characteristics of poverty (such as low levels of parental education)—which in turn contributes to the adverse effects of poverty on children. Thus parenting quality has been posited to mediate the association between family poverty and child development. This key hypothesis is investigated in a new study by Berkes, Raikes, Bouguen, and Filmer.

The study is based on a unique panel data set of almost 7,000 children (ages two to four in 2016) and their families, collected in rural Cambodia in 2016 and 2017. The child survey comprises a set of cognitive tests (language, early numeracy, and executive function) as well as anthropometric measures (height and weight). The battery of child tests was developed in cooperation with researchers from the Measuring Early Learning and Quality Outcomes project and the local survey firm. The caregiver survey includes basic socioeconomic characteristics, questions about the child’s socio-emotional development (Strengths and Difficulties Questionnaire), and 25 questions about parental practices (measuring cognitive, emotional, and “negative” parenting). This survey thus enables the study to distinguish the role of socioeconomic characteristics and that of specific parental practices in explaining children’s development.

The analysis reveals four main findings. First, there is a substantial cognitive gap between children from different backgrounds in rural Cambodia (confirming earlier findings). In the language test the children in the poorest quartile of families score 0.60 standard deviations lower than those in the wealthiest quartile. The gap is larger for cognitive competencies (language, early numeracy, executive function) than for noncognitive or socioemotional outcomes.

Second, the gap in child development widens with age (again consistent with earlier findings from Cambodia and elsewhere). Between ages three and five the gap widens especially in language (from 0.31 to 1.12 standard deviations) and early numeracy, but less so in executive function (from 0.37 to 0.54 standard deviations). It also increases substantively for socioemotional outcomes. That the gap in executive function is already present at age three and increases by only 46 percent between ages three and five suggests that before age three children are already experiencing substantial growth in executive function that is affected by family socioeconomic status.

Third, cognitively stimulating and emotionally responsive parenting is one of the important explanatory factors of cognitive differences associated with family wealth. The measures of parenting behaviors are strongly correlated with children’s performance (even after controlling for other factors), accounting for about 8–14 percent of the gap in cognitive competencies observed among three-to-five-year-olds. Yet the size of the parenting effect is relatively small: a large (1 standard deviation) improvement in the main parental competencies—an improvement beyond the scope of most parenting programs—would compensate for only about half the effect of stunting.

Fourth, the positive effect of parenting is generally stronger for children who are not stunted. This finding is important for two reasons: It shows the importance of designing and testing integrated programs for child development that anticipate the complex interactions that will arise between child characteristics and environmental stimuli. And it contributes to the growing body of research documenting the variable effects of environments on child development, by adding undernutrition as a condition that may moderate the effects of later environmental stimuli on child development.

Encouraging stimulating and responsive parenting and improving children’s educational environments are key to reducing inequalities in cognitive outcomes and improving children’s performance during that critical time when the cognitive gap widens. Yet to fully compensate for initial inequality, improvements in the measured dimensions of parenting are not enough; factors such as nutrition and poverty are also important. These findings highlight the need for integrated interventions that address both parenting and early nutrition, especially for the poorest families.

How Do Targeted Cash Transfers Affect Nutrition among Nonbeneficiary Children?

By raising local food prices, targeted cash transfer programs can worsen nutrition outcomes among children in nonbeneficiary households

Aid programs such as cash transfers—a type of assistance reaching 380 million people in developing countries—often introduce large amounts of money into small village economies. Such cash infusions can bring substantial benefits to a village. But they may also raise local prices, which can have negative consequences for household welfare, particularly among those not receiving the transfers—the nonbeneficiaries.

While an extensive economic literature has considered both direct and indirect effects of cash transfer programs, the study of possible local market effects has focused on positive channels that operate through the labor market or through informal insurance and credit markets. However, emerging evidence suggests that such programs can generate significant negative general equilibrium effects that can detract from their antipoverty goals. In a recent paper Filmer, Friedman, Kandpal, and Onishi test for such local general equilibrium effects on food prices and a range of outcomes for beneficiaries and nonbeneficiaries. Their analysis uses the randomized evaluation of a large conditional cash transfer program in the Philippines, the Pantawid Pamilya Pilipino Program. This program provides cash transfers to poor households conditional on household investments in child education and health as well as use of maternal health services.

The additional income from cash transfers can increase demand for normal goods by beneficiaries. Demand for nutritious foods may increase even further because antipoverty programs typically broadcast messaging on recommended child feeding practices. The price response to such an increase in demand will depend on the market structure of producers and suppliers. If the relevant market is principally local and not fully integrated with the wider economy, the presence of oligopolistic producers or, if the local market is competitive, a rising marginal cost curve of local production will translate the increase in demand into higher prices. In addition, any general equilibrium effect of a cash transfer should be magnified where a larger share of local households are beneficiaries.

Using administrative data on program rollout and food prices, the authors show that the Pantawid program significantly raised the prices of perishable protein-rich foods while leaving the prices of other foods unaffected. The price changes were largest in areas with the highest program saturation, where the shock to village income was on the order of 15 percent, and they persisted more than two and a half years after the program’s introduction. While beneficiary households are (likely more than) compensated for the price increases, this is not the case for nonbeneficiary households. Indeed, consistent with a negative real income shock, consumption of the now more-expensive protein-rich foods such as eggs and dairy declined among nonbeneficiaries, including young children.

Concomitant with these price and consumption changes, the Pantawid program increased the prevalence of child stunting among nonbeneficiaries by 11 percentage points while reducing it among beneficiaries. The effects are observed only for children who were in the vulnerable first 1,000 days of life when the program was introduced and not for older children. Moreover, where program saturation was higher, the detrimental effects on nonbeneficiaries were larger. These are not short-run effects: the transfer program had been in place for 31 months at the time of the follow-up survey. The observed decline in egg consumption associated with higher prices alone explains 40 percent of the negative effect on the stature of nonbeneficiary children.

Besides the food price channel, another, complementary channel that may contribute to the worsening of child growth is that of utilization spillovers in the formal health care system. Access to key maternal and child health services significantly increased among beneficiary households, while the utilization of a few health services declined among nonbeneficiary mothers and children. Whether this decline was due to an increase in financial or convenience costs, or perhaps due to a decline in the perceived quality of care, cannot be determined through available data. The authors investigate and rule out a variety of other potential channels, including behavioral responses to the program by adults and older children that could result in a reduced availability of caregivers, as well as the possible influence of subgroup imbalance in baseline characteristics.

The results show that failure to consider such local general equilibrium effects can lead to overstatement of the net benefit of targeted cash transfers. But they also bring to the fore the issue of program targeting. Like most cash transfer programs, the Pantawid program is targeted to individual households on the basis of a proxy-means test score. The authors suggest that an alternative could be to offer the program on a universal basis in the subset of villages that are particularly poor or remote, an approach that would compensate all households for any rise in local prices and thereby avert increases in child stunting.

Cities, Slums, and Child Nutrition in Bangladesh

Children's nutrition status is particularly poor in Bangladesh's urban slums. Household wealth and the mother's educational attainment are both important factors.

Urbanization offers countries opportunities to broaden and boost welfare gains. But it also poses development risks arising from inadequate infrastructure and lack of basic services. The tension between the potential opportunities and risks is arguably greater for developing countries. One reason is that their already large urban populations are expected to grow substantially in the coming decades. Another is that their governments typically have poor records in designing and implementing policies and regulations and in providing services.

Leveraging the potential socio-economic benefits of urbanization, and mitigating the potential risks, have been recognized as a global imperative by the United Nations. This is reflected in, for example, the 2030 Agenda for Sustainable Development (adopted in 2015) and the New Urban Agenda (2016), a key element of which is protecting and promoting the health of urban residents.

Yet urban health and nutrition in developing countries remain understudied. Rigorous empirical research has been constrained by a lack of large-scale data that are representative across and within urban areas in a country and are extensive in capturing potential determinants. One country for which such data are available is Bangladesh, thanks to a large-scale household survey, administered in 2006 and 2013, that provides data on adult and child health and nutrition outcomes and a wide range of potentially relevant factors. Using data from this survey, a recent study by Raju, Kim, Nguyen, and Govindaraj examines the nutrition status of children under age five in the country's major cities, investigating patterns, trends, and determinants and focusing on differences between slum and nonslum areas.

Theory and evidence suggest that the study of slum health and nutrition should be treated as distinct from the study of urban health or of poverty and health. One argument for this is that the physical and social environments of slum settlements may amplify health risks for residents, particularly for young children, whose immune systems are still developing. Moreover, there is scant literature in this area, and research is needed to guide interventions related to development, and particularly health, in slum settlements.

To measure children's nutrition status, the study uses height-for-age z-scores, which show how much a child's height at a particular age differs from the international reference median. Height is regarded as the most relevant measure of child nutrition, and child stunting (a height-for-age that is more than 2 standard deviations below the international reference median) as the key indicator for tracking progress in addressing child undernutrition.

The study first investigates the effects of child, maternal, household, and neighborhood-area factors on height-for-age z-scores, using the 2013 survey data. It then extends its analysis in four potentially policy-relevant directions. Using the 2013 data, it examines the effects of the local availability of maternal and child health services and of the use of these services, the effects of access to, or use of, potential health-protective household amenities related to cooking fuel, dwelling floor, drinking water, sanitation, and hygiene; and the contributions of different factors to the slum-nonslum difference in mean height-for-age z-scores. And using both the 2006 and 2013 data, it examines the contribution of different factors to the increase in mean height-for-age z-scores in slum and nonslum areas.

The study finds that mean child nutrition status is substantially poorer in slum than in nonslum areas. Comparisons with 2014 statistics that are representative for urban and rural areas indicate that mean child nutrition status is poorer in slum areas than in rural areas. But it is the same in nonslum areas of large cities as it is in all urban areas, pointing to a cause for concern for children in these cities, particularly for those in slum areas.

Child's age, mother's age at child's birth, mother's educational attainment, and household wealth all have significant effects on height-for-age z-scores. Living in a nonslum neighborhood area has a positive effect that remains significant even after controlling for a range of factors. Access to improved toilets that are shared with a large number of other households has a negative effect in slum areas, while a handwashing site with soap and water at the dwelling has a positive effect in nonslum areas.

The difference in mean height-for-age z-scores between slum and nonslum areas in 2013 is driven by differences in the mean levels of factors, particularly mother's educational attainment and household wealth. Similarly, the increase in mean height-for-age z-scores between 2006 and 2013 in both slum and nonslum areas is driven by increases in the mean levels of factors, again particularly mother's educational attainment and household wealth.

Because the study is descriptive, its policy conclusions are necessarily circumspect. Policies, programs, and partnerships aimed at boosting household wealth and women's educational attainment are consistent with its results. So are initiatives to enhance maternal and child health services and the physical environment in homes and neighborhoods, particularly in slum areas.

The Dynamics of Child Development in a Very Low-Income Country

Among a cohort of children in Madagascar, wealth gaps in cognitive outcomes translate into similar gaps in later learning outcomes.

Years before entering school, children living in poor families differ in cognitive and noncognitive abilities from those living in richer families. There is substantial evidence that wealth gradients in child development start early, change over time, and accumulate with age. But much of this evidence comes from studies in high-income countries, where the availability of longitudinal panel data enables researchers to follow the same cohort of children over time while assessing repeated measures of child development outcomes at critical periods. While wealth gradients in child development outcomes have also been documented in low- and middle-income countries, the evidence in these countries has been based largely on cross-sectional data, covering different age groups at a single point in time.

This has left important questions largely unanswered: What are the timing and evolution of the wealth gaps in child development outcomes in a very low-income setting? How do these gaps change over time and accumulate with age? Do the gaps and their evolution differ across different domains of child development? And how do early gaps in school readiness map into learning outcomes?

A recent paper by Galasso, Weber, and Fernald takes up these questions. The paper is among the few examples of a longitudinal cohort study set in a very low-income country in Sub-Saharan Africa that has assessed children through direct measures of cognitive development at two critical stages of child development. The analysis draws on a nationally representative survey of nutrition and child development in Madagascar (Enquête Anthropométrique et de Développement de l’Enfant), following a cohort of children from the age of 0–3 years with follow-up assessments at preschool age (3–6 years) and school age (7–10 years).

In addition, while the literature on child development in resource-poor settings has focused on height, weight, or morbidity outcomes or on a single domain of child development (such as receptive language), this study examines multiple domains of child development, including measures of cognition, language, and executive function. It also evaluates the cohort through early math and literacy measures at school age. The paper relies on both the cross-sectional and longitudinal aspects of the data to document the critical timing of the emergence and evolution of wealth differences in child development and learning outcomes.

The study documents substantial gradients in school readiness outcomes by household wealth even in a very low-income setting. These gradients, already evident when children were 3–4 years old, widen with increasing child age and flatten out by ages 9–10 for all domains of child development.

The magnitude and evolution of the wealth gradient vary by domain, widening earlier (between ages 3 and 6) for receptive vocabulary and sustained attention tasks and later (between ages 7 and 8) for cognitive composite and memory of phrases tasks. The largest wealth gradients are observed for vocabulary and sustained attention and are robust to controlling for lagged outcomes and initial endowments. The close mapping between school readiness and learning outcomes suggests that school readiness measures are a reasonable way to assess children’s potential, even in settings with low school attendance.

Finally, the study shows that wealth gradients observed in child development outcomes map closely onto socioeconomic differences in learning outcomes (math and literacy), with differences between the richest and poorest quintiles of about 1.3 standard deviations, even after controlling for lagged outcomes and initial endowments. The close mapping between school readiness and learning outcomes suggests that school readiness measures are a reasonable way to assess children’s potential, even in settings with low school attendance.

Can Offering People Gifts Increase Their Use of Health Services?

A study in Rwanda shows that women are more likely to seek timely pre- and postnatal care if they expect to receive gifts for doing so.

With the aim of increasing the coverage of health care, a growing number of low- and middle-income countries have introduced programs of conditional rewards for either providers or users of health services. Several Sub-Saharan African countries have implemented pay-for-performance programs at a national scale, while other countries have piloted such programs or implemented them at a regional level. These programs typically give health facilities financial rewards conditional on the number of targeted services provided as well as the quality of care. But if the policy goal is to increase the use of health services, independent of the quality of care, rewarding users rather than providers can be more effective. While providers can exert greater effort in expanding outreach and improving services, it is users who ultimately decide whether to go to a health facility.

A recent paper by Shapira, Kalisa, Condo, Humuza, Mugeni, and Walldorf evaluates the effects of an intervention in Rwanda that offered gifts (in-kind conditional transfers) as an incentive for the use of particular health services. Specifically, the intervention rewarded women with gifts for receiving timely pre- and postnatal care as well as for giving birth in a health facility. The aim was to increase the use of these targeted services so as to improve the diagnosis and treatment of preventable threats to maternal and neonatal health.

This demand-side incentive strategy was introduced as part of the Community Performance-Based Financing Program, itself an extension to the national Performance-Based Financing Program for health facilities. The evaluation relies on an experimental design in which funding for the demand-side incentives was given to health centers in randomly selected subdistricts. Facilities received this funding for a period of about two and a half years. They were given suggestions on the content of the incentive packages, and ceilings were set on the monetary value of the gifts for each type of care.

The results show that offering gifts as demand-side incentives can effectively increase the use of targeted health services. The intervention led to an increase of 7.7 percentage points in the share of women who initiated prenatal care within the first four months of their pregnancy and an increase of 8.6 percentage points in the share who received postnatal care in the 10 days following delivery. The evaluation finds no significant effect on the share of women who gave birth in a health facility attended by a skilled health provider. But the share of deliveries taking place in such conditions increased sharply nationwide, reaching 95 percent at the time of the follow-up survey.

The results are consistent with earlier studies of programs using conditional transfers (cash or in-kind) to encourage the use of health services. But what is remarkable is that most eligible women reported not receiving the gifts; health centers reported frequently running out of the gifts because of a lack of funds. What explains the results? Women might have gone to the health centers with the expectation of receiving the gifts and learned about the lack of stock only after receiving the services. In addition, the intervention might have changed women’s behavior by changing their perceptions. For example, women might have assigned greater importance to the timing of care, whether offered gifts or not, after observing that resources had been invested in rewarding early pre- and postnatal care. And for women who did receive the gifts, this might have improved their general attitude toward the health centers.

One important aspect to keep in mind is that the Community Performance-Based Financing Program was introduced alongside the ongoing Performance-Based Financing Program for health facilities. Because all health centers received performance-based payments, the effectiveness of providing these incentives for health providers cannot be compared with the effectiveness of providing incentives only for users of the health care system. It is possible that there were synergies between the incentives for facilities and those for users. While the incentives for users improved indicators that were not affected by those for health providers, health centers could independently provide women with gifts with the aim of improving their performance on the targeted indicators.

As a growing number of countries in Sub-Saharan Africa introduce or scale up pay-for-performance programs for health providers, this study shows that conditional rewards for users can enhance the effect of these programs on the use of health services.

Looking into the Black Box of Performance-Based Financing

Performance-based financing led to positive results in Cameroon’s health system. But was linking payments to performance the critical factor?

Confronted with slow progress toward health-related targets of the Sustainable Development Goals, some countries have experimented with results-based financing approaches in the health sector. These aim to improve health systems and health outcomes through the use of financial incentives, paid only after targeted results have been attained and verified.

One such approach is performance-based financing (PBF), a specific supply-side intervention comprising a set of health system reforms meant to increase the coverage and quality of essential health services as well as equity and efficiency, often with a special focus on maternal and child health. While models differ, all PBF programs involve the purchasing of health services using a predefined list of services and prices. They also include a strong verification system that relies on systematic and detailed review of health facilities’ records as well as community-level client tracking in which reported patients are asked a series of questions to confirm their receipt of health care. And many involve greater autonomy for health facilities.

Is it possible to isolate the influence on health outcomes of different components of the PBF approach—such as explicit financial incentives linked to results, additional resources available at the point of service delivery (not linked to performance), and enhanced supervision, coaching, and monitoring? A recent paper by de Walque, Robyn, Saidou, Sorgho, and Steenland presents the results of an impact evaluation in Cameroon that sought to do just that.

For purposes of the evaluation, two types of primary health centers—those with a medical doctor on staff (medicalized health centers) and those without a doctor (integrated health centers)—were randomly assigned to four study groups for comparison. The first group received the standard PBF package (the PBF group); the second received the same level of financing, though not linked to performance, as well as the same levels of supervision, monitoring, and autonomy (the additional financing group); the third received no additional resources or autonomy but the same levels of supervision and monitoring, and the fourth received no PBF components.

The evaluation relied on two main sources of data: a household survey carried out before PBF was implemented (at baseline) and after it had been in place for two years (at endline) and a facility-based survey also conducted at baseline and endline.

Overall, the results indicate that PBF in Cameroon is an efficient mechanism for channeling payments and funding to providers. It led to significant increases in utilization in the PBF group for several services (child and maternal vaccinations, use of modern family planning), though not for others (such as prenatal care visits and facility-based deliveries). It also improved structural quality as measured by staff presence, staff satisfaction, and the availability of equipment.

But despite an increase in providers and supplies available at health facilities, PBF did not increase the completeness of service provision during prenatal care and child health consultations. Importantly, out-of-pocket health spending (including unofficial payments) fell for households in the PBF group, and this fall in revenue did not come at the cost of process quality: there were no negative effects on completeness of services and advice provided during prenatal visits and consultations for children under age five. Perhaps not surprisingly, given the lower out-of-pocket costs and improvements in structural and process quality, client satisfaction increased for consultations for children under five.

Nevertheless, for many of these outcomes there was no significant difference between the PBF group and the additional financing group. Indeed, many (though not all) of the improvements measured for the first group were also observed in the second one—though few improvements were observed in the group given enhanced supervision without additional financing or financial incentives. Yet the comparison between the PBF and additional financing groups is delicate because the two share many similarities: the same supervision and monitoring mechanisms, the same level of managerial autonomy, the same level of increased financing. The only difference is that in the PBF group the additional financing was linked to the performance of the individual facility while in the additional financing group it was linked to the average performance of the PBF group facilities in the same district. Among the management and staff of health facilities, this distinction might not have been salient enough to be reflected in how they modified their practices.

The weaker effects in the group offered enhanced supervision but no additional financing or financial incentives suggest that reinforced supervision is not enough to change behaviors and improve outcomes. Additional financing appears to be required, and its impact seems in some instances to be stronger when linked to results.

The Importance of Good Roads in Access to Health Care

Better roads would improve access to health care in rural Madagascar—by helping both patients and medicines reach health facilities

Access to health care is an important challenge in the rural areas of many developing countries, particularly in Africa. As the literature shows, the reasons for this generally include a variety of constraints on both the demand for and the supply of health services.

On the demand side, people in rural areas are often much poorer than those in urban areas. They are also less likely to have health insurance. And many rural people do not have good access to the road network, let alone to health facilities. Therefore, all else being equal, the demand for health services in rural areas tends to be relatively low.

On the supply side, the availability of doctors and nurses is often biased toward urban areas. As a result, rural doctors often have to see more patients than urban doctors do. And because of poor transport connectivity, medical supplies may be inadequate in rural and remote areas. Both these factors can often compromise the level of health services provided in rural areas, and this may further weaken rural demand for health care.

In Madagascar both demand- and supply-side constraints have long hampered people’s access to health care in rural areas. Madagascar is one of the poorest countries in the world, with a GDP per capita of about $400. More than three-quarters of its rural population lives under the national poverty line. In addition, most of the rural road network is in poor condition. According to the Rural Access Index, a measure of rural transport accessibility, only 11.4 percent of the rural population has access to the official road network in good condition. About half of villages (fokontany) are located more than 10 kilometers away from the nearest basic health center. Moreover, the medical supply chain is often disrupted during the rainy season, when rural roads frequently become impassable. And about 25 percent of all health facilities are disconnected (located more than 5 kilometers away) from the official road network.

A new paper by Iimi and Rajoela analyzes this nexus of transport connectivity, availability of medical supplies, and people’s demand for health services in rural Madagascar by estimating a system of equations. These are based on a hypothesis that people’s demand for health services may depend on road connectivity, their income level, and the availability of medicines. While supply conditions, notably the availability of medicines, may depend on road connectivity. By shedding light on the critical question of what determines people’s access to health care, the analysis is designed to help inform policy makers about ways to address the issues through a multi-sectoral approach. The analysis combines micro and spatial data from different sources, such as poverty maps, road network inventory data, and the country’s health management information system.

The results show that transport connectivity is essential on both the demand and the supply side. The distance from villages to health facilities is found to be an important determinant of people’s access to health care. More people could benefit from health services if they lived closer to a health facility. Similarly, transport connectivity between health facilities and the nearest district capital affects the availability of medical supplies. Larger stocks of medicines are available in health facilities that are better connected to district capitals, which play an important part in the country’s medical supply network. The better availability of supplies can in turn stimulate people’s demand for health services: more people are willing to visit health facilities when those facilities are equipped with sufficient medical supplies.

The results highlight the importance not only of physical infrastructure but also of institutional issues relating to health services. For example, they show that poverty is among the most significant factors affecting people’s demand for health services. This suggests the importance of ensuring financial affordability in the health sector, which might call for targeted subsidies, an expansion of insurance mechanisms, free health care programs in rural areas, or some combination of these. And policy coordination among different sector ministries is essential. While health sector reforms need to be advanced to ensure that health care is affordable and the supply of medicines reliable, developing and maintaining transport connectivity to priority health facilities is also important.

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