Early Childhood Development in India: Assessment and Policy Recommendations

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Abstract
We document temporal trends, and inter and intra-state disparities in child health and cognitive ability in India and review the theoretical and empirical literature on policy interventions that may help ameliorate these gaps. We show that despite rapid improvements in early childhood health across much of India over the past three decades, many areas still experience persistently high rates of infant mortality, low rates of child immunization and low levels of child academic achievement. We outline a series of interventions with a strong theoretical and empirical evidence base for improving physical and cognitive development of young children in these areas, including improved nutrition and sanitation, parental stimulation, and caretaker focus on cognitive and emotional development of the child. We then describe how before these interventions can be carried out successfully as other market failures and issues of state capacity are often present. We conclude by recommending that as India scales up programs aimed at early childhood health and development it must a) collect extensive data to understand where programs should be deployed in order to maximize their impact and b) perform rigorous program evaluations to ensure that interventions which have been shown to work in more favorable settings are also successful in the Indian context.

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1. Introduction

Children’s experiences in utero and in early life can have large, long-lasting impacts that translate to health and economic wellbeing in adulthood (Almond and Currie, 2010; Currie and Vogl, 2014; Heckman, 2006 and 2007). Micro effects have also been shown to extend to the macro level, for example in robust international associations between health in early life and economic indicators such as GDP per capita (Weil, 2014). These findings suggest policies that bolster the survival and development of infants and young children have more than just an ethical imperative: when implemented well, they generate large economic returns. Still, despite the growing academic consensus, policymakers in low-income countries have been slow to shift their focus to this issue, resulting in insufficient funding and regulatory oversight for programming that improves the welfare of young children (Brito, Engle and Super, 2013).

With regard to child health, India’s story over the past decade has largely been one of success – in reducing infant mortality and encouraging healthy growth through immunization and supplementation. Infant mortality has fallen from 66 deaths per 1,000 live births in 2000 to 39 deaths per 1,000 live births in 2014, and DPT immunization rates have increased from 58% to 83% during the same time period.

Yet progress has been uneven. Both the level and the rate of improvement of child health in India remain widely unequal. Infant mortality rates in Uttar Pradesh and Madhya Pradesh are more than four times those of Kerala, while the gap between the most and least vaccinated states is more than 40 percentage points. Even within states, there exist stark disparities. Infant mortality rates of children born in rural areas are more than 1.5 times those of their urban counterparts. Similarly, the difference between the most and least vaccinated districts within states is almost always greater than 30 percentage points.

These statistics pose a natural question: how can governments help to remediate disadvantage and reduce the inequalities of early childhood that translate to wide gaps in achievement and wellbeing in adulthood? With regard to health, the best tools for fighting these inequalities are well known: access to vital micronutrients; immunization from life-threatening diseases; clean water and local sanitation; and prevention and rapid treatment of infectious diseases. These tools must be combined with strategies that prioritize the so-called “last mile” – getting effective interventions to the (often disenfranchised) populations that need them most. This is where the most work is still needed, to stimulate consumer demand and bolster the incentives of local agents to provide high-quality health services.

While the survival and health of young children is paramount, cognitive and non-cognitive skills (which are not perfectly correlated with child health) are often more strongly associated with economic outcomes in adulthood. In this regard, the picture in India is fuzzier. While there is some nationally representative evidence on spatial patterns of cognitive development in later childhood in India (ages 5 and up), the
country is lacking a comprehensive data source for skill and capability development at early ages (below age 3, for instance). These data are important to assess where the geographic disparities in skill deficits at early ages are most important.

In recent years, the Indian government has spearheaded early childhood education initiatives, guided by the emphasis given to this topic in the Eleventh Five Year Plan (2007-2012) and subsequently by the Right of Children to Free and Compulsory Education Act in 2009. These commitments from the federal government – along with several high-profile initiatives to support them – establish a set of national priorities related to early childhood development. Such initiatives include the delivery of preschool education through the Integrated Child Development Service; community-based child development support through Accredited Social Health Activists; and the Rajiv Gandhi National Creche Scheme.

These programs have the potential to be vital components of a holistic set of national policies that promote early childhood development. In this paper, we highlight three critiques of the status quo and point to potential solutions that have proven successful in other contexts (covered in detail in section 4). The critiques are as follows: First, policy implementation, which is largely administered by individual states in India, has thus far been inadequate. Second, gold-standard evaluation of pilot initiatives is needed to identify the highest-return policy levers and weed out low-return programs. Third, even successful pilots may flounder when brought to scale; this problem may be particularly salient given India’s complex political and institutional environment. We thus emphasize the need for proper monitoring and evaluation of at-scale initiatives through purposeful investment in data gathering and analysis, while also adjusting program implementation to take into account provider incentives and stimulation of public demand.

The remainder of the paper is organized as follows. Section 2 provides some background on the current status of and recent trends in child health and development in India, with special attention given to the inequality in these measures across Indian states (and between districts within states). Section 3 describes a theoretical framework for health and skill formation in childhood, through which we identify key elements of good policymaking for the early advancement of children. Finally, section 4 reviews the relevant literature in public health and economics for successful interventions aimed at reducing inequities in child health and early skill development, discusses the potential scalability of these interventions in the Indian context, and recommends next steps for public policy.

2. The State of Child Health in India

In this section, we use data from several large, nationally representative surveys to characterize both the current state of early childhood health in India and variation in these outcomes by gender, urbanity, and state. There are three key findings. First, Indian infant mortality and immunization rates have improved considerably since 1980. By 2013, the Indian infant mortality rate had dropped to one third of its 1980 level and DPT immunization rates increased from 16% in 1984 to 83% in 2013. However, there is substantial heterogeneity across and within Indian states in both immunization and infant mortality. For instance, in 2013, infant mortality rates in Kerala were similar to those of Mexico, while infant mortality rates in Madhya Pradesh were slightly higher
than Ethiopia’s. Additionally, all states have severe rural-to-urban disparities in infant mortality but much smaller gaps in immunization rates. Finally, there is also large variability in childhood cognitive outcomes across states: while 99% of 8 to 11 year olds in Kerala can recognize letters, the same is true for only 76% of 8 to 11 year olds in Uttar Pradesh. The following subsections describe these findings in greater detail.

2.1 Measurement of Early Childhood Health Outcomes

We study changes over time and differences across space in Indian early childhood health outcomes and Indian early childhood health investments. To summarize early childhood health outcomes, we use infant mortality, which has several advantages as a measure of early childhood health: it is correlated with many other early childhood health outcomes of interest and it can be objectively measured through surveys (vital registration records from hospitals, for example, would not be as representative for this purpose since many deaths do not occur in hospitals). As a proxy for early childhood health investments, we use the percentage of 12 to 23 month olds receiving all appropriate DPT, measles, polio and BCG (tuberculosis) vaccinations. Immunization rates were chosen because they are easily and objectively measured (most survey enumerators examine an individual’s immunization card); they are highly correlated with other outcomes of interest; and they provide large payoffs in terms of reduced mortality, improved later-life health, and human capital accumulation.

All the 2013 data on state and district immunization rates was collected from the District Level Household and Facility Survey IV (DLHS) and the Annual Health Survey (AHS) 2012-2013 state reports. The 2013 data on infant mortality was collected from the Indian Census Sample Registration System 2013 Statistical Report. All 1993 data on infant mortality and immunizations were collected from the 1992-1993 Demographic Health Survey (DHS). The DHS and DLHS are large, nationally representative surveys of Indian population health with an emphasis on reproductive and early childhood outcomes.

Finally, as a proxy for child cognitive development, we use a rudimentary reading, writing and math test given to children aged 8 through 11 in the 2012 India Human Development Survey (IHDS). Despite the amount of attention paid to early childhood physical health interventions and measurement, there has not been a commensurate focus on early childhood cognitive and socioemotional outcomes. This gap in knowledge is important: a large number of studies from across the developed and developing worlds have shown that cognitive and non-cognitive developmental outcomes are closely linked with adult labor market productivity. Indeed, the wide disparities found in this study based on a much cruder measure of child cognitive development suggest that much more work in this area is needed.

2.2 Aggregate Trends in Indian Early Childhood Health

Indian early childhood health care and health outcomes have improved markedly over the past thirty to forty years. Figure 1 shows trends in Indian infant mortality and Indian immunization rates relative to other large developing countries using data collected by the World Bank. Infant mortality has fallen from 142 deaths per 1,000 live births in 1974 to 39 deaths per 1,000 live births in 2014. Similarly, the
proportion of children receiving the DPT immunization has increased from 16% in 1984 to 84% by 2014. However, despite these advances, Indian infant mortality rates remain more than three times those of China and 1.7 times those of Indonesia, leaving considerable room for improvement.

**Figure 1: Changes in Infant Mortality and Immunization Rates among Selected Developing Countries Over Time**

Figure 2 shows the current ratio of rural-to-urban Indian infant mortality rates and immunization across Indian states. As pictured, there are stark disparities in infant mortality rates between rural and urban areas: the rural infant mortality rate is 25% to 75% greater than the urban rate in most Indian states, and more than double the urban rate in a small number of states in the northeast. Saikia et al (2013) suggests that much of this gap can be explained by the higher levels of maternal education and wealth in urban areas. Thus, development programs aimed at increasing rural standard of living may also work to decrease rural-to-urban early childhood health disparities.

In contrast to infant mortality, rural-to-urban differences in immunization rates while present, appear smaller. Indeed, in some states, such as Andhra Pradesh, Odisha and Tamil Nadu, immunization rates in rural areas have reached or surpassed those of urban areas. These results suggest that although Indian government action has been partially successful in closing the immunization gap between rural and urban regions, they have been less successful in closing the gap in outcomes, at least as proxied through the infant mortality rate. Understanding why this is the case is an important area for future research.

Finally, Figure 3 illustrates the ratio of male-versus-female infant mortality rates across states. In most states, male infant mortality rates are between 5% and 10%

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1 It is important to note that to some extent this difference is mechanical; immunization rates are higher than infant mortality rates on the whole so similarly sized absolute differences in rates between urban and rural areas create a larger rural-to-urban ratio for infant mortality rates. However, the fact that some regions have reached parity between rural and urban areas for immunization rates, while only one state has done so for infant mortality rates, suggests this larger gap is not simply an artifact of how we chose to display the data. The decline in rural-urban immunization gaps has also been documented in Singh (2013).
lower than female rates. Although these disparities are smaller than the rural-urban gap, unlike the rural urban disparity, these differences likely cannot be explained by differences in mother socioeconomic status or access to health facilities. Understanding the extent to which preference for males leads to higher infant mortality rates for females is an area of highly important ongoing research. Male and female infant immunization rates were only available for a subset of states surveyed in the 2012-2013 DLHS, but these data show roughly equivalent immunization rates between boys and girls.

Figure 2: Ratio of Rural-to-Urban Infant Mortality and Immunization Rates by State

Figure 3: Ratio of Male-to-Female Infant Mortality Rates by State

2 The ratio between male and female infant mortality rates in Kerala and Goa are particularly low because the overall infant mortality rates are extremely low. In absolute terms, the difference between Keralan male and female infant mortality rates is only 3 deaths per 1,000 live births.
2.3 State-Level Variation in Early Childhood Health

India has enormous regional variation in standards of living, culture, language, and gender equality. Thus, it is perhaps unsurprising that there is also substantial state-level heterogeneity in early childhood investments and health outcomes. Figure 4 shows infant mortality and immunization rates at the state level in 2013. In general, the south and northwest of the country have relatively low infant mortality rates while the north and northeast have higher rates. The extent of spatial variation is quite striking: Kerala has approximately the same infant mortality rate as Mexico (12 deaths per 1,000 live births) while Madhya Pradesh has a similar rate to Ethiopia (54 deaths per 1,000 live births). There is a similar degree of state-level variation among immunization rates, but much less spatial correlation.3

Figure 4: 2013 Infant Mortality and Immunization Rates by State

Figure 5 shows how infant mortality and vaccination rates have changed at the state level between 1993 and 2013.4 There are several important takeaways. First, infant mortality fell dramatically in almost all Indian states during this time frame with the exception of Jammu and Kashmir. Second, this decrease was especially prominent in the north and Tamil Nadu, with reductions of 40 to 55 deaths per 1,000 live births – a remarkable public health accomplishment. Third, vaccination rates also increased throughout much of the country, but these gains were particularly pronounced in the north. Indeed, several wealthier provinces including Tamil Nadu, Maharashtra and Haryana saw only small gains or small falls in immunization rates over this time period.

The relative stagnation of immunization rates in India’s higher-income provinces is not well understood. Dasgupta et al (2014) found in a correlational analysis that the

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3 Some of the low immunization rates reported in DHLS IV are surprising, especially those of Tamil Nadu (56%). Indeed, the 2009 UNICEF coverage survey recorded immunization rates more than 20 percentage points higher the DLHS IV estimates. However, early reports from the NFHS IV (2016) also found relatively low (although still 13 percentage points higher than the DLHS report) immunization rates and a decrease of similar magnitude since 2005. Thus, although the DLHS reports of immunization rates in Tamil Nadu appear inexplicably low, the directionality of the trend over time appears to agree with other data sources.

4 Changes for newly formed states were computed by subtracting the full average of the 1993 state from which the new state was formed with the 2013 average of just the new state.
districts experiencing immunization-rate declines in nine higher-income states were more likely to be urban and less likely to have a higher proportion of Scheduled Castes/Scheduled Tribes. However, much more research is required to understand why immunization gains may have stopped in India’s wealthier states, especially because early data from the 2015-2016 Demographic Health Survey (DHS) suggests that this trend has continued in the years since 2012.

Broad-based gains in both infant mortality and immunization rates, especially in the poorest regions of India, suggest that the government has been relatively successful over the past few decades in improving investments in child health and child health outcomes. However, despite these improvements, large parts of the country still remain plagued by high infant mortality rates and non-universal vaccination, reminding us that much work still lies ahead.

**Figure 5: Changes in Infant Mortality and Immunization Rates by State between 2013 and 1993**

[Map showing changes in infant mortality and immunization rates by state between 2013 and 1993]

Finally, Figure 6 shows the level of inter-district variation in vaccination rates within the same state. Each point on the graph represents a specific district, with the y-axis reflecting the percent of 12 to 23 month olds fully vaccinated in that district and the x-axis standing for the state in which the district is located. This figure shows huge intra-state variation in immunization rates; even lower-performing states such as Uttar Pradesh and Arunachal Pradesh have some districts with more than 70% of children vaccinated, while higher-performing states like Kerala and West Bengal have districts where fewer than 50% of 12 to 23 month olds have received full immunization. This high level of variation both between states and between districts within states has been documented by Rammohan and Awofeso (2015). The authors show that district education levels, income per capita and access to health facilities (for DPT vaccinations only) are highly correlated with district-level differences, but they do not report how much variance is left unexplained after accounting for these factors.

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5 Districts with less than 10 children surveyed were not included.
2.4 State-Level Variation in Child Cognitive Ability

The above sections summarized the current state of physical child health in today. While decreasing infant mortality, improving child nutrition, and increasing access to medical facilities for children is of first-order policy importance, recent research has also emphasized the significance of early childhood cognitive and emotional development for later-life outcomes. However, unlike child physical health, nationally representative data on the state of early childhood cognitive and non-cognitive development in India is lacking.

In this subsection, we summarize the largest known nationally-representative survey of child ability in India.\textsuperscript{6} In 2004 and 2012, the India Human Development Survey (IHDS) tested more than 11,000 8 to 11 year olds across India on math, reading, and writing skills. Figure 7 summarizes the 2012 state-level averages\textsuperscript{7} in reading and math scores. A respondent is assigned a reading score on a scale of 0 to 4, where 0 means the student does not recognize letters, 1 is for students who recognize letters but not words, 2 means the student can read words but not sentences, 3 signifies the student can read sentences but not paragraphs, and 4 indicates that a student can read paragraphs. Across Indian states, average scores range from just above 3 (can read sentences) to less than 2 (can only read words). Scores are highest in the northwest and Kerala and lowest in the north and southeast. There also appears to be a high spatial correlation in scores.

\textsuperscript{6} The ASER center also provides India-wide testing of 5-14 year olds, but only in rural districts.

\textsuperscript{7} State-level averages were computed for all states with 100 or more observations.
We see a largely similar pattern for math scores. In math, a score of 0 means the student cannot recognize numbers, a 1 is for students who recognize numbers but who can’t subtract, a score of 2 means the student can subtract but not divide, and a score of 3 indicates that the student can divide. Again, we see high levels of variation: scores range from around 1 (student can only recognize numbers) to 2 (student can subtract), and scores are likewise highest in the northwest and Kerala and lowest in the north. Andhra Pradesh and Tamil Nadu were found to perform much better on math than reading.

Figure 7: Average Math and Reading Scores of 8 to 11 Year Olds by State

A different (and perhaps more intuitive) way to examine these data is to analyze the percentage of students who have attained the most basic level of proficiency by state. Figure 8 shows the percentage of 8 to 11 year olds who can recognize letters and numbers in most Indian states. Here, the degree of state-level variation in reading and math ability is especially stark: 76% of 8 to 11 year olds in Uttar Pradesh can recognize letters compared with 99% in Kerala and 96% in Andhra Pradesh. Similarly, only 69% of students can recognize numbers in Uttar Pradesh, compared with 99% in Kerala and 95% in Andhra Pradesh. These findings are especially surprising given that almost all of test-taking 8 to 11 year olds in the survey stated that they attended school.
Finally, Figure 9 conveys the relationship between state infant mortality rates in 2005 and state math scores in 2012 (the relationship is nearly identical for reading scores). There is a strong negative relationship: the higher a state’s 2005 infant mortality rate, the lower its children’s math scores (correlation of -0.58). Obviously this relationship is not causal, but the strong correlation does provide evidence that low levels of development may lead to both higher infant mortality and lower scores in school.
2.5 The Need for Better Measurement of Early Childhood Cognitive and Non-Cognitive Skills

These data on childhood math and reading ability provides a window into both the absolute and state-level variation in core skills across India, but it is unclear whether these differences are caused by deficiencies in the education system, different levels of income, variability in physical health, gaps in early childhood cognitive/non-cognitive development, or other factors entirely. Therefore, the disparities found here call out for more exploration. Although we have detailed data on many potential contributors to these disparities, one important area where data is almost non-existent is cognitive and non-cognitive skills among children in early childhood (0 to 3 years).

To remedy this information gap, we recommend that the Indian government sponsor a nationally representative survey aimed at providing a comprehensive understanding of the state of early childhood development. One potential survey is the Multiple Indicator Cluster Survey (MICS) developed by UNICEF (Aslam et al, 2014). MICS has been carried out in many developing countries over the past decade and includes modules on child physical health, child developmental ability, parental caretaking activities, and maternal health. Implementing this type of survey in India would provide important insight into the types of barriers that lead to large regional disparities in childhood learning and ultimately in long-term labor-market outcomes.

3. Theoretical Considerations

The process of health and human capital accumulation throughout childhood is complex one – a combination of the capabilities that children are born with (so-called “endowments”); investments in children made by parents, caregivers, local communities, and government; and adverse as well as positive experiences that affect child development. Understanding how these elements interact over the course of childhood to determine adult health and skill capabilities (and, in turn, economic outcomes) is crucial to developing sound policies that achieve high returns while remaining cost-effective.

In this section, we review a theoretical framework for health and skill formation in childhood, with an eye toward identifying the key elements of good policy that arise. The basis for this theory has played an important role in academic research for decades (Becker and Lewis, 1973; Grossman, 1972; Rosenzweig and Schultz, 1983; Behrman, Pollack and Taubman, 1982; Behrman, 1997), but recent work by James Heckman and collaborators (Cunha and Heckman, 2007; Conti, Heckman and Uruza, 2010; Heckman, Pinto and Savelyev, 2013; Heckman and Mosso, 2014) has developed a formal mathematical structure specific to the analysis of early childhood development, which has made strides toward estimating the framework’s parameters (Cunha, Heckman and Schennach, 2010; Aizer and Cunha, 2012).

4. Theoretical Framework

The process of health and human capital accumulation begins at conception. Even before birth, children are endowed with “stocks” of health and skills. These stocks are multidimensional. For example, health might include pulmonary, cardiovascular,
and immune function. Skill generally refers to cognitive function as well as non-cognitive capabilities, such as grit, conscientiousness, and adaptability. These endowments capture the variation in initial states observed in the population. For example, some children have robust immune systems while others are predisposed to illness. Similarly, some children are naturally gifted when it comes to cognitive functions while others have lesser natural ability. These endowments surely have a genetic component, driving a correlation in the characteristics (and corresponding outcomes) of parents and children.

Stocks of health and skills in this model can be thought of the same way as capital in a standard model of economic growth: they depreciate over time; they can be augmented through investment; and they are prone to exogenous shifters, or “shocks,” which are out of the child’s control.

Endowments form the initial stocks, which then evolve from period to period, starting at gestation and continuing through birth, early and late infancy, the toddler years, childhood, adolescence, and finally, adulthood. During gestation, prenatal investments (e.g. maternal nutrition, decisions regarding smoking and alcohol consumption, prenatal checkups), shocks (e.g. illness episodes, traumatic events), and depreciation shift initial stocks. The resulting stocks of health and skills at birth are then taken as inputs into a similar process in the next period, early infancy. Here, the stock continues to evolve as parents devote their material resources and time to the infant.

There are several key features in the model that deserve mention. First, the levels of stocks coming into a given period may impact the effectiveness of investments during that period. For example, an infant with a weak immune system (a low stock of immunity) may benefit greatly from supplementation with vitamin A, which helps boost the body’s natural immune response. An infant with a more robust immune system may still benefit from vitamin A but less so than the weaker infant. As we highlight below, this interaction between stocks and investments is absolutely critical to elucidate for the purposes of good policymaking.

Second, the stocks of health and skills may directly impact each other, and one stock may also affect the productivity of investments in the other. For example, investing time in a child’s socio-emotional development may yield the greatest returns for children with the highest stocks of health. In other words, it may be difficult to teach socio-emotional skills to a sick child. Third, as a corollary of the last point, certain investments may affect both health and skill stocks. For example, antimalarial treatment will certainly improve a child’s health if she is sick with malaria, but it may also have indirect impacts on cognitive function and other capabilities.

Finally, inherent in the capital-like dynamics of the model is the idea that health and skill stocks are linked over time, and the extent of this linkage depends on the way in which particular stocks and investments interact (and potentially how this interaction changes over the course of childhood). If, for example, investments have the highest returns for children with higher endowments then children with low initial stocks may find it difficult or impossible to catch up to their better-endowed peers, despite consistent targeted investments. On the other hand, if early remediation of poor endowments is possible, then catch-up should also be possible.
4.1 Policy Implications

The theoretical framework described above is important because it gives us a lens through which to evaluate policies for early childhood development in attempt to target the highest-impact interventions. Implicit in our discussion is a motivation to reduce inequalities that stem from health and human capital formation in childhood. This entails implementing policies that remediate outcomes for disadvantaged children as well as protect against further disadvantage. Several significant lessons emerge from this framework.

4.2 Timing Matters

The evolution of stocks plays a central role in the model. The fact that one period’s “outputs” of health and skills are taken as the next period’s “inputs” generates the potential for long-run consequences of temporary investments or one-time shocks. For the purposes of policymaking, it is therefore critical to understand how much investments matter at different points in time in this model, because their impact determines the long-run returns to intervention. In particular, we would like to know when children with low stocks of health and skills are most receptive to investments.

While we still have much to learn about these parameters, recent research has made some significant strides, combining detailed data on many dimensions of stocks of health and skills over time with rigorous structural estimation techniques (Cunha, Heckman and Schennach, 2010; Heckman and Mosso, 2014). This research shows that there are substantial differences in the way in which stocks and investments interact at different ages. In particular, very early in life, say from ages 0 to 2, investments and stocks of health and human capital are highly substitutable. That is, if a child is disadvantaged at birth, or faces a large shock early in life, it is relatively “easy” to remedy the disadvantage. Later in childhood, however, stocks and investments become less substitutable, or even complementary to each other, within a given time period; that is, beginning at some point in childhood, skill starts to beget skill. This is especially true for cognitive capabilities. Therefore, even if investing in disadvantaged adolescents is ethically desirable, it may be highly inefficient economically.

Perhaps the easiest way to understand this set of results is through an example. An attentive care provider may be able to ameliorate cognitive disadvantage for a very young child by providing intensive time inputs, a specialized curriculum, and material resources like toys and play activities, while even a very high quality teacher may not have the same effect on a teenager who has done poorly in school throughout her life. Put another way, later in childhood, high-quality inputs might best serve those with high baseline abilities.

This changing extent of substitutability over childhood suggests two crucial lessons related to timing: to remediate disadvantage, the highest return investments are those made very early in life, and investments late in childhood are more productive if the stocks of health and skills are already higher. The latter insight implies a “dynamic complementarity” between early and late investments: the greater the level of early investment (and thus the larger the early stocks of health and skills), the more productive later investments become.
4.3 Crowd-Out and Complementarity in Investments

There are likely many potential policy levers focused on early childhood development at a government’s disposal. What subset of these is most appropriate for a given population is a question that the theory is largely silent about. But one insight regarding multiple interventions that does come from the model is the potential for both crowd-out and complementarity.

Crowd-out implies that in a given period, investments that act in very similar ways on the same dimensions of the human capital stock are likely to substitute for one another.

There is some empirical evidence to back up this idea. For example, Rossin-Slater and Wust (2015) study the long-term impacts of two early life programs in Denmark: high-quality preschool childcare and home visitation by a trained nurse. The researchers find that the two programs, intervening at slightly different times in the child’s early life (infancy and around age 3), effectively act as substitutes for one other in terms of generating positive long-term outcomes such as educational attainment and family income. Adhvaryu et al (2015) and Gunnsteinsson et al (2014) find strikingly similar results among much poorer populations in Mexico and Bangladesh, respectively.

On the other hand, complementary suggests that investments that act to augment human capital stocks in different ways may have stronger effects when deployed together than they would have in isolation. There are two remarkable recent examples of this from settings that couldn’t be more disparate: 19th-century Boston and present-day rural India. Alsan and Goldin (2015) examine the impacts of water and sewerage infrastructure in historic Boston. They find that changes in clean water and sewerage infrastructure alone had no effect on infant mortality rates (which, in the late 1800s, were comparable to present-day developing countries). But in parts of Boston that happened to get both interventions, there was a marked impact on mortality, suggesting that the two interventions were highly complementary. Duflo et al (2015) produced similar evidence of improvements in diarrheal disease from an evaluation of an integrated water and sanitation improvement program in rural Odisha, which offered piped water as well as latrines to village households.

4.4 Parental Involvement

Thus far, we have focused on how the stocks of health and human capital evolve over time as they face shocks, depreciate, and are augmented via investments. While the first two factors – shocks and depreciation – may be considered exogenous (out of the control of children and other relevant decision-makers), the last factor, investment, is certainly endogenous: how much parents, communities, and governments invest in children is an active decision, likely governed by preferences, budget constraints, characteristics of the child, local economic opportunities, and prevailing cultural norms (Becker and Lewis, 1973; Rosenzweig and Schultz, 1983; Behrman, 1997).

Parents – mothers in particular – are often the primary caretakers of infants and young children and thus play a pivotal role in children’s early lives (Adhvaryu and Nysshadham, 2014; Almond and Mazumder, 2013). Accordingly, they act both as a source of investment of time and material resources as well as an important mediator of other investments. For example, parents decide how much time to devote each day to
their children; how much and what to feed them; how much to spend on preventative and curative health care; whether and how early to enroll them in school; how much after-school tutoring they receive; and a whole host of other decisions, which, when aggregated, determine the level of total investment in the child. In many cases, parents also determine access to, and the effectiveness of, community or government programming aimed at helping children.

With some care, the theoretical framework laid out previously can be expanded to allow for such investment decisions to be analyzed. This extended theory links parental preferences and budget constraints to the amount they choose to invest in their children, and ultimately to the stocks of child health and human capital on which we have focused in this section. The main lesson to emerge from this model of parental decision-making and the empirical studies that aim to test its predictions is that, depending on the context, parents can both augment and undo the impacts of interventions targeting children (Almond and Mazumder, 2013). Though the evidence is mixed, studies in low-income settings tend to demonstrate a propensity to reinforce interventions with additional parental investment (Adhvaryu and Nyshadham, 2014; Adhvaryu, Fenske and Nyshadham, 2014; Datar, Kilburn and Loughran, 2010; Grantham-Mcgregor et al, 1991 and 1997), while studies in higher-income settings generally reveal the opposite (Bharadwaj, Eberhard and Nielson, 2014). The reinforcing or compensatory effects need to be accounted for to understand the full impacts of policies targeting disadvantaged children in each particular setting.

5. Evidence on Early Childhood Development Programming

This section provides a summary of effective interventions shown to reduce infant mortality, combat malnutrition and promote child development. The key takeaways from this section are twofold. First, while interventions such as micronutrient supplementation, improving food security, and strengthening public health infrastructure are essential in the continuing fight against childhood mortality and malnutrition, we emphasize the importance of a role for stimulation and home visitation, which have been shown to be effective along with traditional malnutrition-based interventions in improving child development. Second, the delivery of these interventions is crucial. While there is plenty of evidence on “what works” with regard to improving child health and development, it is important to note what works in the lab or in theory might not work in real life. With that in mind, we can broadly think of problems of take-up or lack of effectiveness of proven theories as coming from demand or supply side constraints. In this sense, the problems nations face in improving early childhood health are not entirely different from challenges in improving education; hence, understanding the role of market failures in terms of supply and demand is crucial to make progress in this arena.

Given our earlier findings on the immense heterogeneity in health outcomes across states and even districts within states, it should be noted that it is inadvisable to impose a “one size fits all” policy when it comes to improving early childhood health. Further, as section 2 points out, the timing of these interventions is crucial for maximum efficacy. Therefore, if policymakers want the highest return on their investments, it is important to target policies in the most vulnerable places, and for children in specific age groups. Finally, policies are rarely evaluated at scale and those in
the early childhood health space are no exception. These are salient issues to keep in mind when considering what policies to create, how and when to implement them, and what the effects of these policies might look like when scaled up in the long run. In this section, we first review the evidence about what works for child physical health and overall child development (cognitive and non-cognitive aspects) before addressing implementation and take-up issues.8

5.1 Child Survival and Physical Health

While India has made strides in reducing infant mortality over the last few decades, neighboring countries like Sri Lanka and China still lose far fewer children in the first year of life. In fact, Sri Lanka and China’s infant mortality rate (IMR) in 2014 (8.4 and 9.2 per 1,000 live births respectively) is less than that of the average IMR in high-income, non-OECD countries (10.2). In India, as is true around the world, a significant portion of deaths under the age of 5 is driven by neonatal mortality (death within the first month of life). This is important as the causes of neonatal and infant mortality can be quite variable, leading to different policy prescriptions. For example, recent work by Chen, Oster and Williams (2016) finds that while the US lags behind other developed nations in infant mortality, it actually has an advantage in terms of neonatal mortality. Such findings lead to sharper policy prescriptions, which rely on detailed analyses of the causes of neonatal and infant/child mortality.

However, since most deaths in India do not occur at a hospital, obtaining reliable information and representative data on cause of death overtime has been challenging. A study published in The Lancet in 2010 (Million Death Study Collaborators, 2010) provides some of the first analyses of neonatal cause of death by using nationally representative data collected as part of the Sample Registration System, covering about 1.1 million homes in India. According to this study, the top three causes of neonatal mortality in India, explaining about 78% of all deaths within the first month of life, were a) prematurity and low birth weight, b) neonatal infections, and c) birth asphyxia and trauma. For deaths occurring after the first month of life and before 60 months, the main causes (explaining about 50% of deaths) were pneumonia and diarrheal diseases. Each of these five causes are eminently preventable. As the study concludes, “our results suggest that almost half of India’s neonatal deaths are caused by birth asphyxia and birth trauma, sepsis, pneumonia and tetanus – conditions that can be avoided by increases in delivery care and postnatal care.”

Darmstadt et al (2005) conducts a review of interventions that demonstrate strong evidence for reducing neonatal deaths. Examples of such interventions include folic acid supplementation, clean delivery practices, food supplementation, kangaroo mother care for low birth weight infants, and vaccinations. There is ample support that these individual interventions work: for example, a meta-analysis of studies that examine the efficacy of the tetanus toxoid immunization (aimed at lowering deaths due to neonatal infections) found that two properly timed doses for pregnant women can reduce neonatal deaths by a staggering 94% (Blencowe et al, 2010). In a Lancet review,

8 One important caveat to the discussion below is that many aspects of a child's environment matter for child health and development; given space constraints, we cannot review them all thoroughly. For example, our review does not focus on issues like women's education, empowerment, and domestic violence.
Black et al (2008) focuses on the link between maternal and child nutrition, and mortality. They find effective interventions to include promotion of breastfeeding, micronutrient supplementation (including multiple instances of micronutrient supplementation during pregnancy), and food supplementation for populations with insufficient food. Studies suggest pregnant mothers and young children particularly benefit from increased protein intake (Stevens et al, 2015; Puentes et al, 2014). Supplementary nutrition for women and infants in the US (the WIC program) has been shown to be effective in decreasing the incidence of low birth weight, especially among vulnerable populations (Bitler and Currie, 2004). It's also clear that improving health facilities, and access to facilities, can help with child survival. Access to high-quality medical care such as neonatal intensive care units has been found to reduce neonatal and infant deaths among a subset of extremely vulnerable infants in many countries (Almond et al, 2010; Bharadwaj, Loken and Neilson, 2013).

We next move on to a predominant cause of death during childhood, diarrheal diseases. One of the most effective ways to curb this disease is to provide access to clean water and waste management. In developing countries, the burden of diarrheal disease is often the greatest in urban areas, whereas problems like food insecurity and lack of antenatal care tend to be more prominent in rural areas. The centerpiece of the fight against diarrheal deaths in the developing world (including India) currently is the use of Oral Rehydration Therapy (ORT) with Oral Rehydration Salts (ORS), along with exclusive breastfeeding and zinc supplementation. While knowledge of ORT with ORS is high in India, effective use is still low (Lakshminarayanan and Jayalakshmy, 2015).

However, preventing diarrhea from occurring in the first place should be the underlying policy goal. Infrastructure investments by the government to combat open defecation would likely yield high returns by lowering the burden of this disease. Such investments would not only decrease diarrheal deaths but might also reduce the incidence of stunting (Spears, Ghosh and Cumming, 2013). While the provision of clean water is a major part of the fight against diarrhea (a meta-analysis by Fewtrell et al (2005) finds water quality interventions to be incredibly important), sewage systems in urban areas can be complementary in reducing infant mortality. A recent study by Alsan and Goldin (2016) concluded that a combination of clean water and sewerage provision dramatically reduced infant mortality in Massachusetts between 1880 and 1915. However, it's important to note that simply increasing investments in public health infrastructure alone cannot be the solution. Building toilets and sewers is obviously crucial, but if children are not informed about the importance of behaviors like washing their hands after using a toilet, the returns to these basic investments will fall short. Thus, developments in infrastructure and access to clean water need to be coupled with campaigns such as Global Hand Washing Day to have the most impact.

While there are undoubtedly short-term benefits to these interventions in terms of child health and reductions in mortality, studies have also considered their long-run effects. Research in economics has looked at the long-term impacts of micronutrient supplementation, strengthening food security, and access to advanced health facilities. Two examples of the long-lasting impacts of micronutrients come from Adhvaryu et al (2014) and Gunnsteinsson et al (2014). The first found that exposure to iodine in the form of iodized salt in the 1930s led to increased educational attainment and better labor market outcomes in the United States. The second study discovered that exposure to vitamin A supplementation for infants in Bangladesh reduced the risk of harm done
by exposure to such environmental events as typhoons. This is an important result since developing countries like India tend to also suffer disproportionately from climate- and environment-related shocks. With regard to supplemental feeding programs, Hoynes, Schanzenbach and Almond (2016) as well as Aizer et al (2014) found positive impacts of safety-net programs such as food stamps and welfare payments in the US on later-life health and labor market outcomes. Finally, Bharadwaj, Loken and Neilson (2013) showed that access to neonatal intensive care units in Chile and Norway increased cognitive performance in school many years later.

Conditional on surviving the early years, one of the most pervasive problems facing many developing countries, and India in particular, is the issue of childhood malnutrition often measured by stunting (height for age below 2 SD). Stunting and its correlates (apart from mortality, which we already mentioned above) are well studied – it is associated with lower cognitive abilities (Lewit and Kerrebrock, 1997), is a likely driver of later-life obesity and related diseases (Eckhardt, 2006), and it might increase malaria-related deaths (Shankar, 2000). Nearly half of all Indian children under age 5 are estimated to be stunted (UNICEF). Many of the strategies outlined previously like supplemental and complementary feeding, vitamin supplementation, and lowering the burden of diseases like diarrhea are also thought to be effective in combating stunting (Bhutta et al, 2008).

5.2 Child Development

While micronutrients, supplemental feeding, and investments in public health infrastructure are all important tools in the fight against childhood mortality and malnutrition, it’s also essential to focus on overall child development as measured by the inter-related domains of cognitive-language, sensory-motor, and social-emotional skills and capabilities. As section 1 points out, we know less about where childhood cognitive disparities lie in Indian populations, but they are likely correlated with disparities in mortality. A Lancet series on early childhood development identifies four important risk factors among children under age 5 in Least Developed Countries (LDCs) (some of which are also risk factors for mortality): stunting, inadequate cognitive stimulation, iodine deficiency and iron deficiency, or anemia (Grantham-McGregor et al, 2007). Hence, there is considerable overlap between factors that matter for neonatal and child survival and those that affect child development (conditional on survival). Engle et al (2007) discuss evidence on how interventions that reduce malnutrition, iodine deficiency, and iron deficiency improve behavior, cognitive skills, and motor development. In this subsection, we therefore focus on strategies that have been shown to work for improving a child’s cognitive and non-cognitive skills, but are not directly aimed at decreasing malnutrition and micronutrient deficiency.

The best-known example of such studies focused on developing countries is the Jamaica experiment (Grantham-McGregor et al, 1991). The Jamaica intervention randomized 129 stunted Jamaican children between the ages of 9 and 24 months into three treatment arms and a control group. The treatments were: a) psychosocial stimulation, b) nutritional supplementation, and c) both psychosocial and nutritional supplementation. Working with community health workers, the psychosocial component comprised weekly one-hour play sessions at home, which lasted two years. The main idea behind the play sessions was to improve the quality of time that mothers spent with their children. The broad set of results from multiple papers that analyze the
short- and long-run consequences of the Jamaica intervention agree that stimulation, and stimulation plus nutritional supplementation, are most important for realizing long-term gains in cognitive functioning (Grantham-McGregor, 1994; Grantham-McGregor, 1997; Gertler et al, 2013). Perhaps the most important insight from these studies is that nutritional supplementation alone is not effective in helping children build skills. In fact, a 20-year follow up of the original program participants by Gertler et al (2013) found that on average, participants who received the stimulation intervention had 42%-higher earnings later in life.

The results from the Jamaica intervention align with several other papers, including a review by Baker-Heningham and Boo (2010) of over 25 studies in low- and middle-income countries that focus on early childhood stimulation through parenting interventions. The authors concluded: “early stimulation interventions are effective in improving child and maternal outcomes and these benefits are likely to be sustained over the long term.” This sentiment is again echoed in an excellent review by Schodt et al (2015) of interventions largely focusing on home visitation programs in Latin America.

While high-quality early childhood interventions have shown promising results in developing countries, some of the best evidence on this front actually comes from the developed world. The most well-studied intervention shown to have an impact on labor market (and other) outcomes is the Perry Preschool Project (Heckman et al (2010)). The Perry Preschool Project was an early childhood education initiative targeting disadvantaged African-American youth in Ypsilanti, Michigan in the 1960s. The program – which started with 3-year-old children and lasted for two years – consisted of a two-and-a-half-hour preschool session on weekdays that focused on supporting a child’s cognitive and socio-emotional skills. This was supplemented by weekly home visits by teachers. While many studies estimate the rate of return of this program, Heckman et al (2010) computes the impact using various econometric techniques that account for some of the compromises that occurred in the randomization protocol. Taking these into account, the rate of return is estimated to be between 7% and 10%. This rate of return includes not just the labor market return, but also the gains from access to this program on better health and reduced involvement in crime much later in life. Other studies of early childhood interventions in developed nations also find large benefits. (See the Nurse Family Partnership Program (Olds, 2006); Chicago Child-Parent Study (Reynolds et al, 2001 and 2002); Head Start (Currie and Thomas, 1995; Garces, Thomas and Currie, 2002); and the Abecedarian Program (Barnett and Masse, 2007). While these interventions differ in terms of the target population, the specifics of the interventions, and, importantly, in the age of enrollment and length of intervention, the broad thrust from these studies is that stimulation-based interventions in early childhood have very high returns.

5.3 Delivery of Interventions

While many of the above interventions have proven powerful in improving child health and development, it is important to keep in mind the challenges of implementing initiatives in the field. This is a salient issue in developing countries in particular, where multiple market failures may pose barriers to the take-up of what could be a very effective intervention.
A telling example of the failure to adopt effective technology due to sub-optimal distribution policy comes from Adhvaryu (2014). Adhvaryu studies the take-up of artemisinin-based malaria therapy (effective in helping children and adults recover faster from malaria) in Tanzania and finds that while adoption is initially high, there is a steep dropoff two years after introduction. One of the major reasons for the decline appears to be misinformation about the effectiveness of ATC, perpetuated by misdiagnosis at the primary health care center. Hence, while effective in combating malaria, ATC was perceived by villagers to be less useful, perhaps since it was prescribed even when children and adults did not have malaria. Another example in the case of malaria is the low take-up of mosquito nets. While bed nets have obvious benefits, adoption has remained problematic. Dupas (2015) finds that short-run subsidies for bed nets promote long-term adoption, since subsidies allow individuals to learn about the product. A similar study in India by Tarozzi et al (2014) involves microloans to promote the adoption of insecticide-treated bed nets. The research reports increased take-up, though the effects on health are mixed, likely due to low overall usage of the nets.

Further, consider the case of double-fortified salt. While the intervention seems rather simple – to fortify salt with iodine and iron (which directly tackles anemia, a major problem for children and women in India) – fortification alone neither guarantees take-up nor improved health outcomes. Banerjee, Barnhardt and Duflo (2015) find that promoting the use of double-fortified salt through the use of information and incentives to sellers dramatically increases consumption in Bihar. Yet, in a separate paper (Banerjee, Barnhardt and Duflo, 2016), increased consumption of fortified salt does not lead to better health outcomes. Therefore, even improved take-up, resulting from efforts like providing fortified salt for free, or through seller incentives does not solve complex problems such as anemia. In contrast, Thomas et al (2006) notes large positive impacts of direct iron supplementation (iron tablets distributed by a local health worker) and excellent compliance with the supplementation protocol. One of the reasons Banerjee, Barnhardt and Duflo’s (2016) results may differ is due to the lower dosage of iron that is delivered through double fortification. Similar cautionary tales about “effective” health technology confronting take-up problems in the field appear in studies about cook stoves aimed at reducing indoor air pollution (Miller and Mobarak, 2014; Hanna, Duflo and Greenstone, 2016). In short, what works in the lab does not necessarily work in the field since take-up of new technologies is often a matter of learning, preferences, incentives, and costs. Understanding proper delivery of effective technologies is crucial to make progress on these issues.

5.4 Potential in the Indian Context

The examples we’ve focused on not only show policymakers what works but also why one should care about what works. From a policy perspective, it is useful to think about supply and demand issues for the delivery of effective early childhood investments. One broad approach to increasing the demand for health services is the use of conditional cash transfers. There is ample evidence from various developing countries that conditional cash transfers improve the take-up of preventive health services (Lagarde, Haines and Palmer, 2007) and result in better child health (Gertler, 2004). An excellent example of the role of cash transfers comes from Macours, Schady and Vakis (2008), which studies a large cash transfer program in Nicaragua and finds
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Dramatic improvements in child development among the treated households. The findings suggest that the improvements in cognitive development are not due to the cash aspect of the program alone; the treated children are also more likely to receive stimulation at home. Such behavioral changes can have long-term impacts, even after the cash program ends. Banerjee, Duflo, Glenester and Kothari (2016) examine the role of conditional transfers in the take-up of immunization in India. They show that while improving the reliability of immunization camps improves attendance, coupling this reliability with small non-financial incentives nearly doubles the take-up. This is an important finding since it showcases how both demand- and supply-side constraints are extremely important in improving take-up of health services.

India has experimented with many cash transfers. In multiple studies of the Janani Surakhsha Yojana (JSY), a large conditional cash transfer program aimed at increasing deliveries in institutions rather than at home, researchers have found increased take-up (institutional delivery) but conflicting evidence on health measures like infant mortality and maternal mortality (Randive, Diwan and De Costa, 2013; Lim et al 2010; Das, Rao and Hagopian, 2011; Powell-Jackson, Mazumdar and Mills, 2015). In fact, the JSY provides a perfect case study for why careful policy evaluation is essential before implementing an intervention at scale. The JSY is one of the largest conditional cash transfer programs in the world given its scope, but its roll-out and lack of precise data on outcomes before and after threatens the reliability of results. Studies have to rely on quasi-experimental methods and while this can be an effective tool, the results can be sensitive to identification assumptions and it is harder to get at mechanisms and deeper issues about implementation under quasi-experimental methods. While cash transfers are popular for other health-related goals in India (especially to promote gender equality through programs like Apni Beti Apna Dhan, Dhanlakshmi, and Devi Rupak), as the literature suggests, their evaluations often result in mixed findings regarding effectiveness (Sinha and Yoong, 2009; Anukriti, 2014). Careful implementation and sound evaluation is crucial before implementing these schemes at scale.

As discussed, cash transfers may be an important demand-side component. On the supply side, Darmstadt et al. (2005) emphasizes the delivery of antenatal and postnatal care through family-community interventions. These are interventions wherein components of antenatal and post-natal care, such as home visitation, is provided by trained community health workers. The interventions can be thought of as providing a suite of treatments rather than any one specific treatment. In a follow-up Cochrane review, Lassi, Haider and Bhutta (2015) analyze 26 randomized and quasi-randomized studies on the effectiveness of such family-community interventions, including studies done in India, cite tremendous promise and recommend scaling up these types of interventions.

An important part of India’s community-based approach to health is the Accredited Social Health Activist (ASHA). ASHAs were formally included under the National Health Mission in 2005 and the current number of ASHAs is around 860,000 (Ministry of Family Health and Welfare, India 2015). Despite the emphasis on ASHAs, there has been little rigorous research done on how best to improve this network. Recent work in economics has emphasized the recruitment of and incentives for government workers (Ashraf, Bandiera and Lee, 2014; Dal Bo, Finan and Rossi, 2013; Muralidharan and Sundararaman, 2011; Das et al 2015) in addition to incentives for
communities as a whole (PNPM Generasi). For example, Dal Bo, Finan and Rossi (2013) discovered that offering a higher wage attracts not only more qualified people to the government sector but also the most motivated to engage in public service. An in-depth evaluation of the PNPM Generasi program in Indonesia found that using incentivized block grants was crucial in improving health indicators among young children and pregnant mothers. One of the key features of the Generasi program was the training of community health workers, which could have played an important role in improving health outcomes. In addition, the communities got to choose how they would improve on a pre-selected set of target health indicators. Given the heterogeneity in health outcomes in India highlighted in section 2, allowing communities to choose how to focus grants might be an important step forward.

Our stance is that research on the recruitment and incentive structures for ASHAS, as well as understanding whether mothers demand and trust information given by ASHAS, would be incredibly useful in making policy decisions regarding how best to improve the functioning and service delivery of ASHAS. Improving neonatal and infant mortality requires a multi-pronged approach, but understanding the demand for and raising the quality and quantity of service delivery seems to be of great importance.

The Integrated Child Development Service (ICDS) is India’s flagship program that has the potential to deliver high-quality child health and development services. The frontrunner of these services is the anganwadi center (AWCs). While an entire suite of early childhood services is provided at anganwadi centers, the focus of this institution has largely been on supplemental nutrition, immunization, and other basic health and early preschool education needs. There is also clear potential to use AWCs as delivery centers for high-quality early childhood stimulation programs. However, a report by the planning commission on the effectiveness of ICDS on key health outcomes says, “conclusive evidence of positive impact of ICDS is not available” (Planning Commission 2011). Furthermore, while early childhood care and education (ECCE) received national attention due to the Constitution Act of 2002, the programs which were established and how these programs are delivered or monitored is highly variable. While many agencies at the national and state level provide ECCE services, a report by the Ministry of Women and Child Development states, “there is no reliable data available about the actual number of children attending ECCE provisions and their breakup as per delivery of services/type of services.” For a program like ICDS that has been in place since 1975 and whose budget in the 2014-15 year was nearly US$2.2 billion, the lack of rigorous evaluations is a serious concern.

Similarly, while having immense potential, another important policy – the Rajiv Gandhi National Creche Scheme for the Children of Working Mothers (RGNCS) – may not have proper evaluation processes in place. The RGNCS aims to provide precisely the types of services that we know work from other settings such as early stimulation for children under age 3, supplementary feeding, and growth monitoring. According to the website of the Ministry of Women and Child Development, there are currently more than 21,000 of such centers across India, and the program had a total budget allocation of just US$15 million in 2014-15. Considering that the number of births per year in India is around 27 million, even if only a tenth of infants and children needed services, the budget would only include about six cents per child per day. Since services such as stimulation typically last more than a year, the financial allocations for these kinds of services are woefully low. In an excellent review of various child protection and child health programs in India, Das and Kundu (2014) report that only 0.02% of the total
Union Budget is allocated to services that can be classified as “care and protection” for children – this includes schemes such as the RGNCS, Dhanlakshmi, and Integrated Child Protection Scheme.

Perhaps unsurprising then, a report by the Planning Commission in 2013 finds that these centers have low-quality infrastructure and training of crèche helpers as well as an inadequate flow of funds. The report, however, contains no information about whether the crèche program actually leads to greater child skills, nutrition, and the like. While documenting process is crucial and something that routinely seems to be done for such programs, recording impact is just as important. Multiple examples from the education sector have shown that typical inputs like infrastructure and teacher pay are not always causally related with improved performance of students (Glewwe and Kremer, 2006).

While studies such as the Jamaica intervention detailed above reveal the incredible promise of investing early in children, these programs have largely not been scaled up in developing countries. Universal pre-K programs contain some of the same services. Several have been successful (Gormley et al. 2005) whereas others have shown mixed results in developed and developing countries (Blanden et al., 2016; Baker and Milligan, 2008; Bernal and Fernandez, 2013; Berlinski, Galiani and Manacorda, 2009; Bernal and Fernandez, 2013; Rosero and Oosterbeek, 2011). Ongoing research is imperative for future policymaking in this area. A version of the Jamaica program has been replicated by researchers in Colombia with scale in mind (Attanasio et al., 2015). This was achieved by training local female leaders who were already part of one of the largest welfare programs in the country. In the short term, the study finds impressive gains in cognition and receptive language among children. This program is now being tested in Odisha, relying on the ICDS network for delivery. While scaled-up interventions sound promising, a recent article by Attanasio, Cattan and Krutikova (2016) identifies key challenges in this process: a) adapting programs to local contexts, b) ensuring quality of provision, and c) continued investment at later ages in childhood. The results from the Odisha study will be a good starting point for thinking about bringing high-quality early childhood stimulation programs up to scale in India. In a similar vein, Jed Friedman and co-authors from the World Bank and IFPRI are working on an evaluation of adding one additional anganwadi worker to anganwadi centers. Experimental analyses of such programs is essential moving forward.

Budgets for child development in India absolutely need to be increased, but rigorous evaluations of what works in programs like ICDS and RGNCS must also be part of the equation. Analysts should also carefully consider the consequences of scaled-up programs and the possibility of overlap with other ECD or household interventions (such as MNREGA). For example, does the work of RGNCS crowd out what ASHAs do or affect whether a child goes to an AWC? Are households that get MNREGA benefits more or less likely to take advantage of these schemes? It’s these kinds of thoughtful questions that could have a real impact on Indian children.

6. Conclusion

There is growing consensus among researchers in economics, epidemiology, sociology and a host of other disciplines that investing in children early in childhood has large, persistent returns to health and economic wellbeing. India has made significant
progress in terms of reducing infant and child mortality, and malnutrition in the past three decades; while there is much more to be done in terms of improving these basic measures of child health, we urge policy makers to take seriously the idea that focusing on overall child development, measured by socio-emotional and gross motor skills, is crucial. As we emphasize in this piece, pairing nutritional supplementation with stimulation/cognitive interventions have been shown to be much more effective in raising development measures than nutritional interventions alone.

From a policy perspective, it is extremely important to consider how these interventions are delivered. We note many examples of theoretically sound and field tested interventions failing when implemented at scale. The delivery of child development interventions is no less complicated than the delivery of basic educational services; yet, research is severely lacking on how governments in developing countries can best provide these crucial services. While India has the basic ingredients needed to competently deliver child development services, policy makers ought to consider field-testing and rigorously evaluating the various schemes they implement. For example, the ASHA program, the National Creche Scheme, and other conditional cash transfers aimed at improving child development should be implemented with a view to first evaluating and then scaling up. The anganwadi program is another example of an excellent vehicle that can deliver high quality child development services; yet, there is very little by way of gold standard evaluations that one can point to in terms of understanding whether these centers are working efficiently.

There are two main takeaways from this article that we urge policy makers to consider. First, focus on further improving basic child health through interventions aimed at reducing malnutrition and infant mortality, but begin to focus as well on stimulation and home visitation programs. Second, while there is immense potential to deliver these interventions through ASHAs, anganwadi centers, and crèche schemes, there have to be rigorous empirical evaluations that inform how best to improve their functioning.

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