

Key Investments to Build the Foundations of Human Capital

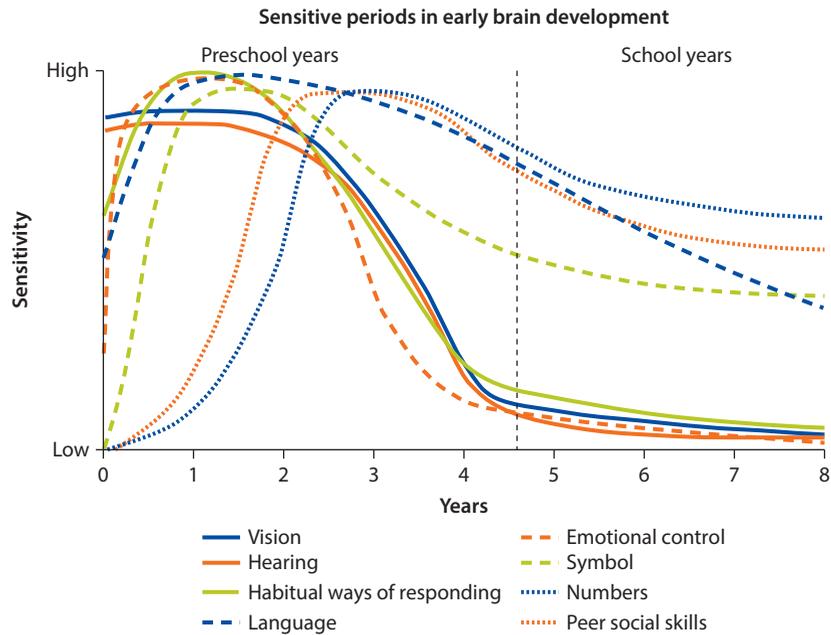
Abstract

The foundations of human capital are set early in life, with long-lasting effects in adulthood and in the next generation. Investing early in health, nutrition, early childhood development, and basic education helps to set those foundations and thus yields high returns. Early investments are subject to fewer efficiency trade-offs, and the cognitive and psychosocial skills acquired in early life enable further strong health, learning, and full participation in society at a lower cost. Poverty and exposure to conflict are major risks in early life through the deprivations and stress they cause to children and adults. Cash transfers can sustain household consumption in the short run and the uptake of human development services, which may improve household welfare, in the long run. While some interventions show promising results at the pilot stage, scaling them up requires qualitative shifts, stronger coordination, and innovative delivery systems, entailing new partnerships between levels of government and with nonstate actors.

The Foundations of Human Capital

The New Evidence on Early Development

The period between the first few days of pregnancy and two years of life (the first 1,000 days) is intense for both physical and cognitive development. Children are expected to grow, on average, 50 centimeters in utero, 24 centimeters in their first year of life, and 12 centimeters in their second year, after which growth slows down until adolescence. Language, vision, and hearing start forming in the womb, and development peaks in the first two years. Some capabilities linked to social functioning, such as habitual responses and emotional control, are also in peak development in those 1,000 days (figure 4.1). During this period, children need good nutrition and become more sensitive to infections and biological programming.¹ At that time, they depend totally on others for nutrition, care, and

Figure 4.1 Early Brain Development Sets the Basis for Many Skills

Sources: Developed by the Council for Early Child Development (Early Years Study 1999; Nash 1997; National Research Council and Institute of Medicine 2000).

social interactions. For this reason, the environment that their caregivers provide is a key factor in their development.

During this period, malnutrition has multiple apparent and insidious consequences: it affects growth, morbidity, intelligence quotient (IQ)—type intelligence, and mortality.² Undernutrition translates into small-for-gestational-age, stunting (inadequate length or height-for-age, a symptom of chronic undernutrition), and wasting (inadequate weight-for-height, a symptom of acute undernutrition). Inadequate growth—the visible symptom—hides invisible symptoms, which include impaired brain development and immune system. Undernutrition can affect the hard-wiring of the brain, through malfunctions in the coating of the nerves (myelination) and the formation of connections between neural cells (synapses) (Yusuf 1992). Micronutrient deficiencies, linked to the quality of children’s diet, may affect development in other silent ways. Vitamin A deficiency can cause night blindness and is a risk factor for increased severity of infections, which leads to increased mortality. Vitamin B12 deficiency can cause involuntary muscle movements, apathy, and cerebral atrophy. Iron deficiency is associated with fetal and child growth failure, lower cognitive development in children (Georgieff 2007; Nyaradi and others 2013), lower physical activity and productivity in adults, and increased maternal mortality. Zinc deficiency is associated with stunting and higher incidences of diarrhea and pneumonia. Iodine deficiency affects cognitive development and reduces IQ. Joint effects of fetal growth restriction, suboptimum breastfeeding, stunting, wasting, and deficiencies

of vitamin A and zinc cause 45 percent of child deaths—3.1 million deaths annually, of which at least 1.5 million are in Africa (*The Lancet* 2008, 2013; Black and others 2013).

With cumulative exposure to developmental risks and shocks, including poverty, disparities widen and trajectories become more firmly divergent as children grow up. In Africa, children in poor families acquire cognitive skills more slowly than children in rich households, and the gap widens with age, which means that children from these groups do not start school on an equal footing (Filmer and Fox 2014). This slower acquisition (figure 4.2) results from poor nutrition, but also from poor stimulation and care, and has cumulative effects if no intervention takes place (similar patterns are found in other parts of the world, such as in Latin America and the Caribbean, as shown by Schady and others 2015). It is an important component of the intergenerational transmission of inequality (Torche 2011).

Conversely, a young brain is remarkably plastic and can repair itself after nutrient repletion during sensitive periods. Since rapid growth and brain development occur during the first 1,000 days, this period is particularly sensitive to deficiencies in diet, but also particularly responsive to interventions, such as the ones described in this chapter. Adolescence is also a sensitive and significant developmental period, with another bout of linear growth and of brain structural reorganization and cognitive maturation.

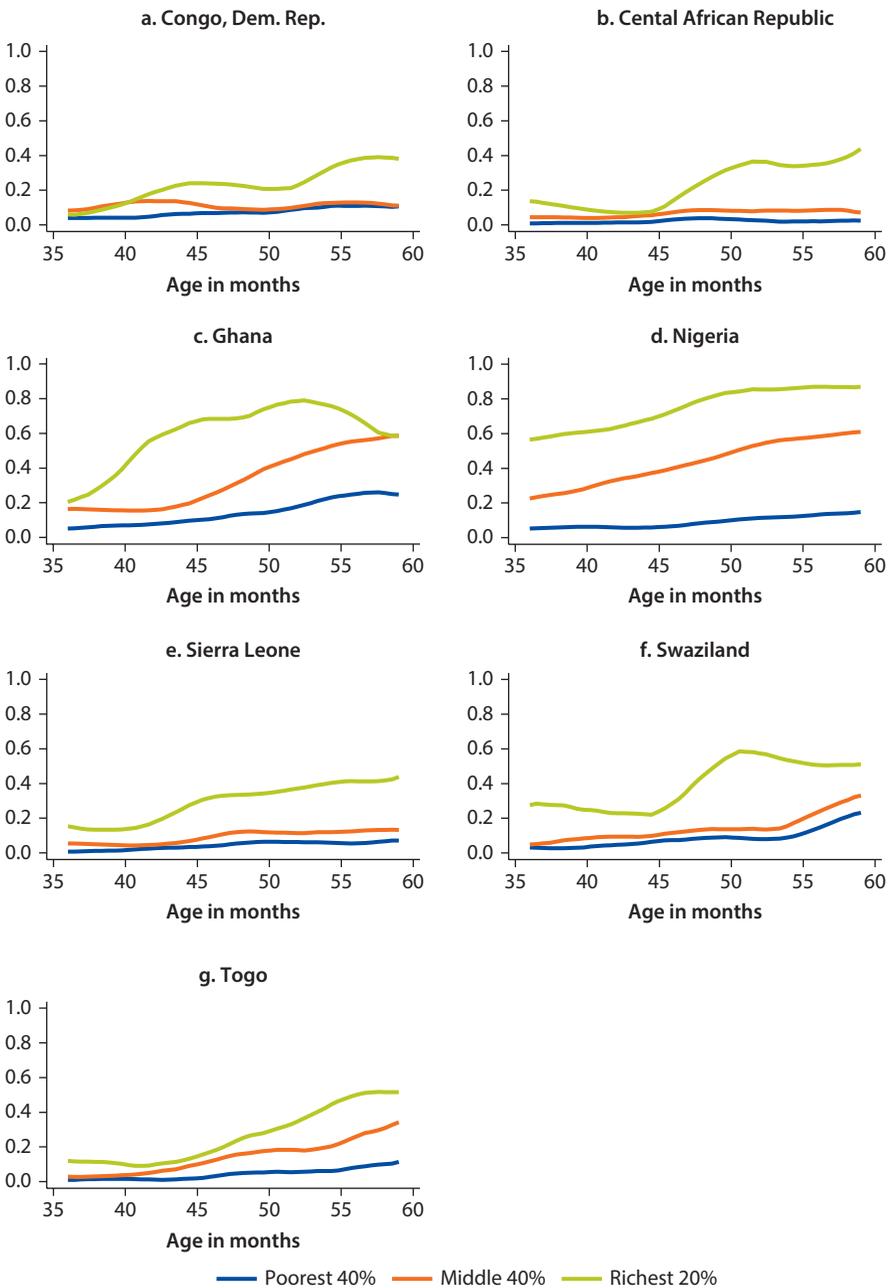
Early Life Conditions and Their Long-Term and Intergenerational Consequences

Early life conditions have a disproportionate influence on the formation of adult human capital, understood in terms of height, skills (cognitive, noncognitive), and capabilities (health, social functioning) (Friedman and Sturdy 2011; Victora and others 2010). Following retarded intrauterine growth, rapid growth falters in the first 24 months (figure 4.3). The rates in Africa and South Asia are particularly high, and limited catch-up occurs between ages 2 and 4. Cognitive ability, socioemotional competence, and sensory-motor development all affect school preparedness and subsequent school performance.

The nature–nurture interactions that shape human development start very early, and some risk factors that children face from conception are linked to the conditions that their families face. These risks include intrauterine growth restriction (11 percent of births) due to maternal malnutrition and stress, stunting (approximately one-third of children younger than 5 years of age), iron deficiency (one-fourth to one-third of children under age 4), and iodine deficiency (one-third of the population worldwide). Maternal depression (which affects one-sixth of postpartum mothers) can impair bonding between mother and infant (Bernard Van Leer Foundation, 2009). Inadequate cognitive stimulation also affects child development.

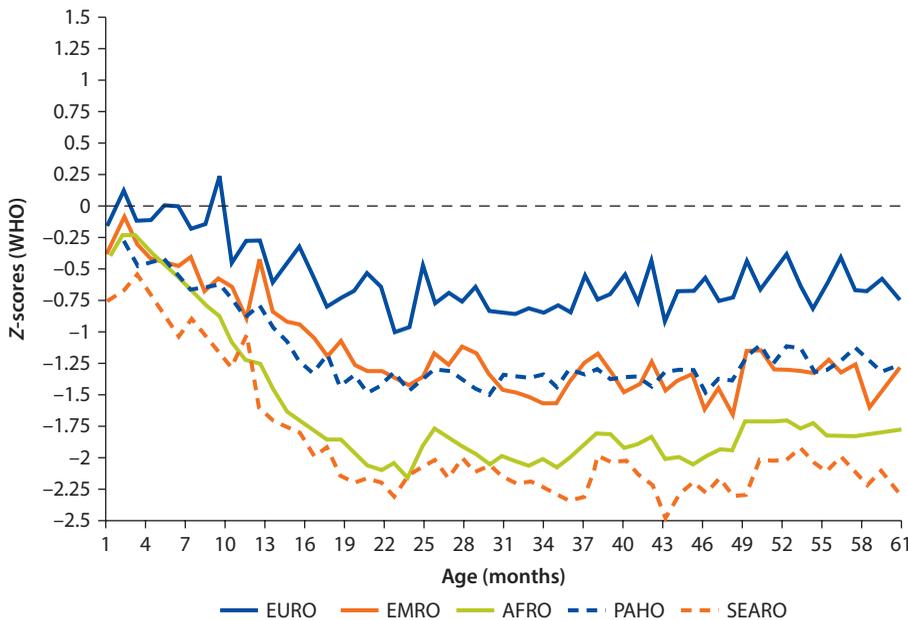
Evidence from Brazil, Guatemala, India, the Philippines, and South Africa (Victora and others 2008) shows that poor fetal growth or stunting in the first two years of life leads to irreversible damage, including shorter adult height,

Figure 4.2 Cognitive Skills Increase Slowly, Especially for the Poorest Children: Proportion of Children Who Can Carry Out Basic Cognitive Tasks



Source: Based on MICS 4 data.

Note: Panels show proportion of children who can perform two of the following three tasks: identify or name at least 10 letters of the alphabet; read at least four simple, popular words; know the name and recognize the symbols of the numbers from 1 to 10.

Figure 4.3 After 24 Months of Age, Stunted Children Have Little Catch-Up Growth

Source: Victora and others 2010.

Note: Mean height-for-age Z scores by age, relative to the World Health Organization standard, by region. EURO refers to the following countries in Europe and Central Asia: Armenia, Kazakhstan, Kyrgyzstan, Moldova, Mongolia, Montenegro, and Turkey; AMRO refers to the following countries in Latin America: Bolivia, Brazil, Colombia, Dominican Republic, Guatemala, Haiti, Honduras, Nicaragua, and Peru; EMRO refers to the following countries in Middle East and North Africa: Egypt, Jordan, Morocco, and Yemen; SEARO refers to the following countries in South and East Asia: Bangladesh, Cambodia, India, and Nepal; AFRO refers to the following countries in Africa: Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Comoros, Cote d'Ivoire, Congo, Eritrea, Ethiopia, Gabon, Ghana, Guinea, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Tanzania, Uganda, Zambia, and Zimbabwe.

lower schooling attainment, reduced adult income, and decreased birthweight of offspring. Children who are undernourished in the first two years of life and who put on weight rapidly later in childhood and in adolescence are at high risk of chronic diseases related to nutrition (high glucose concentrations and blood pressure, and harmful lipid profiles). However, rapid gain in weight or length in the first two years of life does not seem to increase the risk of chronic disease, even in children with poor fetal growth. Height-for-age at two years is the best predictor of human capital. Stunted children have poorer performance in school (reduction in test scores equivalent to two years of schooling). With the assumption that every year of schooling is equivalent to an increase of 9 percent in adult annual income, Grantham-McGregor and others (2007), *The Lancet* (2007, 2011) estimated a loss in adult income of between 22 and 30 percent. Women who were undernourished in infancy are more likely to face risky pregnancies and give birth to low-birthweight children.

Many aspects of fetal growth influence long-term health, and children who experienced malnutrition in utero and in their early years are also more at risk of chronic diseases, such as type 2 diabetes, abdominal obesity, hypertension,

and cardiovascular disease (Alderman 2011; Dover 2009; Torche 2011). For example, children in utero during the Dutch famine of 1944–45 have increased risk of chronic disease and mental illness in middle age and a greater loss of attention and cognitive ability than the general population as they age further. Children with fetal exposure to the Biafra famine of 1967–70 face increased risk of diabetes and hypertension. One possible explanation is linked with adaptation to nutritional stress in the womb (Barker hypothesis). The signal derived from limited nutrients in utero leads to an adaptation in which the child becomes particularly efficient at conserving resources. However, should that individual be subsequently confronted with a resource-rich environment, this maladapted response, or mismatch, would contribute to overnutrition and increased the risk of chronic disease.

While the long-term effects of growth failure are severe, interventions such as nutritional supplementation and basic medical care in the early years have a strong potential to improve outcomes over the life course. A long-run longitudinal study in Guatemala (Hoddinott and others 2011) provides additional evidence on the long-term effects of malnutrition, including on body size, adult fitness, wages, and type of employment (box 4.1). Participants who had received nutritional supplementation (a high-protein energy drink with multiple micronutrients) and free preventive and curative medical care (including community health workers, trained midwives, immunization, and deworming) were less likely to be stunted.

Box 4.1 The Consequences of Early Childhood Growth Failure over the Life Course in Guatemala

Growth failure in early life in rural Guatemala, as measured by height-for-age and stunting at 36 months, has potential effects on a wide range of domains in adulthood: education, marriage, fertility, health, wages and income, and poverty and consumption. Participants in a nutrition supplementation trial between 1969 and 1977 were interviewed again between 2002 and 2004.

Participants who were stunted at 36 months of age left school earlier and had lower grade attainment; they also had significantly worse results on tests of reading and vocabulary and nonverbal cognitive ability 35 years later. They made worse marriage matches—that is, they married people with lower schooling attainment. Women had 1.86 more pregnancies and were more likely to experience stillbirths and miscarriages. No link was found with greater risks of cardiovascular or other chronic disease.

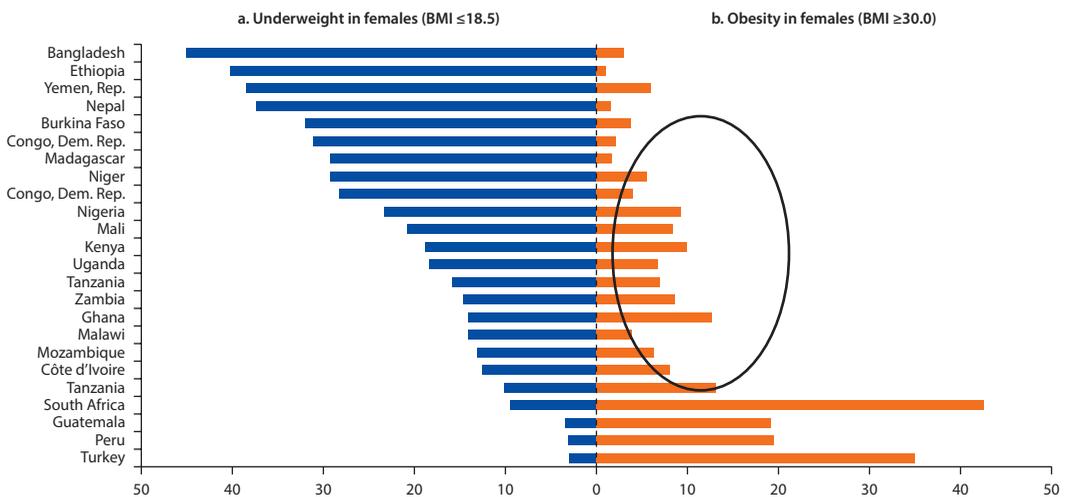
Individuals who were not stunted earned higher wages and were more likely to hold higher-paying skilled jobs or white-collar jobs. They were 34 percentage points less likely to live in a poor household. A 1 standard deviation increase in height-for-age was associated with an increase in men's hourly wage of 20 percent, an increase in women's likelihood of operating their own business of 10 percentage points, and an increase in per capita consumption of households where the participants lived of nearly 20 percent.

Sources: Hoddinott and others 2011, Calderón and Hoddinott 2011.

The double burden of malnutrition—coexistence of high rates of undernutrition and increasing rates of overweight and obesity—is becoming a public health problem in Africa. In many countries, obesity is rising faster than stunting is declining. Some children younger than 5 years of age are becoming overweight; more than 7 percent in Africa and up to 17 percent in Southern Africa (Provo 2013). Countries also are witnessing concurrent increases in being overweight and obesity with changes in dietary patterns linked to urbanization, especially among adolescent girls and women (figure 4.4) (Popkin, Adair, and Ng 2012; Kimani-Murage 2013, for rural South Africa; Keding and others 2013, for Tanzania; UNFPA 2014). In Ghana, in 2008, 9.3 percent of women were obese and 8.6 percent were underweight. In Tanzania, in 2014, 11.4 percent of women were obese and 10.4 percent were underweight. In both countries, obesity rates were higher in urban areas. Obesity in pregnancy may also threaten the welfare of the next generation, as maternal hyperglycemia or diabetes increases the risk of diabetes for their offspring. The double burden may exist within households, with obese mothers and undernourished children, especially in urban areas in Benin, Ghana, and South Africa (Maxwell and others 2000).

Similarly, early patterns of attachment and bonding are key for children to develop self-confidence, conflict resolution skills, and character traits such as conscientiousness, perseverance (being able to delay gratification), sociability (and empathy), and curiosity. These skills can be learned and reinforced, but they depend on the family and caregiving environment. Maternal depression, which leads to increased stress in utero and after birth, may increase anxiety in infants. Toxic stress, linked to poverty, affects family environment.³ Prolonged activation of the stress response systems can disrupt the development of brain architecture and other organ systems and increase the risk for stress-related disease and

Figure 4.4 Malnutrition Imposes a Double Burden



Source: WHO Global Database on Body Mass Index 2013. Data from the most recent year.

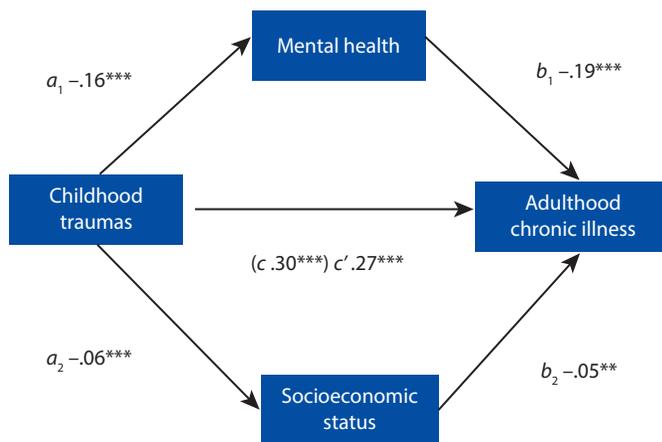
Note: BMI = body mass index.

cognitive impairment well into the adult years. Scarcity affects parenting attention (Banerjee and Mullanaithan 2008; Mullanaithan and Shafir 2013), quality of care, schooling decisions, and children’s capacity to learn. In Canada, childhood traumas are associated with adult chronic illness through poor immune functioning and poor cardiovascular and mental health; socioeconomic status functions as a potential buffer (Mock and Arai 2011; see figure 4.5). In Chile and Lebanon, Torche (2011) and Torche and Shwed (forthcoming) found that exposure to an earthquake and to bombings during the first semester of pregnancy is linked to a higher prevalence of low birthweight and cognitive impairment, especially in low-income families.

Character skills (“soft skills”)—such as conscientiousness, perseverance, sociability, and curiosity—are as important as pure cognitive skills to success at school and in the workplace. They rival IQ in predicting educational attainment, labor market success, health, and criminality. They can be acquired and modified with age and instruction. The foundation for these early skills (1) depends heavily on the quality of nurturing (Snellman, Silva, and Putnam 2015); and (2) provides the basis on which additional skills can be learned (Heckman and Kautz 2013). To succeed in society, people need both cognitive and character skills. While both are malleable to different degrees at different ages, inequalities among families in parenting and a lack of support for schoolchildren are key determinants of inequalities later in life.

Failure to develop those foundational skills is costly and difficult to compensate for later in life. It can lead to long-term, difficult-to-reverse effects on educational attainment, health, fertility, earnings, and engagement in risky activities and crime. These problems are costly for both individuals and society (Heckman

Figure 4.5 Childhood Trauma Is Associated with Chronic Illness in Adulthood and Mediated through Mental Health and Income



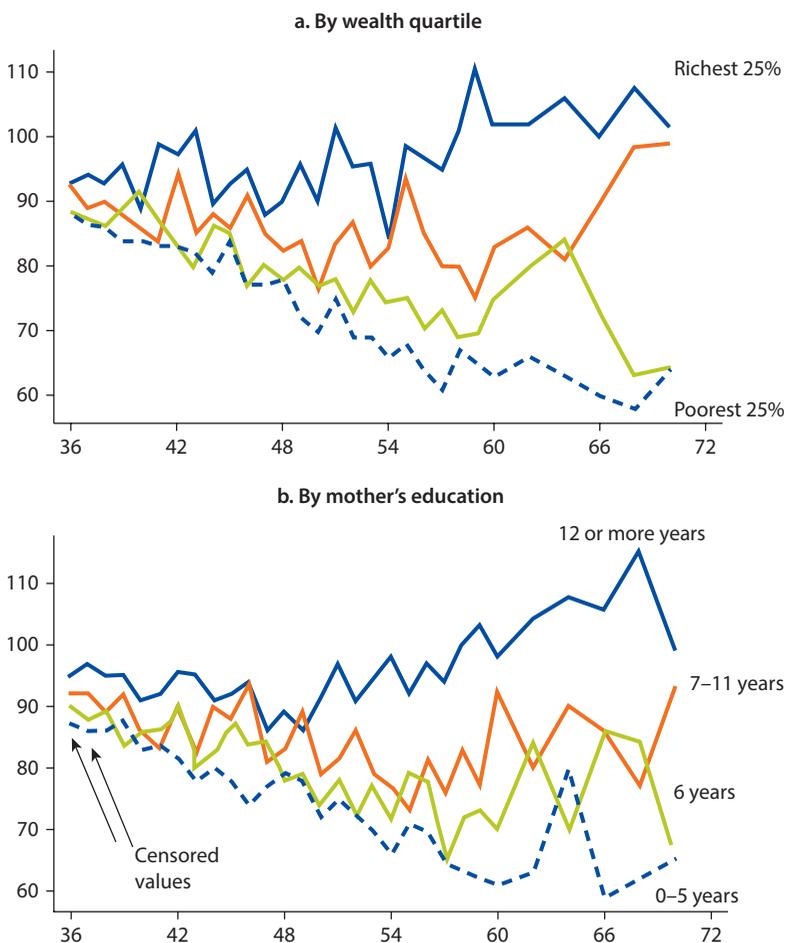
Source: Mock and Arai 2011.

Note: The value in parentheses is the unstandardized regression coefficient for the association between childhood traumas and adulthood chronic illness before the addition of self-rated mental health and socioeconomic status to the model; n = 9,301.

p < .01; *p < .001.

and Masterov 2007; Naudeau and others 2008). Linguistic and cognitive delays accumulate quickly in preschool children; Paxson and Schady (2007) have shown that, while children at age 3 in Ecuador have similar vocabularies, by age 6, children in poorer households have a poorer age-adjusted vocabulary, while those in richer households have a richer vocabulary. A similar pattern develops with maternal schooling; by age 6, children whose mothers have not completed primary school have a poorer age-adjusted vocabulary than those whose mothers have completed secondary school. There is a similar, but less clear, pattern with paternal schooling (figure 4.6). One potential explanation is that children in poorer households or with less educated mothers tend to be spoken to less, and the speech they hear may be poorer in vocabulary and in sentence complexity (Fernald and Hidrobo 2011).

Figure 4.6 Gaps in Vocabulary Widen among Ecuadorian Children Ages 36–72 Months According to the Wealth of Their Households and Their Mother's Schooling



Source: Paxson and Schady 2007.

In summary, early life conditions have long-term consequences for human development:

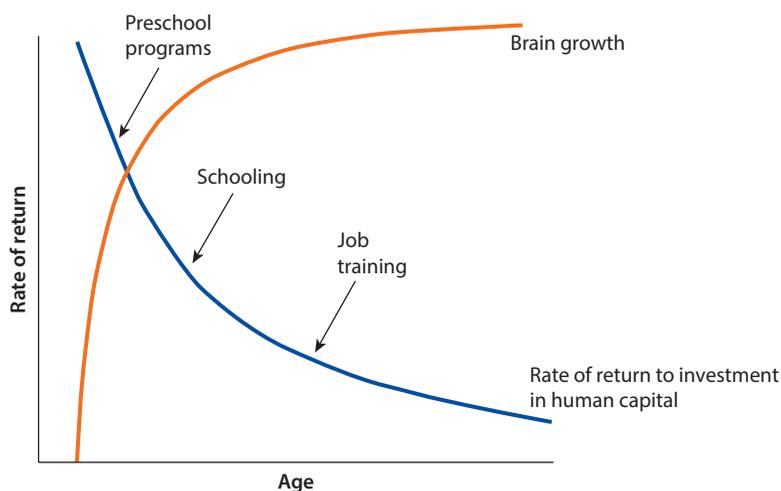
- Early life nutrition matters for brain development and adult health (diabetes, high-blood pressure, and mental health).
- Early life stimulation provides the basis for IQ-type intelligence (prior to age 3, which solidifies around adolescence) and character skills (which are more malleable), and
- Providing the foundation early is easier and cheaper.
- Multiple skills are necessary to succeed in life. Character skills take longer to develop than cognitive skills, but both skills matter for productivity and productive inclusion in society.
- Long-term undernutrition in infancy is linked with worse marriage matches, and women who are stunted face more and higher-risk pregnancies. Children of malnourished mothers face higher risks of chronic diseases such as diabetes. In contrast, girls' education is associated with decreased undernutrition. In resource-rich countries where the demographic transition is at an early stage, investments in prenatal care, children's health, and girls' education can help to accelerate the transition between quantity and quality of children and stimulate the positive feedback loop between decreased fertility and investment in human capital.

Toxic stress linked with living in poverty has lasting effects through its effects on family environments (limited attention, parenting quality), so children who have grown up in poverty are more likely to experience dropping out of school, low productivity, and a low income and to contribute to the intergenerational transmission of poverty (Grantham-McGregor and others 2007). In addition, poor families have fewer resources to deal with acute stress (natural and human-made disasters), so the consequences of short-term shocks at sensitive periods have long-term repercussions for children's development. In resource-rich countries, both types of stress are prevalent, given high poverty rates and risks of conflict, so investing early to improve the family environment has potentially high returns.

Interventions to Strengthen the Foundations of Human Capital

The early years of life are a period of both great vulnerability and great opportunity to invest in human capital. Failure to invest early is costly and difficult to compensate for later in life (Walker and others 2011). A range of interventions can strengthen the foundations of human capital, notably those that promote better nutrition, maternal and child health, early childhood development, and basic education. The earlier the intervention, the higher are both the probability of preventing and reversing the damage and the long-term payoff. Investing early is effective, minimizes efficiency trade-offs (figure 4.7), and helps to break the intergenerational transmission of poverty.

Interventions to strengthen the foundations of human capital are sound investments with very high rates of return. No one has conducted a global cost-benefit analysis of nutrition interventions (World Bank 2010), but individual interventions

Figure 4.7 Investing Early, While the Brain Is Growing, Pays Off

Source: Heckman and Carneiro 2003.

Table 4.1 Per Capita Costs of Nutrition Interventions Are Very Low

Intervention	Annual per capita cost (US\$)
Breastfeeding promotion	0.30–4.00
Vitamin A supplements	0.20
Therapeutic zinc supplements	0.47 (10 days)
Deworming (school age)	0.32–0.49
Iron supplement	10–50
Folate fortification	0.01
Iron fortification of staples	0.10–0.12
Salt iodization	0.05

Sources: Horton, Alderman, and Rivera 2008; Horton and others 2010.

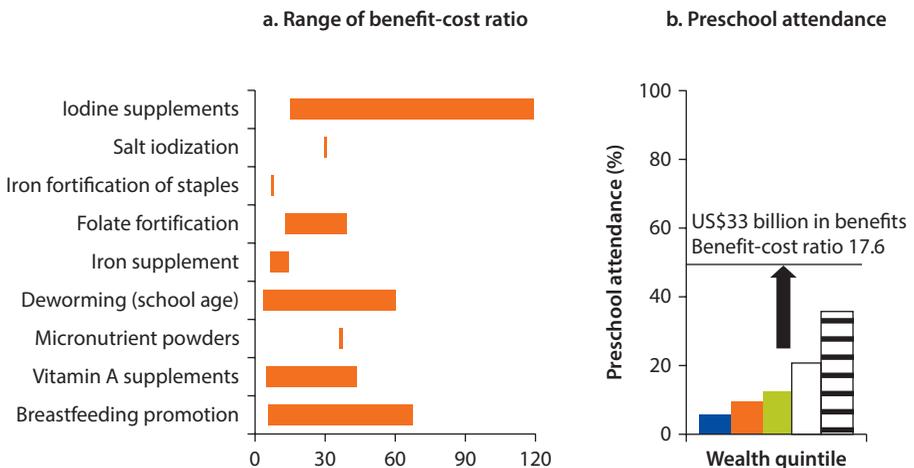
have consistently shown low costs per capita benefit-cost ratios greater than 2:1 (table 4.1). Rates of return for behavioral interventions range from 5:1 to 67:1 for the promotion of breastfeeding, from 4:1 to 43:1 for vitamin A supplementation, 30:1 for salt iodization, and from 3:1 to 60:1 for deworming. The newer evidence on the long-term benefits of improved nutrition in utero and in the first two years of life may mean that the returns are larger still. New delivery approaches—such as multimicronutrient powders (*sprinkles*), therapeutic foods (*plumpy nut*), and better social marketing—also make implementation more effective. In addition, because the determinants of malnutrition lie in several sectors (access to clean water, adequate maternal and child health services, and access to and the availability of nutritious foods), a multisectoral approach builds on the synergies. Continued investments in nutrition-specific interventions to avert maternal and child undernutrition and micronutrient deficiencies through community engagement and delivery strategies that can reach poor segments of the population at greatest risk can make a great difference. If this improved access is linked to nutrition-sensitive

approaches—that is, women’s empowerment, agriculture, food systems, education, employment, social protection, and safety nets—they can greatly accelerate progress in countries with the highest burden of maternal and child undernutrition and mortality (Bhutta and others 2013; Ruel and others 2013).

Investments in early childhood development (ECD) have also shown significant and long-lasting benefits to enhance school readiness and related educational outcomes, improve physical and mental health, reduce reliance on the health care system, and reduce involvement in high-risk behavior (Naudeau and others 2011). In the United States, participants in a high-quality active learning preschool program (High/Scope Perry Preschool) had higher rates of high school completion (71 vs. 54 percent for the control group), higher monthly earnings (29 vs. 7 percent earned more than US\$2,000 per month), and higher rates of homeownership (36 vs. 13 percent for the control group at age 27 years). Participants in a full-time quality child care program (Abecedarian Project) were less likely to smoke, use marijuana, or become teenage parents than nonparticipants. These kinds of effects are especially important in resource-rich countries where poverty and fertility levels and risks of conflict are high. In terms of lifetime earnings only, Engle and others (2011) computed a global benefit-cost ratio of 17.6:1 for increasing preschool enrollment (figure 4.8).

As an integrated system for human capital formation, interventions in nutrition, health, and early education have mutually reinforcing and cumulative effects. Well-nourished, healthy children who have received adequate care and stimulation are better prepared to enter school and succeed. The skills that children develop early form the basis for future learning and labor market success (Heckman and Kautz 2013). Nutrition feeds the brain and builds the body, stimulation sparks the mind, love and protection buffer the negative effects of stress and adversity (Lake and Chan 2015), and good schools provide cognitive

Figure 4.8 Early Child Nutrition and Education Interventions Have Positive Benefit-Cost Ratios



Sources: For nutrition interventions, Horton, Alderman, and Rivera 2008; for preschool attendance, Engle and others 2011.

and social learning to enable people to succeed in the workplace. For these reasons, the three main priorities for interventions are ensuring that mothers and their children are healthy, that children are prepared for school, and that they learn what they need to succeed in the workplace and outside. These interventions build on each other's synergies, and multisectoral approaches and system building are key to harnessing these synergies and accelerating the effects.

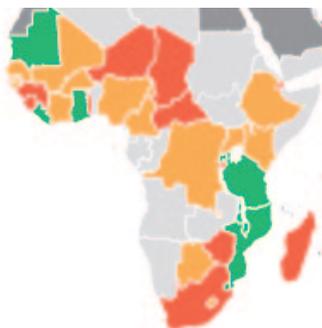
The rest of this section discusses some of the key interventions in each of these domains. For each priority, we summarize the risks, the interventions to address them, and some of the evidence on their effects.

Ensuring Healthy Mothers and Babies

Many African countries did not reach the Millennium Development Goals (MDG) of reducing the proportion of people who suffer from hunger as measured by the proportion of underweight children (MDG1), reducing child mortality (MDG4), or improving maternal health by reducing maternal mortality and ensuring universal access to reproductive health (MDG5). For the SSA countries for which information is available (map 4.1), only Ghana, Liberia, Malawi, Mauritania, Mozambique, Rwanda, Swaziland, and Tanzania were on track to reach MDG1 in 2011. For MDG4, the 11 countries with the highest child mortality rates were Angola, the Central African Republic, Chad, Côte d'Ivoire, the Democratic Republic of Congo, Guinea, Mali, Niger, Nigeria, and Sierra Leone—all emerging or resource-rich countries—and Guinea-Bissau. In terms of MDG5, the countries with maternal mortality ratios greater than 1 per 100 live births were Angola, Cameroon, Chad, the Democratic Republic of Congo,

Map 4.1 SSA Countries Made Slow Progress toward MDGs 1, 4, and 5, 2011

a. Rate of decrease of underweight children: average annual rate of reduction of underweight prevalence (AARR)



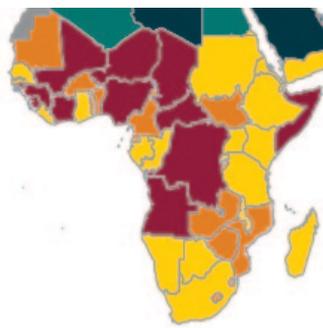
■ On track—AARR > 2.6%
or prevalence < 5%

■ Insufficient:
0.6% < AARR < 2.6%

■ No progress

■ Insufficient data

b. Level of under-5 mortality (U5M): deaths per 1,000 live births

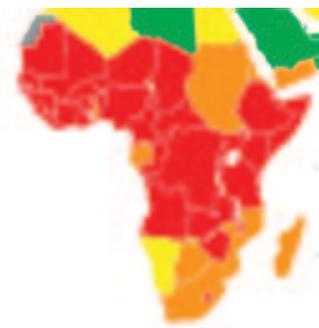


■ 40 < U5M < 79

■ 80 < U5M < 100

■ U5M > 100

c. Maternal mortality rates (MMR): deaths per 100,000 live births



■ 100 ≤ MMR < 300

■ 300 ≤ MMR < 550

■ MMR ≥ 550

Sources: For rates of underweight, UNICEF 2013; for rates of mortality, UNICEF and others 2014.

Guinea-Bissau, Liberia, Nigeria, Niger, and Sierra Leone—all emerging or resource-rich countries—and Burundi, Malawi, and Rwanda.

The first steps to guarantee that children are healthy is that their mothers are healthy and do not die. In SSA, maternal undernutrition, severe anemia, tuberculosis, malaria, and human immunodeficiency virus / acquired immunodeficiency syndrome (HIV/AIDS) increase the risks of maternal death. Orphans face heightened challenges in terms of both physical and mental health. As mentioned, maternal undernutrition is linked to intrauterine growth restriction and low birthweight; maternal stress and depression are also linked to low birthweight, stunting, and insecure attachment in their offspring.

Interventions to strengthen maternal and child health include providing prenatal care during pregnancy, adequate birth and emergency preparedness and skilled care during childbirth, and proper care and support in the weeks after childbirth; preventing teenage pregnancy; promoting breastfeeding; providing complementary feeding; and managing childhood illnesses.

First, it is important to provide prenatal care during pregnancy, adequate birth and emergency preparedness and skilled care during childbirth, and proper care and support in the weeks after childbirth. The goal is to provide four comprehensive visits during a normal pregnancy, including iron and folate supplementation and multinutrients, as needed, to ensure a low-risk pregnancy and adequate weight for the baby. Overall coverage of births by a skilled attendant remains at 46.5 percent in SSA; a lack of skilled care contributes to more deaths by hemorrhage (one-third of deaths), perinatal infections (one-tenth of deaths), and hypertension (one-fifth of deaths). Fee abolitions and results-based financing have helped to increase coverage in Burundi and Rwanda (Africa Health Forum 2013). A low birthweight (weight less than 2.5 kilograms) reflects the poor health and nutrition status of mothers and yields long-term nutritional and health consequences for the children. Interventions to address it include the following:

- Provide affordable (free or low-cost) health and nutrition services (such as those described here) through different mechanisms, including insurance schemes, social safety net programs, and government provision.
- Prevent or treat maternal infections, including prophylaxis for and treatment of malaria and testing for and management of syphilis and other sexually transmitted infections.
- Provide iron folate supplementation for all pregnant women.
- Provide counseling and support for increased dietary intake (quality and quantity) during pregnancy, reduced maternal workload, prevention and treatment of anemia, decreased indoor air pollution, reduced tobacco consumption, avoidance of gender violence, and planning for contraception after delivery.
- Provide maternal supplements of balanced energy and protein for pregnant women facing food shortages.

Second, preventing teenage pregnancy is essential. Africa has the highest rate of teenage pregnancies, with Niger topping the list (51 percent of women ages

20–24 years reporting a birth before age 18 years). Interventions upstream to support secondary schooling for girls include the recruitment of female teachers (Baird and others 2009), provision of sanitation facilities in school, and provision of cash transfers (Baird and others 2011; Duflo and others 2006; Lindert and others 2007), fee waivers, stipends, fellowships, and in-school health interventions, including access to information and contraceptives. Cash transfers may also have effects on sexual debut and age at marriage (Baird and others 2010, for Malawi; Handa and others 2014, for Kenya). Workforce initiatives to support the school-to-work transition for adolescent girls, such as the Adolescent Girls Initiative, are important too. This is an important step, especially in resource-rich countries, which are still in the early stages of demographic transition from high fertility and mortality to low fertility and mortality. Improving prenatal care and child health as well as girls' education can help to accelerate the transition and promote a virtuous cycle of investments in human capital.

Third, it is key to promote breastfeeding. Effective transmission of infant and young child feeding messages through multiple communication channels, lactation management training for health workers in the field and in the hospital, and community outreach (home visits by midwives) have made it possible to increase exclusive breastfeeding in Sri Lanka (World Bank 2013). A high-level political commitment and a culture supportive of breastfeeding also likely contribute.

Fourth, complementary feeding is needed to foster catch-up growth before age 2. Growth can falter significantly in the first 18 months of life, and weaning is a critical moment in that trajectory. Complementary feeding, together with adequate child-feeding practices and management of infections, are essential to avoid significant growth faltering. Complementary feeding needs to be timely and adequate in terms of amount, frequency, and consistency. The foods need to be prepared in a safe manner and given in an adequate way, with active, responsive feeding emphasizing the relationship with the child.

Fifth, it is essential to manage childhood illnesses. Integrated management of childhood illnesses combines improved management of childhood illness with aspects of nutrition, immunization, and other important disease prevention and health promotion activities. The objectives of this approach are to reduce deaths and the frequency and severity of illness and disability and to contribute to improved growth and development. Developed by the World Health Organization and the United Nations Children's Emergency Fund, the strategy includes three main components: (1) improvements in the case management skills of health staff through the provision of locally adapted guidelines on the integrated management of childhood illnesses and through activities to promote their use; (2) improvements in the health system required for the effective management of childhood illness; and (3) improvements in family and community practices. Specific challenges include addressing the prevalence of diarrhea and the administration of therapeutic zinc, the prevalence of acute respiratory infections, and the treatment of malaria.

To deliver these services, many African countries are seeking to complement center-based care with community health providers. These providers can perform a range of basic services from prenatal care to growth monitoring, management

of diarrhea, instructions about proper hygiene and feeding practices, malaria prophylaxis, access to contraception, and even management of maternal depression. Similarly, community-based nutrition interventions such as those in Senegal hold much promise for improving child nutrition (box 4.2).

Accelerating the progress in nutrition will require effective, large-scale nutrition-sensitive programs that address key underlying determinants of nutrition and enhance the coverage and effectiveness of nutrition-specific interventions (Ruel and others 2013). These include investments in agriculture, social safety nets,

Box 4.2 Community-Based Growth Promotion Programs

Honduras, Jamaica, Madagascar, Nigeria, Senegal, Tanzania, and some states in India use a strategy of community-based growth promotion, which incorporates some of the key Scaling-Up Nutrition interventions and strengthens knowledge and capacity at the community level.

Such strategies have proven effective in improving mothers' knowledge of child nutrition, attitudes, and practices; in boosting family demand for health care; and in reducing undernutrition. Successful, large-scale child growth promotion programs in these countries achieved sharp declines in child malnutrition in the first five years, with a more gradual rate of decline in moderate and mild undernutrition after that. The community basis allows practitioners to address multiple causes of malnutrition, with a focus on women and on children under age 2.

Leading interventions include nutrition education or counseling. These interventions often accompany child growth monitoring, offer advice on maternal care services during pregnancy, promote exclusive breastfeeding and appropriate and timely complementary feeding, encourage health and childcare practices, and make referrals to health centers. Some programs have provided micronutrient supplements for pregnant mothers and children, as well as immunization and related services.

Program experiences highlight the importance of three elements: female community workers as service delivery agents; regular monitoring of child growth (weight), paired with counseling and communication with the mother by a well-trained agent who benefits from regular supervision in weighing, recording, and counseling; and well-designed, culturally appropriate, and consistent nutrition education to promote specific nutrition practices. The challenges relate to agent training, support, and motivation; barriers faced by beneficiary mothers in implementing recommended behavioral changes; and the high costs of food supplementation.

In Senegal, the national nutrition program adopted community-based approaches, targeted the "first 1,000 days," implemented systematic nutrition screening, and delivered interventions using a network of well-supervised nongovernmental organizations (Linnemayr and others 2008). Over the years, the program added bed net distribution, community management of acute undernutrition and food fortification, and, most recently, a cash transfer initiative. Prenatal care increased from one-third to two-thirds, exclusive breastfeeding for the first six months doubled to 58 percent, and correct use of bed nets more than doubled to 59 percent. The rate of stunting in 2005 was only 59 percent of that in 1990. Similarly, the rate of being underweight in 2005 was 65 percent of that in 1990.

Source: World Bank 2013.

early child education, and parenting. Ways to enhance the nutrition sensitivity of programs include improving targeting, using conditions to stimulate participation, strengthening nutrition goals and actions, and optimizing women's nutrition, time, physical and mental health, and empowerment. Nutrition-sensitive programs can help to scale up nutrition-specific interventions and to create a stimulating environment in which young children can grow and develop to their full potential.

Resource-rich countries face a specific set of challenges in protecting their nascent and growing human capital from potential public health problems that have accompanied the discovery of natural resources, including tuberculosis, HIV/AIDS, infectious diseases, and gender-based violence as well as occupational health issues in the mining sector. Box 4.3 summarizes some of these local economic effects and interventions to limit the negative effects of mining.

Box 4.3 Mineral Wealth and the Protection of Human Capital

While, in theory, local resource booms could stimulate an increase in local incomes if the sector has enough local backward linkages, the effects on education and health are potentially less benign. Environmental pollution and work-related injuries can reduce the benefits. The magnitude of the negative effects are in part, related to the quality of local institutions to enforce air and water quality regulations or safety oversight.

Large-scale mining and mineral processing can generate significant amounts of air pollutants. Mining also can release industry-specific pollutants—such as cyanide, mercury, and heavy metals—which have cumulative effects on the quality of soil and water sources. Environmental pollution has important health consequences and can affect school and cognitive development as well as agricultural productivity. In Northern Chile, children living near a deposit of mineral waste have a higher concentration of lead in their blood and worse school results. A review of 44 countries showed increased stunting in children and anemia among young women within 5 kilometers of mines. In Ghana, gold production is associated with decreased agricultural productivity within 20 kilometers of the mines. Decreased agricultural productivity may undermine women's ability to provide food and water for their family and increase their workload.

The often harsh living conditions for miners in small-scale mining as well as in large-scale mining, along with the lack of information and education about prevention, can contribute to a high prevalence of HIV/AIDS and other communicable diseases among miners and their families. Also, work-related injuries and health risks—lung cancer, for example—reduce miners' life expectancy and often put families in particularly precarious situations. In addition, a transient male workforce can bring increased alcohol use, sex workers, and violence to communities, which can affect women's safety.

The closing of noneconomic mines has added to poverty, especially in mono-industry communities and mineral-dependent regions. In addition to the loss of jobs among the local population, essential public goods and services originally provided by the mining company—transportation and water, for example—have ceased to be delivered, with particularly harmful effects on the poor and other vulnerable groups.

Source: Aragon and others 2015; Chuhan-Pole and others 2015; Loayza and Rigolini 2016.

Ensuring School Readiness

The skills that children develop in their first years of life provide the foundations for their future learning and labor market success. ECD enhances a child's ability to learn, work with others, be patient, and develop other skills on which to build formal learning and social interactions in the school years and beyond. In resource-rich countries, ECD is potentially a key factor in helping children to manage conflicts and develop patience, which will serve them as adults. ECD also ensures that children stay in school, an important ingredient in decreasing risky behaviors in adolescence. Across all countries, children in the highest income quintile are more than twice as likely to attend preschool as those in the lowest quintile. They are also more likely to benefit from higher-quality stimulation at home.

The most promising interventions include parenting interventions and center-based care and early education. Engle and others (2007, 2011) systematically reviewed studies and identified the benefits from various "ECD" interventions. In all cases, effects are larger for children from disadvantaged situations. Results seem stronger for small programs than for scaled-up programs.

- *Parenting interventions* promote parent–child interaction to improve responsiveness in infants and child feeding, increase attachment, and encourage learning, book reading, play activities, positive discipline, and problem solving related to child development. Parenting education and support can be delivered through home visits, community groups, regular clinic visits, and media. These interventions can improve children's cognitive and psychosocial development. Effects are larger when there are systematic curricula and training opportunities for childcare workers and parents and when there are active strategies to show and promote caregiving behaviors—practice, role play, or coaching to improve parent–child interaction.
- *Preschool care, childcare, and daycare* can be formal (linked to schools or offered by private providers with a fixed classroom) or nonformal and community-based (with few or no professionally trained teachers and locally adapted sites). These interventions usually improve children's cognitive functioning, readiness for school, and school performance. Effects are larger for high-quality programs, whether formal or nonformal.

Other promising interventions try to create opportunities for changes through the environment by tackling poverty and using the media. As mentioned, cash transfer programs can help parents to provide for their children's needs and provide incentives for parents to invest in their children's human capital. Very few evaluations have assessed cognitive and language skills, but those that have (Ecuador, Mexico, and Nicaragua) have found small positive effects. As television and radio ownership increases, educational programming (content that is educational, nonviolent, and designed for young children) may help to improve child development (Engle and others 2011; Naudeau and others 2011).

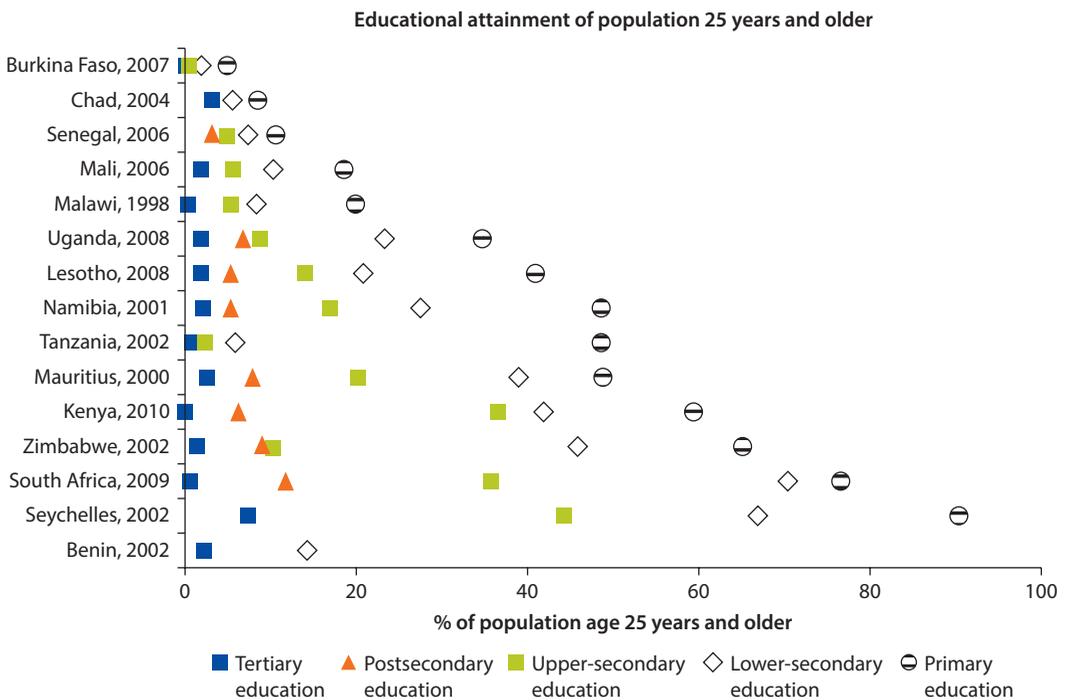
Interventions are most effective when they are both multisectoral—they address the health, nutrition, early stimulation, and learning needs of young

children—and integrated (Grantham-McGregor and others 2007). This is not always possible during countries’ early engagement with ECD—hence the importance of constructing a policy framework that can raise the visibility of a nation’s vision and goals for young children, clarify the respective responsibilities of different government agencies, and provide critical guidance for public and private investments (Naudeau and others 2011).

Ensuring Relevant Learning and Quality Basic Education

Sub-Saharan Africa has made great strides toward achieving universal primary enrollment (from 60 to 78 percent between 2000 and 2012), but rapid population growth and conflicts pose a big challenge to maintaining this progress. Armed conflicts—particularly in resource-rich countries—and other emergencies are keeping too many children out of school. For example, in the conflict-affected province of Nord Kivu in the Democratic Republic of the Congo, almost one in two children of primary school age from the poorest households had never been to school in 2010, compared with one in four in the province of Kasai-Oriental (United Nations 2014). In addition, the early incidence of dropping out is higher in resource-rich countries, and poor, rural girls are more likely not to complete their primary education (figure 4.9), which is an important determinant of early childbearing. Reasons for early dropouts include being over-age for grade level

Figure 4.9 The Early Dropout Rate Is Still Too High in SSA: Educational Attainment of Population 25 Years of Age and Older



Source: Huebler (2012).

(due to late entry or repetition), distance between home and school, household poverty, need to combine work and study, and opportunity costs. In total, 43 million children are out of school in Sub-Saharan Africa, of whom 56 percent are girls.

Quality of schooling remains an issue, with high rates of absenteeism among teachers (discussed in chapter 3), poor infrastructure, and poor-quality textbooks and teaching methods. As a result, the potential learning gains from schooling—cognitive and psychosocial—elude many pupils and place them at further disadvantage in the transition from school to the labor market. Similar to noncognitive skills, cognitive skills such as literacy and numeracy form the foundation for acquiring higher-order and technical skills later in life, whether through more formal education, training, or on-the-job learning. Basic cognitive skills are necessary for learning more advanced concepts, and better foundational skills lower the costs of additional investments (Filmer and Fox 2014).

Key interventions include education for all, training teachers to improve their academic qualifications and pedagogical skills, smaller classes and groupings by levels, and accountability. Curricular reforms to focus on competencies (basic numeracy and literacy skills, noncognitive skills) are key to increasing learning and responding to the demands of employers. Teaching approaches that are more interactive and group based may facilitate the acquisition of both cognitive and behavioral skills, for instance (box 4.4). Complementary interventions to ensure that girls stay in school and to improve learning for all include the following:

- Hiring female teachers
- Building separate latrines for girls or maintaining clean, accessible latrines for all children
- Promoting school health interventions such as deworming, and
- Promoting parents' participation in school through school committees or volunteer activities.

Box 4.4 What Types of Interventions Improve Student Learning?

The literature on what improves learning in schools is vast, but systematic literature reviews have been conducted to identify the types of interventions that are most effective in improving learning outcomes for students. Probably tens of thousands of articles have been published on factors affecting student learning. Even when one restricts the literature to rigorous impact evaluations conducted in developing countries, the number of studies remains large. Fortunately, several literature reviews have recently been conducted to synthesize the messages from this literature (Conn 2014; Glewwe and others 2014; Kremer, Brannen, and Glennerster 2013; Krishnaratne, White, and Carpenter 2013; McEwan 2015; Murnane and Ganimian 2014). Evans and Popova (2015) assessed whether these various reviews provide similar messages regarding what does and does not improve learning outcomes in developing and especially low-income countries. In total, the six reviews identified 227 rigorous studies measuring the impact of various interventions on learning outcomes

box continues next page

Box 4.4 What Types of Interventions Improve Student Learning? *(continued)*

in developing countries. A bit more than half (134) were random control trials (RCTs). The others were quasi-experimental studies. As noted by Evans and Popova (2015), there is quite a bit of divergence in the recommendations made by the studies, for at least two reasons:

- *Different samples.* Only three studies were included in all six reviews, and 70 percent of the studies were included in only one review. The reviews had different selection criteria (for example, considered RCTs only or only studies for Africa), but also different search methodologies and levels of comprehensiveness.
- *Different categories and interpretations.* The same programs were classified in different ways in the various reviews, and interpretation of “success” varied depending on the criteria used.

Despite the divergence in findings, the literature reviews point to some common sets of interventions that are likely to improve learning. Evans and Popova (2015) suggest that three types of interventions tend to be recommended across multiple reviews: (1) pedagogical interventions that match teaching to individual student learning levels; (2) individualized, repeated teacher training that is associated with a specific method or task; and (3) accountability-boosting interventions. Specific interventions in each of these three broad areas have proven successful (table B4.4.1). This does not mean that other interventions cannot be successful or are not required, but there seems to be a consensus about the effectiveness of these interventions in the various reviews.

Table B4.4.1 Interventions with Some Consensus on Effectiveness in the Literature Reviews

<i>Area of intervention</i>	<i>Specific interventions</i>
Pedagogical interventions that match teaching to individual student learning levels	<ol style="list-style-type: none"> 1. Assign students to separate classes based on initial ability so that teachers can focus instruction at the level of learning of individual students (Duflo and others 2011) [4 reviews] 2. Use mathematics software to help students to learn at their own pace (Banerjee and others 2007) [5 reviews]; by contrast, distributing computers does not, by itself, lead to gains 3. Train teachers to use an initial reading assessment and then continually assess student performance (Piper and Korda 2011) [2 reviews]
Individualized and repeated teacher training associated with a specific method or task	<ol style="list-style-type: none"> 1. Train teachers and provide them with regular mentoring to implement early grade reading instruction in local language (Lucas and others 2014) [3 reviews] 2. Combine student reading groups with in-school supervisors to provide ongoing guidance to group leaders (Cabezas and others 2011) [2 reviews] 3. Teach teachers to use storybooks and flash cards (He and others 2009) [1 review]; by contrast, similar programs introduced without teacher preparation tend to be less effective (He and others 2008) [3 reviews]
Accountability-boosting interventions	<ol style="list-style-type: none"> 1. Provide teachers with incentives to be present in school (Duflo and others 2012) [4 reviews] and to perform (Muralidharan and Sundararaman 2011) [3 reviews]; but design the incentives to improve learning, while reducing the risk of strategic countervailing teacher responses (Glewwe and others 2009) [5 reviews] 2. Supplement civil service teachers with locally hired teachers on short-term contracts (Duflo, Hanna, and Ryan 2012) [4 reviews]; (Banerjee and others 2007) [5 reviews]

Source: Box contributed by Quentin Wodon, based on Evans and Popova (2015).

Education systems have scope for developing skills other than cognitive skills. Increased attention to imparting behavioral skills through schooling may take several forms, including modes of instruction as well as the modeling of appropriate behaviors, including teachers' behavior, in the school environment. First, school success itself increases self-esteem and confers a greater sense of self-determination, as shown in research among high school and college graduates in the United States. Second, the way that teaching and learning are delivered may influence behavioral skills. Teaching approaches that encourage participation, group activities, and exploration instill different mind-sets among students than approaches that emphasize rote learning. Third, the experience of education and the habits learned in school matter. Students' exposure to an environment where teachers are absent 20 percent of the time with little consequence (box 3.2) will likely instill a sense that punctuality (one of the skills that some employers say they are seeking) is not important (Filmer and Fox 2014).

Technical and vocational education and training (TVET) has the potential to help youth in the school-to-work transition, given the levels of high school dropouts and the demands of the labor market for midlevel technical skills as countries urbanize and develop more industry and services (box 4.5). However, TVET is not fully geared to the needs of either job seekers or employers in most African countries. Issues of curriculum, quality, participation of employers, and costs are pervasive. In resource-rich countries, this mismatch could be a short-term bottleneck to providing technicians for the extractive industries and a longer-term bottleneck to helping workers to move from one sector to another as countries diversify their economy.

The benefits of investing across health, nutrition, early childhood development, and education accrue to individuals, generations, and countries. For each individual, synergies occur between health, nutrition, and education, and early skills form the foundation for acquiring new skills at a lower cost. Empowering women and involving men in positive ways are key for the next generation. Between 1970 and 1995, an increase in female education was associated with an increase in farm productivity and a 43 percent decrease in undernutrition (figure 4.10). In contrast, early marriage and maternal mortality were

Box 4.5 The Role of Technical and Vocational Education and Training

Formal TVET runs parallel to general schooling at the secondary or tertiary level and meets the need for intermediate or advanced technical skills. Entry requirements often include having completed primary or secondary school. Therefore, participants in formal TVET have substantially more schooling than participants in other forms of postschool training.

In Nigeria, technical colleges at the secondary level produce craftsmen and master craftsmen, focusing on traditional technical vocations (electricians, vehicle mechanics, and masons).

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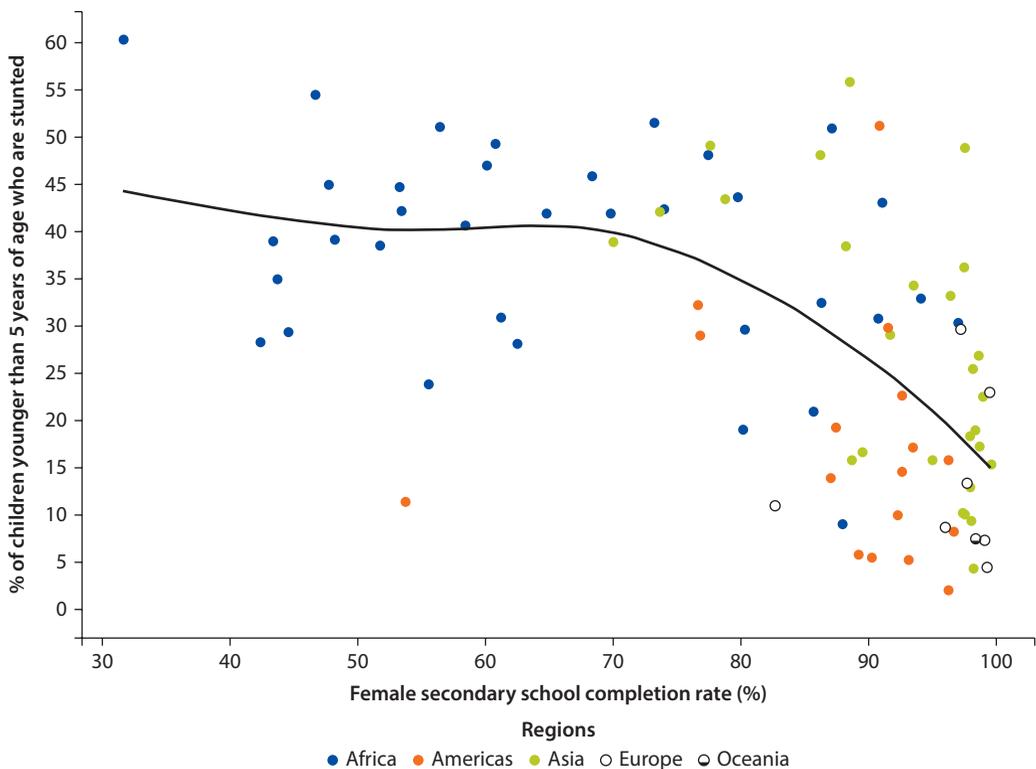
Box 4.5 The Role of Technical Vocational Education and Training *(continued)*

At the tertiary level, vocational institutions (polytechnics) produce technicians, professionals, and engineers. In Rwanda, technical secondary schools prepare students to enter the labor market at roughly the same level as an upper-secondary-school graduate. Vocational training centers prepare basic education graduates or dropouts to enter the labor market.

Several types of nongovernmental entities also provide technical and vocational training, including for-profit private institutes and firms, which provide 35 percent of the training across Africa (Mingat, Ledoux, and Rakotomalala 2010). Compared with public institutes, private training providers tend to focus on “light” vocational skills—such as business, commercial, and service skills—possibly owing to the high fixed costs of providing more industry-oriented sorts of skills. Private providers in Uganda, for instance, focus on office qualifications and various business skills that require only limited investment. Private providers also tend to be concentrated in specific regions—often those with larger populations and greater demand for training (Ghana and Zambia are examples).

Source: Filmer and Fox 2014.

Figure 4.10 Girls’ Completion of Secondary School Is Associated with Less Stunting



Source: World Bank 2014.

associated with an increase in stunting (World Bank 2014). Maternal education has multiple protective effects: it is associated with less maternal depression; better child nutritional status; a better quality of the childrearing environment through family planning (birth spacing), knowledge about ECD, and higher educational aspirations; and an ability to access and benefit from human development interventions. Positive involvement of fathers is also associated with higher educational aspirations and less exposure to violence. Undernutrition taxes 3–4 percent of gross domestic product annually in Sub-Saharan Africa (World Bank 2013). Human capital is at the core of broad-based growth, as East Asian countries have demonstrated.

The Role of Cash Transfers in Increasing Demand for Health and Education Services

This chapter has identified key points of entry for building human capital at the youngest ages. This section turns to the demand side and focuses on the types of interventions that aim to increase the use of services. It examines, in particular, various types of cash transfers that have been deployed in many parts of the world (Fiszbein and others 2009) and that are increasingly being discussed in the context of natural-resource-rich countries in SSA (for example, in Tanzania), sometimes in the form of direct dividends.

Since the first generation of evidence on cash transfers in Latin America in the 1990s, similar programs have been increasingly adopted and evaluated in Sub-Saharan Africa. Latin American cash transfer programs have traditionally focused on the dual goals of reducing current and future poverty by conditioning cash receipt on compliance with certain education- and health-related activities (conditional cash transfers, CCTs). In contrast, cash transfer programs in Africa tend to focus on either combating chronic poverty and food insecurity or easing the effects of shocks such as droughts on vulnerable populations (Del Ninno and Mills 2015; Garcia and Moore 2012), through the provision of often unconditional transfers (UCTs). However, in practice, while many UCTs do not impose explicit conditions, they often carry strong social messaging (that is, labeling), which is likely to affect recipients' behavior, notably with respect to health and education. Indeed, a review of achievements in Africa (Evans and Popova 2014) showed that cash transfers increase school enrollment, attendance, test scores, and grade completion significantly and have positive effects on health and nutrition (box 4.6).

Cash transfer programs increase demand for health and education services through two pathways: an income effect, and an effect of the conditions or accompanying measures. Demand for education increases with income (see the discussion on inequalities in chapter 1). The additional income provided by cash transfers may enable households to resolve barriers such as informal fees, transportation, uniforms, and supplies. It may also compensate households for some of the opportunity cost of the lost child labor, especially as children enter their teenage years.

Box 4.6 Cash Transfers in Sub-Saharan Africa: What Do They Achieve?

As the number of cash transfer programs in Africa has grown, so too has the quality of evidence about their effectiveness. Since 2008, 21 cash transfer programs have been rigorously evaluated across 14 SSA countries, consisting of 16 RCTs and 5 quasi-experimental studies. Of these 21 cash transfer programs, 15 are UCTs, 3 are CCTs, and 3 have both unconditional and conditional arms.

Between them, these impact evaluations provide evidence from both resource-rich and non-resource-rich SSA countries that cash transfers improve many outcomes, including consumption, income, education, health, and nutrition measures. In terms of consumption, 13 of 16 evaluations found that total (food and nonfood) consumption increased as a result of the transfer, 2 found no significant impact, and 1 found that cash transfers decreased expenditures on a specific consumption item, while increasing spending or remaining constant on other items. Moreover, consumption of temptation goods, such as alcohol and tobacco, does not increase as a result of receiving cash transfers (Evans and Popova 2014). Fewer evaluations reported effects on income and poverty reduction, but 4 of the 7 that did found significant improvements and none found the opposite.

Almost all programs for which education outcomes are reported were found to increase either student attendance, enrollment, test scores, or grade completion significantly. Similarly, of 19 evaluations reporting cash transfer effects on either health or nutrition, 15 found a significant positive impact, while the remainder found an insignificant positive impact. A new wave of evaluations also found that cash transfers can decrease risky sexual behavior and HIV/AIDS prevalence.

Both UCTs and CCTs alike produce significant positive effects on education, health, and nutrition. Among three programs with both UCT and CCT arms, CCTs tended to produce larger education effects (in Malawi), particularly for marginalized children (in Burkina Faso). CCTs were more effective in improving health center visits for children in Burkina Faso, but UCTs were more effective at improving mental health for adolescent girls in Malawi.

Overall, a small but highly valuable amount of experimental and quasi-experimental evidence from diverse countries and program modalities across the region found that cash transfers—both conditional and unconditional—have been effective at improving many facets of human development and are now showing promise for tackling new issues specific to the region.

Source: This box was contributed by Anna Popova and David Evans.

When services are available, the basic premise of CCTs is that healthier and better-educated workers will get better jobs and be able to afford more education for their children, breaking the vicious circle of intergenerational poverty. First-generation programs placed a high emphasis on enrollment and attendance, especially in primary and lower-secondary school. Programs are now experimenting with promoting transitions from primary to secondary school, and secondary

school completion (Mexico). Others are linking cash transfers with preschool attendance (the Philippines) and growth monitoring (pilot in Bangladesh).

To reach young children and areas where services are not fully available, cash transfer programs have adopted a range of strategies, including strong social messaging, communications for behavior change, and community-based interventions to promote parenting practices, early stimulation, nutrition, health, and sanitation practices through peer-to-peer learning (using positive deviant households to show others how they can change their behavior). These approaches had positive effects in Nicaragua (Macours, Schady, and Vakis 2012). Evaluations of first-phase pilot programs are under way in Burkina Faso, Djibouti, and Niger.

Going to Scale with ECD and Cash Transfers

Education and basic health services are typically already provided on a large scale. However, many of the other types of services discussed in this chapter have not gone to scale, although they show promising returns at the pilot level. Some that have gone to scale have shown lackluster results since (a) economies of scale did not materialize and (b) coordination costs increased. In addition, if unit costs are high, budget constraints may cause partial implementation of the intervention package or limit coverage. However, a few programs are testing innovative ways to keep costs low and quality acceptable as they scale up.

Providing Early Childhood Development and Education Services at Scale

Based on the experience of countries such as Cambodia, the Arab Republic of Egypt, El Salvador, Indonesia, Mexico, Mozambique, Turkey, and Senegal, Naudeau and Holland (2014) and Bernal, Sirali, and Naudeau (2015) identified a three-pronged strategy to scale up ECD interventions to reach the 0–6 years age group:

- *Leverage existing health, nutrition, and education services.* At health facilities, providing training for providers, materials for parents, and play materials for children helps to transmit key messages about ECD. If community health workers visit families regularly, they can discuss and monitor nutrition and parenting during their visits. Indonesia and Mexico are also strengthening school preparedness by supporting volunteers who teach groups of parents or children in community structures.
- *Leverage the capacity of nonstate actors.* Partnerships can be leveraged with civil society organizations (as the Mozambican government is doing with Save the Children to expand the successful preschool pilot; Martinez, Nadeau, and Pereira 2012), the private sector (to provide basic health and early childhood care and education, especially in poor urban areas), and communication channels (to expand educational programming that is age-appropriate and nonviolent).
- *Use cash transfers to promote ECD.* Cash transfers can be used to encourage access to services (when available) and changes in behavior regarding parenting practices with the support of civil society organizations.

Scaling-Up Cash Transfers

Based on the experience of countries such as Brazil, Ethiopia, Ghana, Kenya, and South Africa, several strategies to scale up cash transfers in Africa seem promising:

1. *Earmark sources of funds.* Earmarking some of the resources for health and education may increase the amount of resources, signal ownership of the programs to donors, and foster sustainability by integrating the programs in the national budget (Ethiopia, Kenya, Tanzania).
2. *Leverage local government capacity and nonstate actors for local implementation.* In SSA, targeting is often devolved to local governments and communities, while the delivery of complementary interventions is subcontracted to nongovernmental organizations and other partners (Niger).
3. *Promote a systems approach with common tools and improved coordination.* A common registry of poor and vulnerable households and a common payment mechanism are important tools for minimizing duplications and gaps in coverage and fostering coordination with health and education providers at the local level. Complementary actions targeting girls' education (fellowship, boarding facilities) and female economic empowerment (Zambia) or workfare (Ethiopia and Tanzania) can also integrate effects at the household level.
4. *Leverage information and communication technologies.* Mobile and electronic payments have high institutional and setup costs but may increase efficiency in the medium term. Sending text messages with human development content may nudge behavior changes and reach households in remote locations at a lower cost.

Conclusions

This chapter has sought to make the case for investing in the foundations of human capital by summarizing the evidence on early life conditions and their effects in adulthood and between generations. It has also shown that investments in health, nutrition, early childhood development, and basic education are complementary and mutually reinforcing. Early cognitive and psychosocial skills provide the basis for learning further skills at a lower cost. The chapter argues that investing early is cheaper and smarter, as the returns are very high and the equity and efficiency trade-offs are minimal. After windows of opportunity close, remediation is more expensive even if the brain retains learning capacity throughout life. To reap maximum benefits, quality of services is key. Cash transfers can help to overcome some barriers to accessing existing services, and they can also be combined with behavior change interventions, focusing on feeding practices and ECD. Some countries in Africa are taking these interventions to scale with innovative homegrown partnerships and implementation processes.

Annex 4A: Cash Transfer Programs in Africa

Country	Program name	CCT or UCT	Education	Health and nutrition	Consumption	Income and poverty reduction	Evaluation
<i>Random control trials</i>							
Burkina Faso ^a	Nahouri Cash Transfers Pilot Project	CCT and UCT	CCT: +; UCT: +				Akresh, de Walque, and Kazianga 2013a
				CCT: +; UCT: (+)			Akresh, de Walque, and Kazianga 2013b
Democratic Republic of Congo ^a	Concern Worldwide Cash Transfer and Vouchers Program	UCT		(+)	+	(+)	Aker 2013
Kenya	GiveDirectly Unconditional Cash Transfers Program using M-Pesa	UCT	(+)	(-) & +	+	(+) & (-)	Haushofer and Shapiro 2013
	Kenya Cash Transfer Program for Orphans and Vulnerable Children	UCT		+	+		Kenya CT-OVC Evaluation Team 2012a
			+				Kenya CT-OVC Evaluation Team 2012b
			Primary: (+); secondary: +	+	+	+	Ward and others 2010
					+	+	Zeza, de la Brière, and Davis 2010
Lesotho	Child Grants Programme	UCT	+	+	+		Daidone, Davis Dewbre, and Covarrubias 2015
						+	Filipski, Thome, Taylor and Davis 2015
Malawi	M'chinji Social Cash Transfer Pilot Scheme	UCT		+	+		Miller, Tsoka, and Reichert 2011
			+	+	+		Miller, Tsoka, and Reichert 2008

table continues next page

Annex 4A (continued)

Country	Program name	CCT or UCT	Education	Health and nutrition	Consumption	Income and poverty reduction	Evaluation
			+		+		Zeza, de la Brière, and Davis 2010
	Social Cash Transfer Scheme	UCT	+				Covarrubias, Davis, and Winters 2012
	Zomba Cash Transfer Program	CCT and UCT	2 years after program: dropouts CCT: +; schoolgirls CCT: (+); schoolgirls UCT: (+)	2 years after program: dropouts CCT: (+); schoolgirls CCT: (+); schoolgirls UCT: (+)			Baird and others 2015
				+			Baird, de Hoop, and Ozler 2013
			+				Baird, McIntosh, and Ozler 2011
			CCT: +; UCT: (+)				Baird and others 2010
			Round 1: +; round 2: –				Baird, McIntosh, and Ozler 2009
			+				Aker and others 2016
Niger ^a	Concern Worldwide's UCT using Zap m-money platform	UCT		+			
Nigeria ^a	Kano Conditional Cash Transfer Program	CCT	+				Sabarwal and Habyarimana 2015
Tanzania ^a	TASAF CCT Pilot Program	CCT	+	(+)	Most items (+) and (–), except insurance: +; other flours: –		Evans, Hausladen, Kosec, and Reese 2014
	RESPECT trial	CCT	+				Packel and others 2012
Uganda	Youth Opportunities Program	UCT	+		+	+	Blattman, Fiala, and Martinez 2013
	WFP Cash Transfers to UNICEF-supported ECD centers	UCT	+	+			Gilligan and Roy 2013

table continues next page

Annex 4A (continued)

Country	Program name	CCT or UCT	Education	Health and nutrition	Consumption	Income and poverty reduction	Evaluation
Zambia ^a	Child Grants Programme	UCT	+		+		Handa, Natali, and others 2015
				(+) and (-)			Handa, Peterman, and others Tembo 2016
				(+) and (-)	+		Seidenfeld and others 2014
			+				Seidenfeld and others 2015
Zimbabwe ^a	Diocese of Mutare Community Care Program	CCT and UCT	CCT: +; UCT: +	CCT: +; UCT: +			Robertson and others 2013
Quasi-experimental studies							
Ethiopia	Productive Safety Net Programme	UCT			(+)	(+)	Sabates-Wheeler and Devereux 2010
	Productive Safety Nets Programme and Household Asset Building Programme	UCT and PW		+	+		Berhane and others 2011
Ghana ^a	Livelihood Empowerment Against Poverty	UCT	+		(-)		Handa and others 2013
South Africa	South African Child Support Grant	UCT		+			Aguero, Carter, and Woolard 2008
	Old-Age Pension Program	UCT		Girls: +; boys: (+)			Duflo 2003
			Male pensioner: +; female pensioner: (+)				Edmonds 2006

Note: CCT = conditional cash transfer; UCT = unconditional cash transfer; WFP = World Food Programme; UNICEF = United Nations Children's Fund; ECD = early childhood development; PW = public works; + = a significant positive result, - = a significant negative result, (+) = an insignificant positive result, (-) = an insignificant negative result.

a. Resource-rich country.

Notes

1. Biological programming is the process by which exposure to a stimulus (positive or negative) during a critical period of development can change the predisposition to developing disease with long-term consequences for health status. During a critical period for a nutrient, if that nutrient is in adequate supply, an irreversible change in the brain structure and function can occur. An example is the a lack of folic acid in the first few weeks of pregnancy, which can lead to neural tube defects (spina bifida).
2. Malnutrition includes undernutrition and overnutrition. Undernutrition results from insufficient quantity and quality of food intake, a high burden of infections and poor care practices, compounded by low access to health and social services. It translates into small-for-gestational-age, stunting (low height-for-age, a measure of chronic undernutrition), wasting (low weight-for-height, a measure of acute undernutrition), being underweight (low weight-for-age), and micronutrient deficiencies (vitamins A, calcium, iron, and zinc in particular). Overnutrition results in being overweight (body mass index (BMI) [weight (kg)/height squared (meters)] greater than 25) and obesity (BMI greater than 30).
3. Toxic stress response can occur when a child experiences strong, frequent, or prolonged adversity—such as physical or emotional abuse, chronic neglect, caregiver substance abuse or mental illness, exposure to violence, and the accumulated burdens of family economic hardship—without adequate adult support.

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