

Putting science into practice for early child development



The debate between nature and nurture as determinants of early child development is over. Today, we understand that the two are inextricably linked. The degree of their interdependence—and the impact of this interplay on the developing brains of children—is even greater than we previously imagined.¹ This knowledge has tremendous implications for how we design and deliver early child development interventions.

During the past 24 years, the united efforts and shared goals of the global community have achieved substantial progress in child survival, and child mortality worldwide has declined by 49%.² We can build on those gains by focusing new effort and attention not only on saving children's lives, but also on supporting the healthy development of their brains. This is especially important for the millions of children growing up in the most disadvantaged and vulnerable communities and countries, who already face multiple adversities and whose societies also suffer the consequences of those deprivations.

We already know that the brain develops most rapidly in the first few years of a child's life. During these critical years, neuroplasticity is at a peak—neurons form new connections at the astounding rate of up to 1000 per second.³ These synaptic connections are the foundation of a child's physical and mental health, affecting everything from longevity to the lifelong capacity to learn, from the ability to adapt to change to the capacity for resilience.

New lines of research are expanding our understanding of the part environment plays in the formation of these neural connections. If children fail to get what they need—enough nutrition, nurturing, stimulation, and a sense of security—during the most critical years of early childhood, the impact on their lives and futures is enormous. For example, inadequate nutrition in the early years of childhood can result in stunting, which can cause diminished physical and cognitive development that undermine a child's ability to learn and earn later in life. Similarly, inadequate stimulation during the same critical period of earliest childhood can reduce learning capacity and ability to form social and emotional attachments.⁴

The impact of such deprivations can intensify in situations that produce toxic stress in children, including chronic deprivation and prolonged hunger, domestic violence and abuse, and the effects of living through

violent conflicts and other catastrophes. Toxic stress increases the production of cortisol, a hormone that can disrupt the healthy development of the brain, affecting health, learning, and behaviour. Toxic stress also undermines the ability of the body to absorb nutrients, so potentially exacerbating malnutrition.⁵

We are just beginning to understand how environmental factors—including the quality of parenting—might modify the expression of genes, and possibly affect not just one, but multiple, generations.^{6,7} This growing area of inquiry is beginning to change the way we think about development in early childhood and early childhood development interventions. As separate fields of study begin to come together to translate scientific evidence into practical action, some key recommendations are emerging.

First, early intervention is essential. Neuroplasticity begins to decline after early childhood. It becomes progressively harder to offset the effects of early childhood deprivation on the brain. Interventions are most effective during the period of most dynamic growth, and what happens in these early years affects a child for life.

Second, to be most effective, interventions must be intersectoral, going beyond education to encompass health, nutrition, and protection. The healthy development of a child's brain depends on multiple positive experiences. Nutrition feeds the brain; stimulation sparks the mind; love and protection buffer the negative impact of stress and adversity. And distinct interventions are mutually supportive, achieving the strongest results when delivered together. One example is Care for Child Development,⁸ an intervention jointly developed by WHO and UNICEF that instructs mothers and caregivers to stimulate language and learning in young children using everyday objects and activities. This intervention is designed to be delivered with instruction on the importance of improving nutrition for young children. Better nutrition, in turn, supports a child's ability to benefit from cognitive stimulation. By increasing the quantity and quality of caregiving, these interventions also strengthen affectionate bonds between children and parents. In doing so, this approach effectively reinforces a sense of responsibility to continue the interventions: a virtuous cycle.



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Intersectoral interventions in early childhood are also important because of the complex interactions of toxic stress, nutrition, and brain development. Studies show that nutritional supplements alone will not fully alleviate the effects of malnutrition in children who also experience high levels of toxic stress.⁹ Similarly, failing to provide adequate nutrition undermines the development of neural connections: a vicious cycle. This knowledge has special significance in the context of humanitarian emergencies, and underlines the need to minimise the negative impact of toxic stress and inadequate nutrition in the lives of the most vulnerable of all children.

Third, designing interventions to optimise brain development must also take into account the entire lifecycle, beginning with maternal health and prenatal care. This means investing more in interventions to support mothers before conception, during pregnancy and childbirth, and beyond. Similarly, we must also focus attention and resources on adolescence, the period during which the developing brain consolidates the neural connections formed in the early years. We now understand that such interventions could help offset, although not fully ameliorate, the effects of earlier deprivation.

Today, 200 million children younger than 5 years are not achieving their developmental potential.¹⁰ Most of these children are growing up in the poorest households of their respective societies. They are the children living in remote rural communities and urban slums; children living through emergencies and chronic conflicts; children from minorities; and children with disabilities. This loss of potential for these children is a personal tragedy; but more broadly, it helps perpetuate cycles of poverty and inequality in their societies and undermines stability and prosperity. But investing in early interventions timed to take advantage of crucial phases of brain development can improve the lives of the most disadvantaged and vulnerable children and their societies.

The long-term benefits of doing so are potentially great. Studies of children in Guatemala and Jamaica who participated in learning and nutrition programmes in their first 2–3 years of life showed dramatic differences in earning capacity later in life. The interventions included a protein supplement for infants, and home visits by community health workers to guide mothers in the

importance of early stimulation. The cost of delivering these interventions is exceeded by the short-term and long-term benefits: children who benefited from these interventions earned between 20% and 40% more in adulthood than those who did not.¹¹

As the Millennium Development Goal period comes to a close and the post-2015 development agenda takes shape, the global community has an opportunity to assess its progress in reducing poverty, and in expanding growth, prosperity, and sustainable development. Even more, it has the responsibility to address the barriers that remain. We have an opportunity now to do just that, by translating scientific knowledge into practical solutions to change the lives of millions of children.

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