

What makes a difference for early child development?

Total Environment Assessment Model for Early Child Development
(TEAM-ECD)



For years, research has demonstrated that children growing up in countries worldwide follow similar developmental patterns. No matter where they are growing up, most children walk, talk, construct things, learn to feed themselves, and build trust and independence. At the same time there are wide variations in what is considered “typical development,” which is driven by a number of genetic, cognitive, physical, family, cultural, nutritional, educational, and other factors.

EARLY EXPERIENCES & EARLY ENVIRONMENTS

There are many things that influence children’s development from genes to early environments.¹ Although we do not fully understand the mechanisms by which children are influenced by early life experiences, we do know that these experiences, and therefore the qualities of early environments, can shape the ways that our genetic building blocks (DNA) are expressed. This in turn influences individual differences in development and behaviour. Early experiences actually influence chemical reactions in our growing bodies and these reactions can change the way our genes function.²⁻⁵ And through this process, the environments in which children grow and develop have a lifelong effect on physical and mental health, on socio-economic well-being, and on an individual’s ability to contribute to society. We call this process biological embedding.

SOCIAL DETERMINANTS OF HEALTH

In our society, we tend to understand health in terms of biology, focusing mainly on physical well-being. The biological determinants of health include healthy functioning hormonal and immune systems, inherited or genetic predispositions, and exposure to harmful microorganisms that affect organ function. But biological determinants are only part of the determinants of overall health. Social determinants of health are of equal significance for one’s health but are less well understood. Social determinants, including access to proper nutrition, adequate housing, access to programs and services, adequate income, and other socioeconomic circumstances, can influence early environments and health in substantial ways.⁶

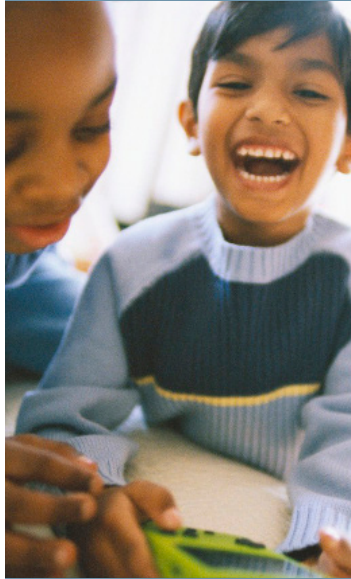
Biological and social determinants work together to influence health and development, however, there is an important distinction between them: we have considerable control over changing the social determinants of health. Improving the *social* conditions that determine health means paying attention to not only the individual child and family but also to the broader society. Actions to influence the social determinants of health can potentially impact millions of people: altering the social conditions to create more family-friendly systems of supports and services means that we can affect populations of children, subsequently improving the health of populations more generally.

NURTURANT ENVIRONMENTS

Nurturant environments promote healthy child development. Good nutrition for physical growth, secure shelter, and protection from harm are basic aspects of nurturant environments.⁷ Young children also need to spend their time in loving, socially responsive, language-rich environments, supported by caring adults. They need opportunities to explore their world, play, solve problems, and learn to speak and listen to others. Generally, we expect parents and caregivers to create these nurturant environments but they cannot do it alone. Their ability to do so is affected by the socio-economic conditions in which they live: their income level, working hours, knowledge, past experience etc. It is clear that families require supportive programming and policy in their community, regionally, provincially, and federally to create conditions that support the kinds of environments to which we aspire for all children.

MULTIPLE ENVIRONMENTS: THEIR CHARACTERISTICS AND IMPORTANCE

Research has helped us to better understand how everything from the smallest cell to the more complex growing child is influenced by the environments in which they spend their time. The Human Early Learning Partnership has developed the Total Environment Assessment Model of ECD (TEAM-ECD) as a way of understanding these environments and their qualities that play a significant role in influencing early development.⁸ Environments—from the most intimate to the broadest—can and do influence the growing and developing child and therefore influence life-long health and well-being. Social, economic, cultural, and gender factors affect the nurturant qualities at play within each environment and have a impact on the development of the child. An assumption that lies at the heart of this model is that more equal societies have better long term health and well-being.



Social, economic, cultural, and gender factors affect the nurturant qualities at play within each environment and have a impact on the development of the child. An assumption that lies at the heart of the TEAM-ECD model is that more equal societies have better long term health and well-being.

WHY IS IT IMPORTANT TO CONSIDER THE TEAM-ECD MODEL?

The TEAM-ECD model illustrates the connections between environments and key influences that relate to children's early development. The environments are nested and interconnected so aspects of each can affect the others in a number of ways and at various levels. The more positive and supportive the environments, the richer they are in supporting children to develop, grow, and learn. The results of such rich and nurturing environments can be measured by monitoring children's development over time at a population level.

A Program and Policy Perspective

The significance of the TEAM-ECD model is that it provides a mechanism for considering early child development practice, policy, and programming together rather than in isolation. The model also highlights the importance of interconnected and collaborative efforts across levels, addressing each of

the environments that affect child development, thus helping children and families thrive.

Recent recommendations contained in the New Deal for Families,⁹ and which draw on the TEAM-ECD research, speak to broad-based federal and provincial policies that are intended to influence the ability of families and caregivers to nurture and support their children. The recommendations speak to the importance of parents having TIME with their children, having the RESOURCES to care appropriately, and having the SUPPORTS AND SERVICES they need to both parent and engage in the workforce. And in doing so, improving the quality of environments in which children spend their time.

The proposed system is built on the principle of proportionate universality with a universal platform of programs, services, and policies, but delivered locally at a scale and intensity that is proportionate to the level of need (for more on proportionate universality see HELP's brief, found online at earlylearning.ubc.ca/documents/70).

THE IMPORTANCE OF MONITORING OUR PROGRESS

Understanding systematic differences in the prospects for healthy child development at every level of the TEAM-ECD model is critical to planning changes to investment and policy that can improve the health of populations. One way to understand these differences is through monitoring early child development.

At HELP, we have monitored and reported, at a population level, on the health, well-being, and competence of British Columbian children using the Early Development Instrument (EDI) as an outcome measure. New work has also led to a Middle Years Development Instrument (MDI) that will help us to better understand the health and well-being of children in their middle years (ages 6 to 12), again at a population level. Our goal, through these projects and others, is to improve the health and well-being of our youngest citizens. By understanding the barriers, whether systemic or specific, that children

Biological Embedding

The early years are considered to be one of the most important developmental phases throughout the lifespan. These years are marked by extremely rapid development of the brain and other key biological systems. At the same time, current research is unequivocal about the fact that children's early environments have a vital impact on the way their brains develop.¹³⁻¹⁵ Developing fetuses create new brain cells at a rate of tens of millions each week that represent lifelong potential.^{16,17} To develop optimally, these brain cells need to connect with each other. The more stimulating and nurturing the early environment, the more positive connections are formed in the brain and the better the child thrives in all aspects of his or her life, in terms of physical development, emotional and social development, and the ability to express him or herself and acquire knowledge.¹⁸ All of these aspects of growth and development matter for later life health and success.

TOTAL ENVIRONMENT ASSESSMENT MODEL FOR EARLY CHILD DEVELOPMENT (TEAM-ECD)

Individual Child

At the centre of the TEAM-ECD model lies the child with his/her unique biology. Children live within a series of interconnected and interactive environments from the immediate family, to the community, and further to the province (region), country, and global environment. The conditions in each of these environments and the degree to which they support (or undermine) child development determine how well children are supported. Therefore actions taken at any of the environmental levels will affect children not only in present day, but also throughout their lives.

Family

Family has the largest share of human contact with children. In addition, family mediates a child's contact with their broader environments. Family environments are where children aged 0-6 spend most of their time and they are the primary source of influence in shaping children's early development.^{10,11} A wide range of familial social and economic factors directly influence children's early development. A family's social resources include parenting skills and education, demands on their time from work, cultural practices and approaches, intra-familial relations, and the health status of the family members. Economic resources include wealth, occupational status, and dwelling conditions, all of which can have a profound effect on a child's early development.

Residential Area

Children and families live in residential communities and the extent to which these communities offer families multiple forms of support matters for children. The key aspects of the residential environment for children include the economic environment (e.g., economic well-being), the physical environment (e.g., safety, access to parks and playgrounds), the service environment (e.g., the existence of and access to high quality community support programs), and the social environment (e.g., quality of social relationships).

Relational Community

The relational environment includes the family's social ties to others with a common identity. The relational community provides, among other things, a source of social networks for families (e.g., faith-based groups, community groups), information and emotional forms of support, and shared knowledge about child-rearing practices. Yet, these same relational communities can also be the source of social exclusion leading to social inequities for early child development (e.g., sources of racism, barriers to access for programming and services).

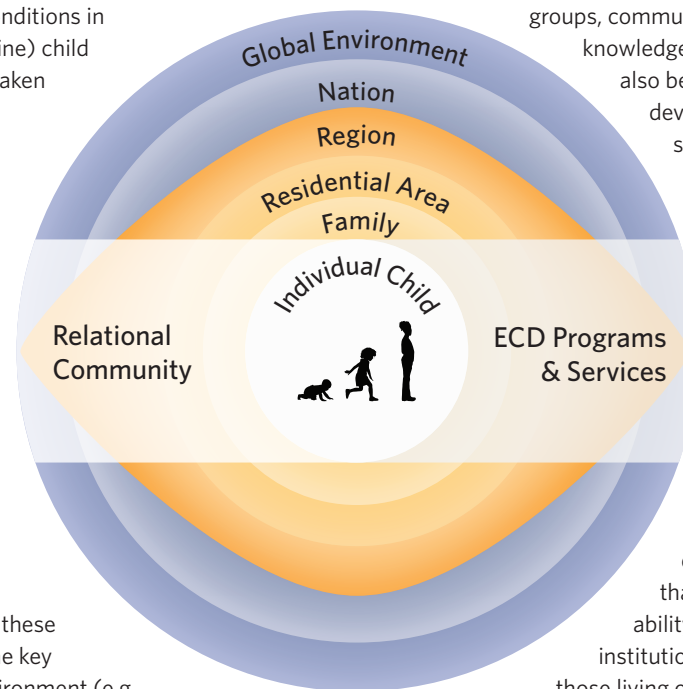
ECD Programs and Services

The availability of ECD programs and services to support children's development during the early years is a crucial component of an overall strategy for success in childhood. Programs and services must also manage to overcome physical and cultural barriers that can affect access by some groups of people. While early child development programs and services are essential, they will not be as effective if under-resourced and unregulated, and if they are of low quality.

Region, Nation & Global Environments

At these levels, regional, national and global policy and investment define the more intimate environments which offer an indirect effect on early child development. These environments are responsible for qualities such as: access that parents have to work that pays a living wage sufficient to raise a family; ability of parents to be at home with their infants until they are ready to enter institutional care settings; the degree to which social policies are in place to support those living on low incomes to raise their children optimally.

The environments within this model are interconnected and interdependent: they are not hierarchical. While the home environment is critical, parents and caregivers may not be in a position to provide optimal care for children because of pressures imposed on them by these broader policy environments.



Source: TEAM-ECD figure adapted from Total Environment Assessment Model for Early Child Development: Evidence report for the World Health Organization's Commission on the Social Determinants of Health.^{8,12}



and families face and by ensuring that children have access to nurturant environments, we can reduce child vulnerability. Achieving this goal requires coordination and action at many different levels in every sector – it requires a “whole of society”

approach. How well populations of children develop and are ready to learn, work, and give back to their community is an indicator of the future health and well-being of a society.

REFERENCES

1. Keating DP, editor. Nature and nurture in early child development. Cambridge, MA: Cambridge University Press; 2010. Available from: http://www.cambridge.org/gb/knowledge/isbn/item5735933/?site_locale=en_GB.
2. Barouki R, Gluckman P, Grandjean P, Hanson M, Heindel J. Developmental origins of non-communicable disease: Implications for research and public health. *Environmental Health*. 2012;11(1):42.
3. National Scientific Council on the Developing Child. Early experiences can alter gene expression and affect long-term development: Working Paper No. 10. Cambridge, MA: Harvard University, Center on the Developing Child; 2010 January. Available from: http://developingchild.harvard.edu/index.php/resources/reports_and_working_papers/working_papers/wp10/.
4. Crews D. Epigenetics and its implications for behavioral neuroendocrinology. *Frontiers in Neuroendocrinology*. 2008 Jun;29(3):344-57.
5. Dolinoy DC, Jirtle RL. Environmental epigenomics in human health and disease. *Environmental & Molecular Mutagenesis*. 2008 Jan;49(1):4-8.
6. Hertzman C, Siddiqi A, Hertzman E, Irwin L, Vaghri Z, Houweling TAJ, et al. Tackling inequality: Get them while they're young. *British Medical Journal*. 2010 February 13;360:346-8.
7. Pivik J, Herrington S, Gummerum M. Nurturant environments for children's social, emotional and physical well-being. In: Goelman H, Pivik J, Guhn M, editors. *New approaches to research in early child development: Rules, rituals, and realities*. New Orleans, LA: Palgrave-MacMillan; 2011.
8. Siddiqi A, Irwin LG, Hertzman C. Total Environment Assessment Model for Early Child Development: Evidence report for the World Health Organization's Commission on the Social Determinants of Health. Vancouver, BC: University of British Columbia, Human Early Learning Partnership; 2007 Jun. Available from: http://earlylearning.ubc.ca/media/uploads/publications/2007_total_environment_assessment_model_for_ecd.pdf.
9. Kershaw P. *New deal for families. A Canada that works for all Generations*. Vancouver, BC: University of British Columbia, School of Population and Public Health; 2011.
10. Obradovic J, Portilla XA, Boyce WT. Chapter 16. Executive functioning and developmental neuroscience: Current progress and implications for early childhood education. In: Pianta RC, editor. *Handbook of early childhood education*. New York, NY: Guilford Press; 2012.
11. NICHD Early Child Care Research Network. *Child care and child development: Results from the NICHD Study of Early Child Care and Youth Development*. New York, NY: Guilford Press; 2005.
12. Irwin LG, Siddiqi A, Hertzman C. Early child development: A powerful equalizer. Final report for the World Health Organization's Commission on the Social Determinants of Health. Vancouver, BC: University of British Columbia, Human Early Learning Partnership; 2007 Jun.
13. Hertzman C, Boyce T. How experience gets under the skin to create gradients in developmental health. *Annual Review of Public Health*. 2010;31:329.
14. Shonkoff J, Boyce WT, McEwen BS. The childhood roots of health disparities. *Zero to Three*. 2010;30(5):54.
15. Shonkoff JP, Boyce WT, McEwen BS. Neuroscience, molecular biology, and the childhood roots of health disparities. *JAMA: Journal of the American Medical Association*. 2009 06/03/;301(21):2252-9.
16. Nelson CA. Neural development and lifelong plasticity. In: Keating DP, editor. *Nature and nurture in early child development*. Cambridge, MA: Cambridge University Press; 2010. p. 45-69. Available from: http://www.cambridge.org/gb/knowledge/isbn/item5735933/?site_locale=en_GB.
17. Mustard JF. Early brain development and human development. In: Tremblay RE BR, Peters RDeV, Boivin M, editor. *Encyclopedia on Early Child Development [online]*. Montreal, Quebec: Centre of Excellence for Early Childhood Development (CEECD) and the Strategic Knowledge Cluster on ECD (SKC-ECD); 2009. p. 1-5.
18. National Scientific Council on the Developing Child. Excessive stress disrupts the architecture of the developing brain. Cambridge, MA: Harvard University, Center on the Developing Child; 2005 Summer. Available from: http://developingchild.harvard.edu/index.php/resources/reports_and_working_papers/working_papers/wp3/.