HOW EARLY EXPERIENCES GET INTO THE BODY: A Biodevelopmental Framework

1

The healthy development of children provides a sturdy foundation for responsible citizenship, strong communities, and sustained economic prosperity. Dramatic advances in neuroscience, molecular biology, genomics, and the behavioral and social sciences are deepening our understanding of how healthy child development happens, how it can be derailed, and what we can do to keep it on track. These scientific advances explain how early experiences are biologically embedded in the development of the brain and other organ systems and have long-term impacts on physical and mental health as well as cognitive, language, and social skills. By identifying the early, controllable influences on positive and negative life outcomes, this framework can guide the targeting of more effective policies and services for young children and families.

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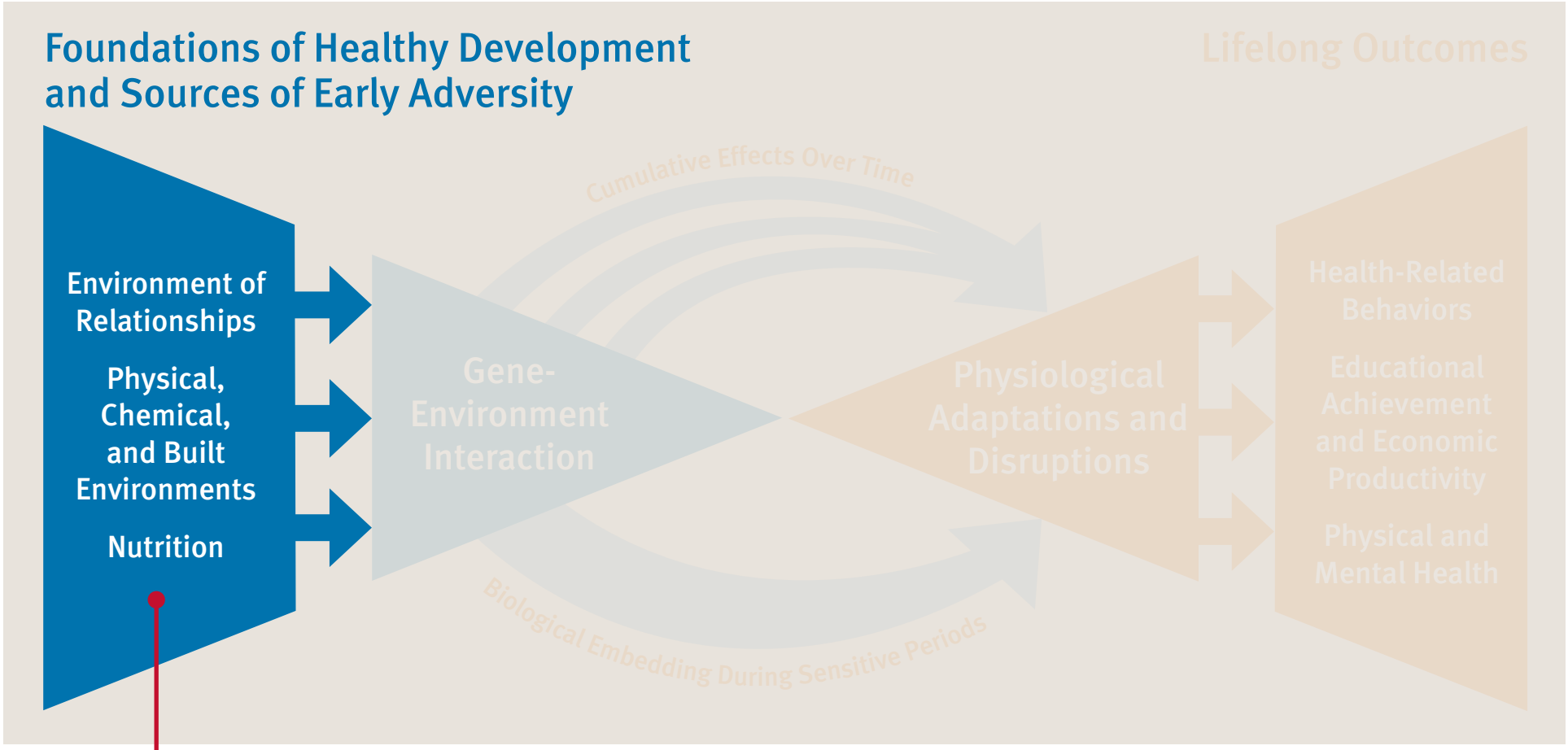

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Positive early experiences lay a foundation for healthy development, but adverse experiences can weaken that foundation. The environment of relationships in which a young child develops includes both family and nonfamily members and encompasses a continuum from nurturing, responsive caregiving to neglectful or abusive interactions. The physical, chemical, and built environments in which child development occurs require protection from neurotoxic exposures, such as lead, mercury, and organophosphate insecticides; safeguards against injury, such as the use of infant seat restraints in automobiles; and availability of safe neighborhoods, places to play, and spaces for supportive social interaction. Nutrition relates to the availability and affordability of healthy food; parent knowledge about age-appropriate meal planning for young children that assures adequate intake of essential nutrients; and effective interventions to address the growing problem of excess caloric consumption and early obesity.

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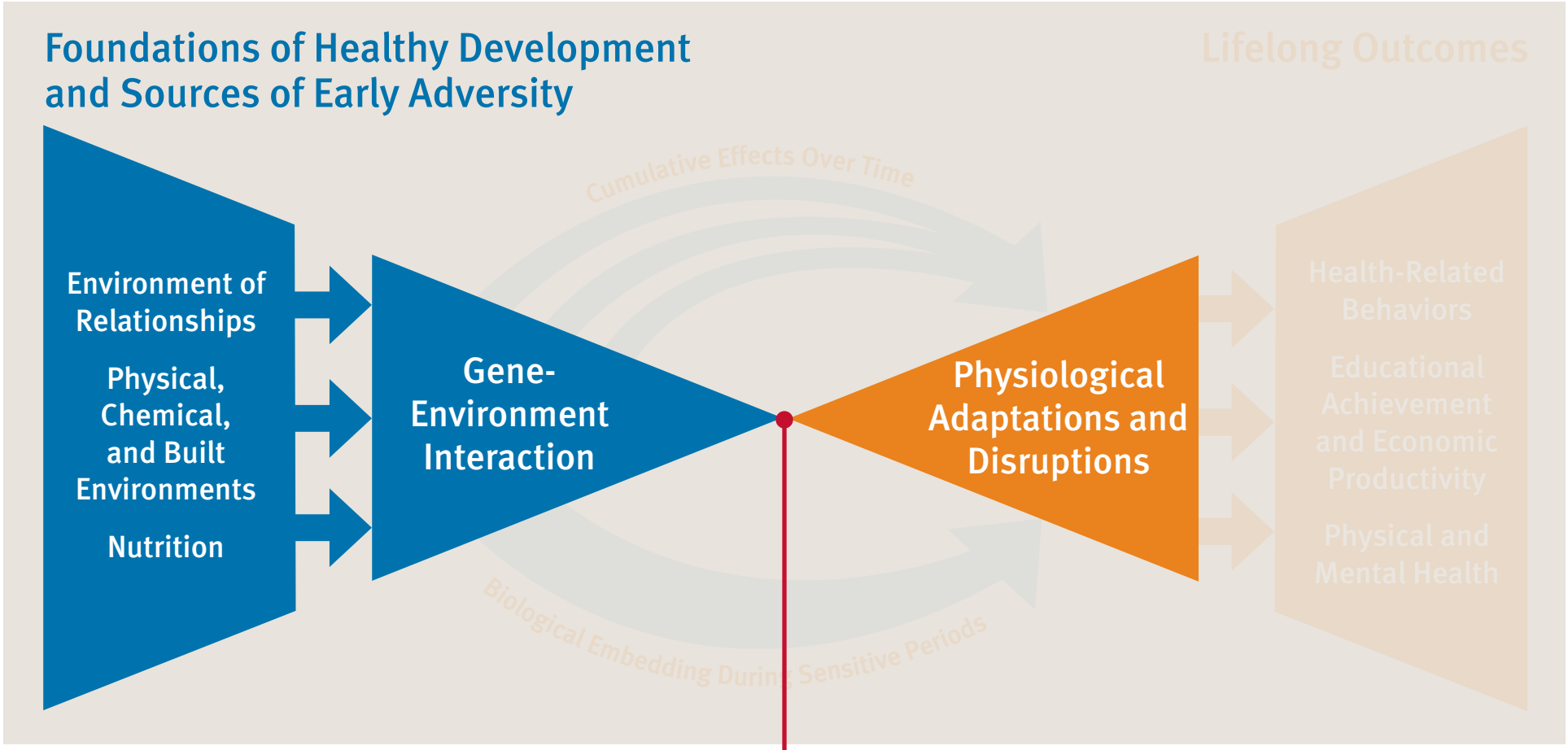

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The experiences of children in each of these domains interact with their genetic predispositions to create either physiological adaptations (when development is healthy) or disruptions (when it is not). In other words, both healthy development and many impairments in physical or mental health can be traced to biological "imprints" that are created through the interaction of a child's genes and experiences in the early years of life, in some cases beginning as early as the prenatal period. Indeed, our early experiences can actually leave a chemical "signature" on our genes that determines whether and how the genes are turned on or off. This is known as "epigenetic adaptation," and it shapes how our brains and bodies develop. This process is the biological mechanism through which our environment of relationships, physical, chemical, and built environments, and early nutrition cause the physiological adaptations and disruptions that can influence a lifetime of well-being.

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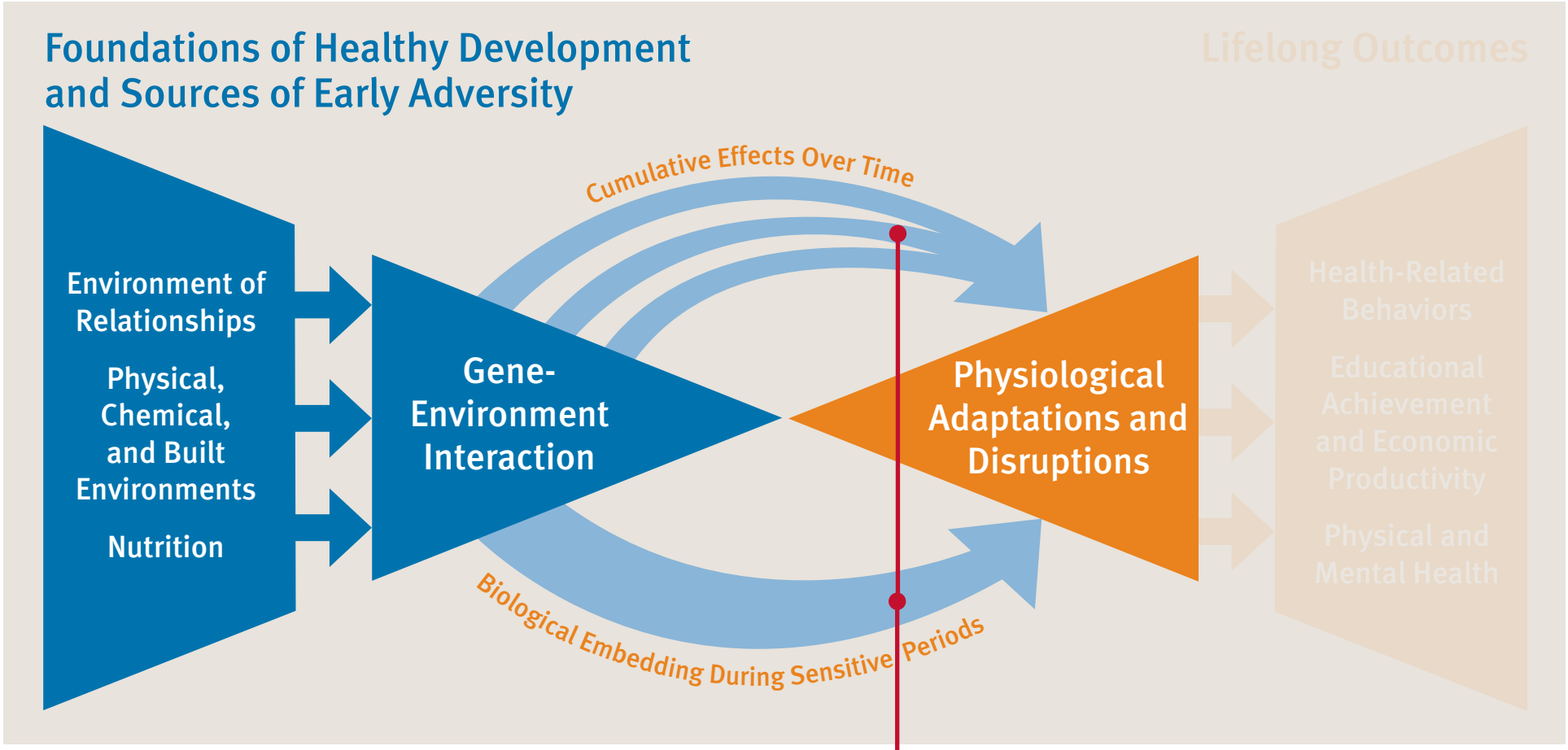

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There are two ways in which early experiences get built into the body. The first is the embedding of disruptions caused by adverse experiences during sensitive periods in the development of the brain or other organ systems. The lifelong cognitive and physical impairments associated with significant prenatal alcohol exposure are one prominent example of this type of time-sensitive effect. The second comes from the cumulative damage, or biological "wear and tear," caused by recurring experiences such as abuse, chronic neglect, or exposure to violence, particularly when added to the everyday stresses of family economic hardship. The biological mechanism for this "weathering" effect is related to the adverse impacts of chronic activation of the body's stress response systems. The stable relationships with supportive adults that help young children learn how to cope with stressful circumstances can make the difference between positive adaptation that promotes healthy development and negative disruptions that can undermine the architecture of the developing brain and other biological systems.

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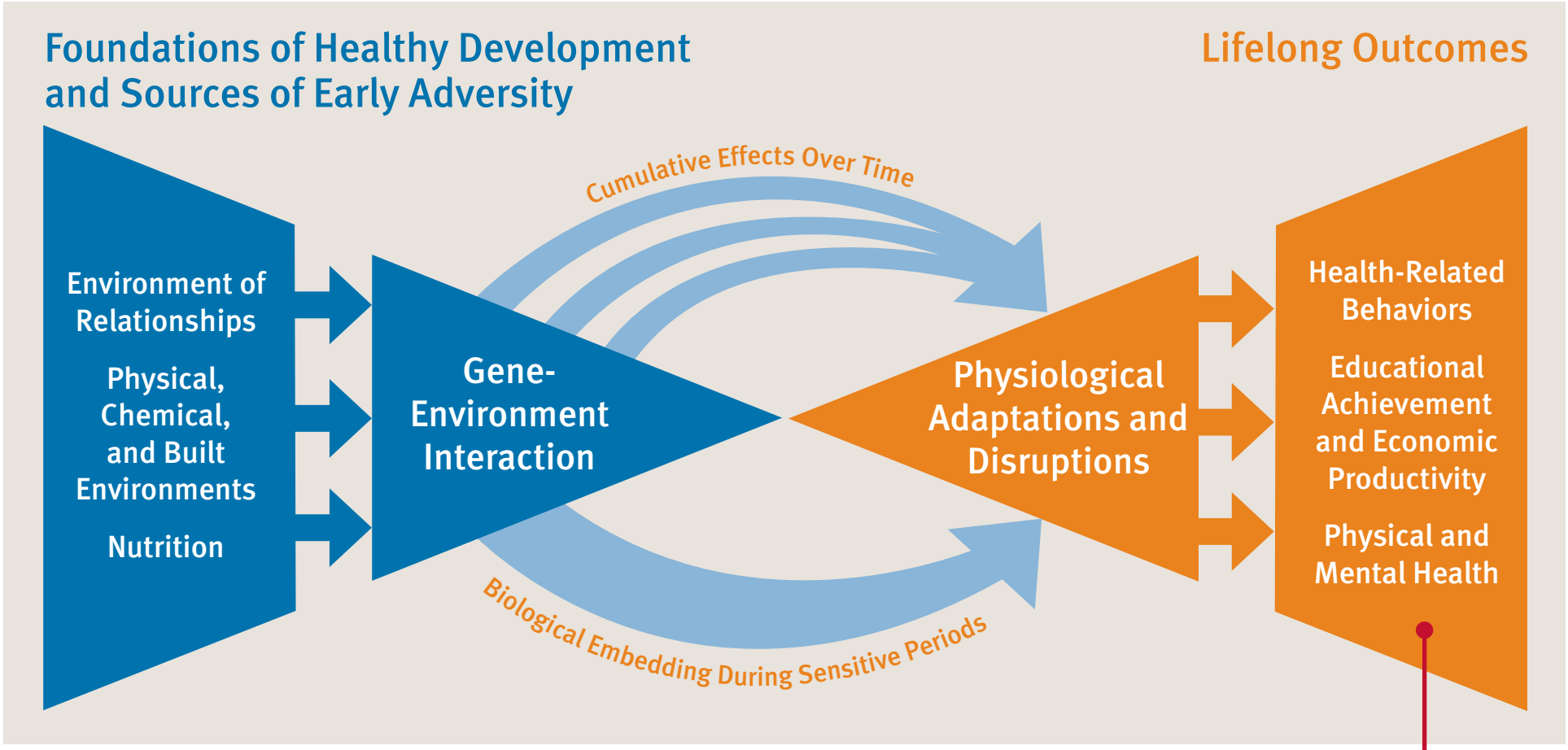

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These physiological responses to early experiences, in turn, affect adult outcomes in educational achievement and economic productivity; health-related behaviors that are either enhancing (e.g., nutritious diets, frequent exercise) or threatening (e.g., smoking, alcohol abuse, illicit substance use, other risk-taking behaviors); and physical and mental health. When early influences have been positive, physiological systems are typically healthy and adaptive. When influences have been adverse, systems may be dysfunctional and can lead to impaired learning, maladaptive behavior, illness, disability, and a shortened lifespan. In other words, children who live in health-promoting environments and have positive early experiences tend to go on to complete more years of school and have higher-paying jobs, live healthier lifestyles, and live longer, healthier lives. Children who experience significant adversity early in life without consistent support from caring adults are more likely to drop out of school earlier, earn less, depend more on public assistance, adopt a range of unhealthy behaviors, and live shorter and less healthy lives.

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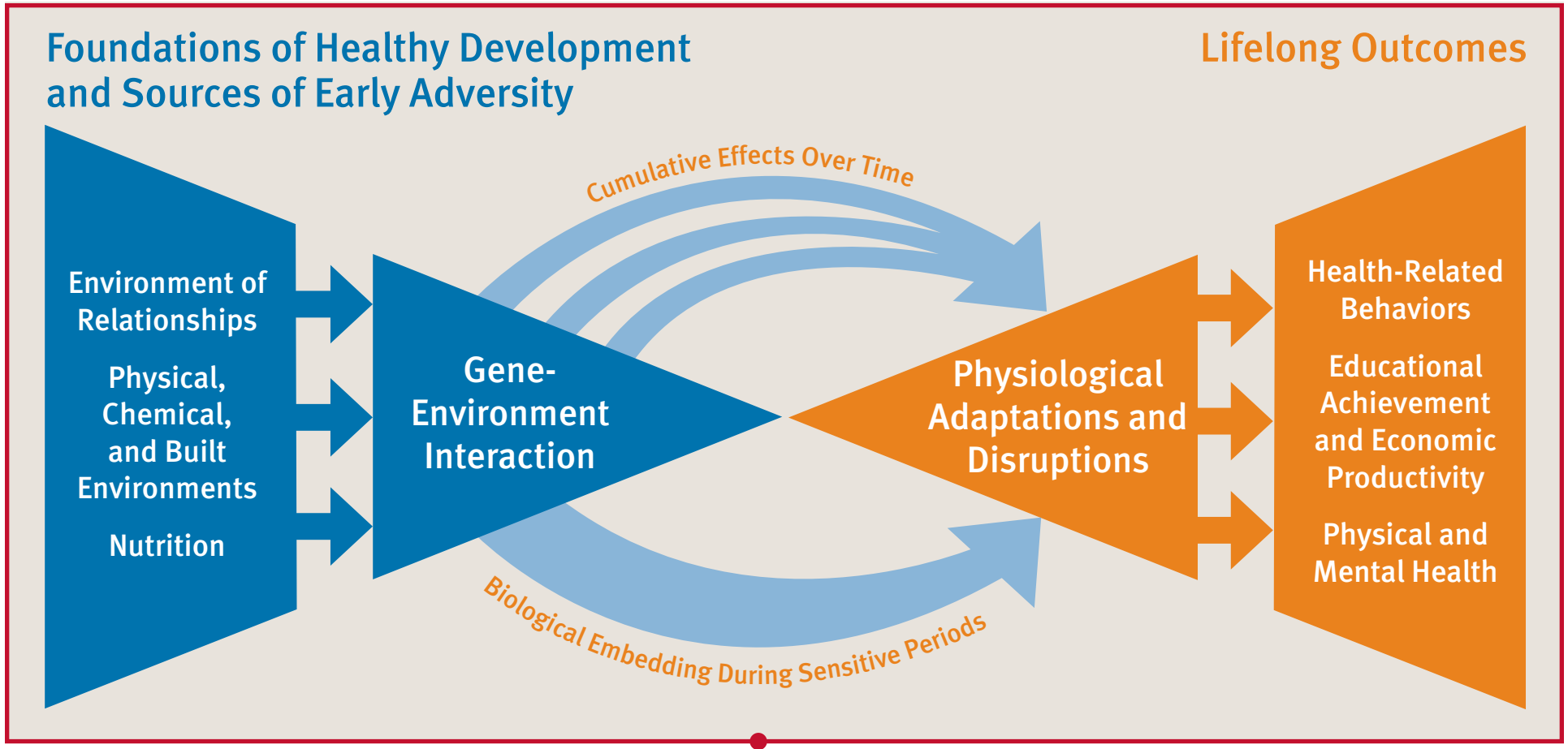

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This biodevelopmental framework highlights the shared early childhood roots of lifelong outcomes in learning, behavior, and both physical and mental health. An integrated approach to addressing disparities in those outcomes offers a promising opportunity to devise interventions that attack societal problems at their source. We know more now than ever before about how young children learn and develop and how to promote competencies in a variety of domains. These rapidly growing scientific frontiers offer unprecedented opportunities to catalyze a new era in early childhood policy and practice that is guided by science and driven by leadership that combines a strong sense of civic responsibility, an informed understanding of the positive returns that can be generated by wise investment, and a willingness to explore new ideas.