

## Environment Shapes Health, Including Children's Mental Health

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At the end of the 19th century, nearly every American had lost friends and loved ones to illness and early death. During the course of the 20th century, there was a 30-year improvement in the American life span. Although this may seem a medical miracle, most of those added years of life were due to environmental change—better water, food, and housing; less crowding; and safer workplaces.<sup>1</sup> These changes were often spearheaded by the advocacy of physicians, but became reality through the work of civic leaders, business people, engineers, and designers. What may have been seen as a hopeless Utopian effort to create cities and towns with healthy water, decent transit and schools, and civic centers such as libraries and hospitals turned out to be a spectacular public health success.

Now, in the early years of the third millennium, the American public faces a new set of challenges. In the United States, we have transitioned from an era marked predominantly by infectious diseases to one dominated by chronic diseases such as coronary artery disease, diabetes, cancer, and mental disorders.<sup>2</sup> Addressing these modern ailments, clinicians and researchers have been working ever harder to promote healthy lifestyles and to offer the latest therapies and medications.

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However, there is much to be learned from the lessons of a century ago. Physicians, as daily witnesses to the ill health caused by contaminated water and intense crowding, were valuable advocates in the efforts to improve people's living environments. The role of the physician is just as critical today: the challenges are different, but the environment still shapes many of our health problems, including those of mental health.

Throughout humanity's history, children have been immersed in the natural world, but over the past several generations, the natural environment has been dramatically displaced by the "built" environment. Children now spend almost the entirety of their days in houses, schools, vehicles, and commercial facilities. Children require more than social immersion to develop—they need environmental immersion. They experiment hourly with gravity and tastes, textures, and colors; they have developmental needs for stimulus from and interaction with the world around them. What are the physical and mental health consequences of this new immersion into an entirely built environment?

The physical health effects of America's built environment are extensive. For example, the leading cause of death for ages 3 to 33 years is motor vehicle crashes.<sup>3</sup> Infant and booster seat requirements have reduced this mortality somewhat, but the inescapable fact is that American communities are designed and built for vehicles, not for children or older adults, disabled, or poor. Most American children are unable to meet their life needs by walking or biking and must depend on being driven to their life tasks. The number of children walking or biking to school has decreased from 41% to 13% since the 1970s.<sup>4</sup> Children need this incidental exercise and free time for both physical and mental development, yet most modern schools are built far from where children live, usually without sidewalks or bicycle routes. Because of distance and inaccessibility,

many children must take the bus home and cannot stay for after-school athletics or clubs. It is not surprising that a 13-year-old girl is 16 pounds heavier today than 30 years ago<sup>5</sup> and that only one of four fifth graders can pass all levels of a fitness test that includes run-walking 1 mile.<sup>6</sup> Many new subdivisions in America have no foot- or bike-accessible parks or civic buildings, including schools and libraries. In most new subdivisions, a child cannot get together with a playmate without the help of a car and driver (often a harried parent who struggles with long commutes of her or his own). Our neighborhoods are built to speed cars, not to grow children and families.

For mental and developmental well-being and enjoyment of life, a child requires increasing mastery of physical and social challenges. The removal of autonomous space, where a child has the latitude and time to explore and play, affects children's fitness. Could it be affecting children's mental and social resilience as well? Consider how the built environment contributes to how American children experience a typical day: after a heavily sugared cereal at breakfast, given by parents themselves about to commute, they are strapped in a car or hauled by bus to a large school where they sit at a desk for long periods, have limited recess and playtime (many schools have reduced or even eliminated their physical education programs), eat a school lunch in a makeshift cafeteria, and then have more desk time in a schoolroom, before they are back in the vehicle and then into a room at home for computers and video games. They experience a series of days with no outdoor neighborhood play; they are isolated from their neighborhoods and from the public space around them. The buildings they live in and the vehicles they are transported in—however well they are decorated—are designed for efficiency, for enclosure, and for safety (from threats that are largely part of the built environment: traffic on roads, for example).

Ask parents why their children do not walk to school. You will hear about distance and traffic, heavy books, and bad weather, but the final answer is commonly: child molesters. "Stranger danger" is an anxiety deeply imbedded in today's America, even though the actual data do not substantiate any increase in rates. News reports, especially television news, make us feel that the safest place for children is within the walls of their own home.<sup>7</sup> The lack of shared spaces and the adult preference for isolation in vehicles lead to fewer face-to-face interactions with others and a decreased

familiarity with the neighborhood. Not knowing the neighbors, having no "eyes on the street," and a lost sense of community amplifies the loneliness, increases anxiety, and affects personal and social well-being.

Alienation from public spaces is not the only cause for concern. Ask any member of the baby boom generation what their after school hours or Saturdays were like, and they invariably answer: "I went out pretty much wherever I wanted and just had to be home in time for dinner." Were you bored? "Never, although I am glad my parents didn't know all the stuff I was up to." Ask a modern American suburban child the same question: What is it like where you live? "Boring!" Although the research is limited, there are correlations between boredom and attention-deficit/hyperactivity disorder<sup>8</sup> and boredom may be one contributing factor to substance abuse.<sup>9</sup>

Researchers are increasingly interested in gene-environment interactions and specifically in making sense of the contribution of "environment" to health.<sup>10</sup> Recognizing the sheer breadth of the term "environment" and considering the effects of the built environment on our phenotypes are two significant challenges to current research in this area. This is particularly important for children because we cannot assume that the environment affects children in the same way that it affects adults.

Meeting the developmental needs of children would require a shift in priorities and would demand that we rethink how we direct our research and investments. The effects of the built environment on physical health, ranging from lack of fitness and obesity to asthma and lead toxicity, are increasingly recognized and documented. There is a similar need for research into the effects of the physical environment on children's mental health as well.

Pediatricians and psychiatrists daily see children and families confronting mental disorders. These children are often directed into the health care system and their problems dealt with the tools we have: clinical interventions such as therapy and medications. Our clinical "one-at-a-time" approach to these children is challenging and time-consuming and not infrequently discouraging. Perhaps the limitation is not our skills, but rather our focus: we are trying to return the most affected tail of a population distribution to the mean, rather than recognizing that the entire population needs to move toward mental well-being bringing along the

disaffected—a shift that can only occur by shaping the “environment writ large.”<sup>11</sup>

Children who are exploring and playing are not bored, especially if they are with other children. Children who are accustomed to new people are better prepared for the world. Is it possible that the social isolation, the lack of safe, natural public spaces, and immersion in the built environment with minimal exercise of modern America is contributing not only to today’s lack of fitness and obesity but also to the increasing prevalence of mental disorders?

When America faced epidemics of infectious diseases a century ago, society banded together to create communities and infrastructure that afforded better housing, water, food, and health. Life spans improved. As we become increasingly aware of the effects of the built environment on the social and mental development of children and the well-being of families and communities, we may want to investigate specific changes in our landscape, just as we previously recognized the benefits of clean water sources, lead-free paint, and safer workplaces.

What sort of changes might be required? Schools could be required to be accessible to children walking or biking, under the formal and informal supervision of parents and neighbors; this would entail more support of “Safe Routes to Schools” programs and locating schools nearer to where families live. It would be physically helpful if a 10-year-old boy weighing 86 pounds were to walk 1 mile per day to and from school for 1 year, he would burn off 18,720 calories, about 5½ lb of body weight. Might he reap mental and social benefits as well? Children can become invested in the environment not only through an appreciation of these open spaces but also through community or school-run gardens, where children learn to grow and prepare food. (See, for example, the California School Garden network, at <http://www.csgn.org/publications.php>.<sup>12</sup>)

Changes in urban design may include new perspectives on economic planning, so that subdivisions and housing developments are priced with wider cost ranges, giving children more opportunities to meet people of different means and to gain the cultural richness that a diverse economic community offers. Less controver-

sially, if cities had higher density public transport—accessible downtowns with economic and cultural diversity, shops, and civic structures, then teenagers may feel less like hostages in their homes waiting for a ride in a car and parents may feel less like chauffeurs on a busy, harried schedule. Suppose transit nodes were located near where children lived, taking them to other sites and life destinations, like ballparks and beaches?

Politicians, architects, urban planners, and public health officials are becoming increasingly interested in creating walkable vibrant towns and neighborhoods, with energy efficiency and diversity, urban edge agriculture, and “eyes on the street.” Physicians, including child and adolescent psychiatrists, may have a role to play in identifying needs, comprehending the relationship between pathology and psychopathology and the built environment, and advocating for the well-being of children and the world in which they live.

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