

Design & Health Topics

Six approaches to achieving health through built environment design & policy

Defining scope

The American Institute of Architects' 83,000 members are experts in the design and spatial organization of built environments. They use design thinking to create systems and spaces that solve client needs, inspire occupants, and support a sustainable environment. Alongside urban planners, developers, interior designers, and landscape architects, architects provide the physical and aesthetic framework for healthy homes, workplaces, neighborhoods, and cities.

“Architects are public health workers. We have a partnership—public health professionals and architects and planners. Our minds have to talk because we have an influence on America’s public health that we’re only now beginning to grasp.”

Rear Admiral Boris Lushniak

Acting US Surgeon General

Rear Admiral Lushniak’s statement is a rallying call to all architects and their colleagues. The countless decisions architects make in public and private practice have health impacts that deserve closer reflection and analysis. This is particularly true of architects who uniquely practice at the urban and individual building scale.

Recognizing the enormous responsibility that architects have to create positive change, the AIA has adopted a conceptual framework in which the physical environment creates access to health opportunities and facilitates positive health behaviors. Further, the model recognizes that public health presupposes social equity—that we must reconcile the socioeconomic and political environments that influence and regulate the built environment with the need for equitable distribution of health.

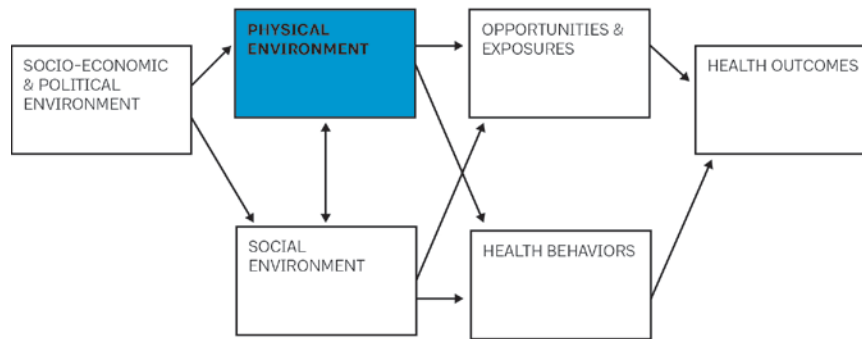


Image 1: Adopted model for health

All AIA policies and design approaches will directly address physical environments. As the leading voice for licensed architects and allied partners, the AIA is an authority on influencing and determining policy and design factors that pass through the blue box "Physical Environment."

As the leading voice for licensed architects, emerging professionals, and allied partners, the AIA promotes policies and practices that enhance the health and well-being of all populations through the design and construction of physical environments at the urban and building scale.

Six approaches to health

Health and well-being are complex phenomena, reflecting innumerable factors and relationships. Throughout human history, infectious diseases such as tuberculosis and cholera plagued humanity. With modernity, chronic diseases such as cardiovascular diseases, cancer, and diabetes became predominant. Mental illness afflicts large segments of populations in all countries. Other modern diseases, such as neurodevelopmental disorders (autism spectrum and attention deficit disorders), autoimmune conditions, and reproductive disorders, are important, and in some cases are on the rise.

But health and well-being comprise more than the absence of such diagnoses. The World Health Organization constitution (1946) defined health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." Well-being includes social connectedness, spiritual fulfillment, life satisfaction, and happiness. These conditions depend in part upon health, and in turn contribute to health.

The built environment has an important impact on health and well-being. However, these links to health—compounded by unique cultural, demographic and geographic considerations—often extend beyond the workaday practices and vocabularies of design professionals.

The Design and Health Leadership Group recommends six evidence-based approaches to health that architects can control through design practices and policies: environmental quality, natural systems, physical activity, safety, sensory environments, and social connectedness. These approaches suggest a new minimum standard of conscientiousness as practicing architects, educators, and interns consider the implications on health outcomes.

ENVIRONMENTAL QUALITY

Environmental quality, in the context of design and health, refers to preventing, mitigating, or reversing quantifiable chemical and microbial site, water, and air pollutants that directly or indirectly affect populations. Environmental quality is a public health priority because chemical exposure can inhibit neurological function, increase rates of

cancer, and increase incidence of low-birth weights; untreated water increases the likelihood of waterborne illness, especially among vulnerable populations; and air pollutants contribute to increased mortality and morbidity from cardiovascular and respiratory disease, as well as to climate change.

Barriers to good environmental quality include sealed buildings; poor maintenance practices; proximity to freeways; covered streams and natural corridors; and impermeable paving. Low-income and minority populations are particularly sensitive to issues of environmental quality where HVAC and water management systems may be less refined; where populations are proximal to high-load traffic corridors; and where brownfields and contaminated sites are more prevalent.

Architects create opportunities for increasing environmental quality through design and policy approaches that include:

- Materials that limit allergies or potential toxins
- Adequate air exchange
- Brownfield site remediation
- Vegetation screens, onsite plants
- Building envelopes to manage moisture and prevent mold growth
- Limited opportunities for pests and rodents to hide and nest
- Efficient water use to minimize waste
- Zoning that addresses hazardous use
- Buildings sited away from major infrastructure, highways
- Systems & practices to monitor particulate matter, especially chemical and vehicular
- HVAC systems sited away from existing pollution
- Surface streams
- Permeable surfaces
- Structural and non-structural storm water management
- Vegetate filtration systems
- Preserved urban forests and wetlands

Potential research questions of importance to practicing architects may include:

1. What are the health impacts of choices among increased use of individual wells, extended municipal water systems, and increased use of non-potable gray water?
2. How effectively are building materials engineered to purify air and water, especially in areas with high concentrations of air contaminants?
3. What effect do real-time dashboard-like displays of air pollutants, water contaminants, etc., have on individual behavior? How might internet applications and social networks support healthy decisions?

NATURAL SYSTEMS

Natural systems refer to natural forms, diverse species, and ecosystems that influence design. The promotion of natural systems is a public health priority because it provides stress relief, accelerates recuperation times, healthy eating, promotes physical activity, and encourages social activity. More than that, they provide shelter, filtration, crop vigor, and climate control.

Barriers to natural systems include a lack of vegetation, quality parks, and zoning; the presence of food deserts; and policies affecting green infrastructure. Vulnerable populations are often underserved by natural systems, especially related to food production and distribution.

Architects create opportunities to natural systems through design and policy approaches that include:

- Natural site characteristics as starting point for building and community design
- Passive solar design
- Natural materials and patterns in design
- Views and adjacencies to nature
- Interior or adjacent courtyards

- Parks within .5 mile radius of facility
- Linear parkways
- Biomimetic elements and processes
- Healthy, diverse microbial populations
- Green roofs to reduce heat-island effect, ground-ozone formation, pollutant filtration, and storm water management
- Outdoor space within walking distance of all occupants
- Select natural vegetation
- On-site food production
- Bio-swales
- Water filtration, flood control

Potential research questions of importance to practicing architects may include:

1. What are the health costs and benefits of many small local parks accessible by walking, compared with having fewer large parks accessible primarily by automobile?
2. What are the obstacles (e.g. the use of electronic debit cards) to increased availability and use of farmers' markets?
3. How does the integration of microbial populations through design affect human health and function? Could these microbes contribute to a pro-biotic environment, and what controls are necessary to regulate future effects?

PHYSICAL ACTIVITY

Physical activity refers to exercise, recreational activity, and activities that comprise everyday life, including labor, commuting, and chores. Physical activity is a public health priority because it promotes individual choices and habits that reduce the risk of cardiovascular disease and other health problems.

Barriers to activity include a lack of access to infrastructure and opportunities to physical activity, including playgrounds and pedestrian amenities; overdependence on automobiles; and prescriptive policies affecting stair design and location. These barriers are particularly burdensome among lower-income and older populations who will become housebound without comprehensively designed facilities and communities.

Architects create opportunities for physical activity through design and policy approaches that include:

- Multi-modal transportation systems
- Bicycle and pedestrian trails
- Varied park types, including dog, ball, and skateboard
- Attractive, connected streets
- Exercise facilities
- Showers and changing rooms
- Point-of-decision prompts
- Street furniture at consistent intervals
- Prominent stairs
- Active Design strategies
- Universal Design strategies

Potential research questions of importance to practicing architects may include:

1. After controlling for socioeconomic status and other factors, do communities with higher levels of observed walking have less obesity than those with lower levels of observed walking?
2. What impact does the elimination of parking minimums in zoning codes have on commutes by walking, mass-transit, and bicycle?
3. In retrofit projects, how much distance between prominent stairs and mechanical vertical circulation (e.g. elevators, escalators) is required to see a noticeable change in behavior?

SAFETY

Safety refers to the protection from physical or psychological harm caused by accidental injury or crime. The promotion of safety is a public health priority because it removes both real and perceived impediments and disincentives influencing physical activity, including walking; it reduces the likelihood of physical injury; and it helps alleviate and reduce anxiety and stress that can increase the likelihood of hypertension, hyperglycemia, and obesity.

Barriers to safety include the presence of incivilities (litter and graffiti); lack of access to infrastructure; unregulated traffic speed and congestion; inadequate pedestrian safety; and a fear of crime, especially in lower-income communities.

Safety is, perhaps, the best-regulated tenet of the architect's profession obligation to HSW. Architects create opportunities for safety through design and policy approaches that include:

- Elements to minimize falls
- Adequate lighting
- Durable, quality materials
- On-site concierge or security stations
- Clear signage
- Open sightlines
- Adherence to fire code
- Increased pedestrian visibility
- Support regular maintenance
- Visible access to entries / exits
- Visual connection to public recreation
- Flexible furniture plans to reduce
- Communal social spaces
- Dense, walkable neighborhoods with many "eyes on the street"
- Wide sidewalks
- Access to vital services including shopping, food, and education

Potential research questions of importance to practicing architects may include:

1. What are the effects on crime and visitor use when designs are implemented that result in more "eyes on the street"?
2. What design elements most contribute to actual and perceived safety?
3. What features of the built environment—e.g. front porches, sidewalks, parks, churches, community centers, and transportation alternatives—affect social connectedness and health?

SENSORY ENVIRONMENTS

Sensory environments refer to the perceived olfactory, tactile, acoustic, and aesthetic quality of space that contributes to the physical, mental and emotional well-being of people. Diverse sensory environments are a public health priority because they promote safety, well-being and quality of life.

Barriers to sensory environments include inefficient thermal controls; poor lighting; intense shadows; uneven or overly slippery surfaces; and noise, especially at higher decibels over longer periods of time. These barriers can give rise to physical damage and psychological, behavioral, and somatic discomfort and stress when not appropriately considered in the design process. Methods should be developed to measure the impact of these physical environmental attributes on health and wellbeing, objectively, sensitively, non-obtrusively, and at low cost.

Architects create opportunities for sensory environments through design and policy approaches that include:

- Reduced construction noise
- Ergonomic furniture and fixtures
- Circadian rhythms and diurnal lighting
- Envelope design to optimize glare-free direct and indirect lighting
- Diverse color, graphics, and textures
- Graphic and structural way finding
- Individual thermal controls
- Mood-enhancing lighting systems
- Noise barriers
- Acoustic controls
- Hypoallergenic materials

Potential research questions of importance to practicing architects may include:

1. How do characteristics of a physical setting such as noise level, crowding, and lighting affect the mental health and social functioning of adults and children? How do these characteristics affect health in persons at different life stages and in different social groups?
2. Do communities where local governments pay for sidewalks have better infrastructure and maintenance than places where homeowners pay for sidewalks? What material and aesthetic features distinguish public from private pedestrian pathways?
3. In offices where full-spectrum LED lighting systems have replaced fluorescent lighting, what energy and productivity savings have been measured? What co-benefits exist for individual productivity outside of business hours?

SOCIAL CONNECTEDNESS

Social connectedness—also referred to as “social capital”—refers to the networks of relationships that bind people together. It includes attitudes and norms such as trust and reciprocity, as well as behaviors such as civic participation, voting, and helping neighbors. Social connectedness is a public health priority because it helps communities and societies function more effectively, it predicts higher levels of happiness and well-being, and it predicts better health.

Design for social connectedness reinforces other design elements discussed in this document. For example, communities with high levels of social connectedness have “collective efficacy”—social cohesion and a willingness to intervene for the mutual good, which results in reduced levels of violence and greater safety. Similarly, well-designed parks both promote social connectedness and provide contact with nature.

Barriers to social connectedness include restricted access to third spaces, which are the anchors to community life including cafes, lobbies, and bistros; non-contiguous urban pathways that separate populations; restrictive zoning policy; and underdeveloped public parks and courtyards.

People thrive on relationships with each other—within our families, with our friends, across our communities. Architects create opportunities for social connectedness through design and policy approaches that include:

- Public spaces such as lobbies and staircases
- Third places such as cafés and bistros in commercial and residential developments
- Mixed-use zoning policies
- Public squares, promenades, courtyards, and pocket parks as parts of urban fabric
- Parks and green spaces that draw people in and offer opportunities for social interaction
- Access to civic services including libraries, museums, community centers, and playgrounds
- Porches and street furniture to activate streetscape
- Centrally located water coolers and dining areas in offices

Potential research questions of importance to practicing architects may include:

1. How do high levels of social connectedness contribute to a community’s resilience, especially following periods of intense interruption such as flooding or fire?
2. Do communities with zoning policies and variances that encourage porches, street furniture, and mixed-use density demonstrate higher levels of social connectedness? How do these policies and resources affect health in persons of different life stages or social groups?
3. What is an effective ratio of shared space to dedicated space in commercial and government development to maximize human performance, social connectedness, and well-being?