HAPI

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Access to Community Resources, Health, and Place

A RESEARCH BRIEF
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Photo by Ann Forsyth

The HEALTH AND PLACE INITIATIVE (HAPI) investigates how to create healthier cities in the future, with a specific emphasis on China. Bringing together experts from the Harvard Graduate School of Design (HGSD) and the Harvard School of Public Health (HSPH), it creates a forum for understanding the multiple issues that face cities in light of rapid urbanization and an aging population worldwide.

Health and Places Initiative
http://research.gsd.harvard.edu/hapi/
Harvard Graduate School of Design

The Research Briefs series summarizes recent research on links between human health and places at the neighborhood or district scale and provides background for a number of other forthcoming products—a set of health assessment tools, planning and urban design guidelines, urban design prototypes, and neighborhood cases. While the Research Briefs draw out implications for practice, it is these other tools that really provide specific, real-world guidance for how to create healthy places.

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Big Ideas

- A key question connecting health and place is whether people have **community resources** available that they need to live a healthy life, and also the ability to get to them conveniently. This is a fundamental need underpinning the relationship between health and place.
- **Accessibility** to community resources can be characterized through the density and diversity of available resources, potential route options (connectivity), distance of residents to resources (proximity), and mobility options.
- A lack of community resources has an indirect effect on health, through shaping the availability and convenience of health resources and habits that support healthy behaviors.
- Community resources important to health include (but are not limited to): health facilities (e.g. doctors, pharmacies), physical activity/recreation spaces, and healthy food.
- This brief takes a broad view of access to community resources, through the lenses of **urban form** and **transportation**. Can people get to the places they need to work, play and make healthy choices?
- Depending on the particular area, **low-income people** may or may not have less access to community resources than higher income (as measured by quantity, not quality).
- Generally speaking, greater density and diversity of resources, and greater amounts of connectivity via different modes of transport, will equate to more accessibility.

What the Research Says

Health Issues

Geographical access means someone is able to get to services he or she needs conveniently (i.e. in a reasonable amount of time).

Example: According to the International Encyclopedia of the Social & Behavioral Sciences, geographical access is defined as,

> *"Access in a geographical context is the quality of having interaction with, or passage to, a particular good, service, facility, or other phenomenon that exists in the spatiotemporal world. For example, access may be based on measuring the distance or travel time between where residents live (housing units) and the facilities they need (e.g. medical facilities, shops, workplaces). Access is also a relative concept that varies according to the level of opportunity afforded at the destination. Assessments of access (or lack of access) are made meaningful by comparing access in one zone (or for one type of individual) with access in (or for) another" (Talen 2001, 30).*

This brief takes this broad view of access to community resources. Can people get to the places they need to work, play, and make healthy choices? Are a variety of land uses available? Are they close enough? Can people get to them conveniently by different modes of transportation?

Geographic access is indirectly connected to health through difficulties accessing public facilities, resources, or transportation options (see Table 1 below). Alternatively, a group of people (e.g. low-income urban residents) may have too much exposure to negative, obnoxious, or toxic environments, leading to health effects (environmental justice issues). For more information see other HAPI Research Briefs on disasters, housing, noise, air quality, and toxics.

Table 1. Sample health issues related to geographical accessibility

Health Issue	Examples	HAPI Research Brief
Prevention of chronic diseases and weight issues	• Access to healthcare resources • Access to recreational facilities and green space (physical activity) • Access to healthy food	Healthcare Access, Healthy Food, Physical Activity
Treatment and maintenance of injuries and illness	• Access to healthcare resources (doctors, hospitals, mental health resources, pharmacies)	Healthcare Access
Overall mobility and access, independence, quality of life	• Effective and convenient transit options • Universal design/accessible infrastructure	Universal Design synthesis and Access to Community Resources

Note: Geographic accessibility to employment opportunities, education, and childcare are important issues, as are having a range of job opportunities that match the skills of residents, since they allow for more financial independence and quality of life. However, these specific issues are mostly outside the scope of this research brief.

Place Issues

Geographic access has two main themes: how close, dense and diverse are available resources? And, can you get to them quickly, safely and conveniently?
As a function of place, this comes down to:
(a) The pattern of spatial development (density, land-use diversity)
(b) The transportation network (diversity, speed, infrastructure, available modes, etc.)

Two other health-relevant issues related to geographic access include regional inequalities and uneven access to public facilities and resources. Table 2 below describes examples and questions related to these place issues. It should be noted that accessibility varies among kinds of people. For example, while a higher density environment with nearby destinations may be generally more accessible through walking and transit, this may not be the case for an older person with mobility impairments that make walking long distances and using stairs more difficult. Such a person may find a lower-density environment to be easier to get around in, because it makes using a car more feasible.

Photo by Ann Forsyth

Older people with mobility impairments may find lower-density environments easier in later life, because it makes using a car more feasible.

Table 2. Place issues related to geographical accessibility[1]

Place issue	Examples
Urban form	• Sprawl versus compact urban form • Housing density, mixed-use • Town centers versus strip development • Transit-oriented development
Transportation barriers	• Lack of transportation alternatives for those who do not drive (availability and convenience) • Lack of cycling/pedestrian infrastructure • Uneven construction and operation of public transportation systems • Mobility barriers (environments without universal design make accessibility more difficult for younger people, older people, and those with disabilities or injuries)
Regional inequalities	• Inner cities versus suburbs or rural areas (resources may or may not be concentrated in one or the other – employment, economic, cultural, political, etc.) • Federal or foreign investment in certain areas of the country over others • Service/area deprivation
Uneven distribution of public facilities and resources	• Maintenance and quality of utilities, like roads, water, or electricity more in one area than another • Uneven location and quality of parks, playgrounds, pools, libraries, or schools • More distant locations and lengthened response times of first-responders (police, fire, ambulance)

1. Morrill 2001, 14790-14791; Talen 2001, 31; Universal Design HAPI Research Brief

Vulnerable Groups

Possibly (but not necessarily) people in low-income areas

Historically, there has been inequity in the distribution of public resources between poorer and wealthier areas (see Morrill 2001 or Williams 2001 for a review). There is currently mixed evidence about whether deprived neighborhoods (low income or education levels) have generally worse access to resources or employment in terms of density of resources and travel time.

Although historical inequities remain in some areas, the most recent evidence suggests that this is not necessarily so; it really depends on the particular place.

Example: Macintyre (2007, 1) critically reviewed international studies (USA, Europe, and Australia) on deprivation (72 articles cited) and found evidence to counter the frequently made argument that low-income areas always have less access to resources, such as healthy food and free recreational areas. Some studies found low-income places had less accessibility. For example, several places in the United States were found to have less access to healthy food for low-income residents, as opposed to the U.K., Europe, or Australia. In contrast, in other low-income areas no differences (or even higher access) were found for healthy food, recreation, or other community resources. The author concluded, "...it may not always be true that poorer neighbourhoods are more likely to lack health promoting resources, and to be exposed to more health damaging resources. The spatial distribution of environmental resources by area socioeconomic status may vary between types of resource, countries, and time

periods. It may also be that the presence or absence of resources is less important than their quality, their social meaning, or local perceptions of their accessibility and relevance."

Example: Boschmann and Kwan (2013) conducted a GIS spatial analysis of geographic job accessibility and the working poor in Columbus, Ohio. They conclude, "Our findings cannot confirm that minority composition or economic deprivation of neighborhoods is directly related to inferior [geographic] access to employment… this research provides further empirical evidence of the geographically diverse structure of work opportunities in decentralized postindustrial metropolitan regions" (Boschmann and Kwan 2013, 518).

Photo by Ann Forsyth

Some (but not all) lower income communities have less access to community resources.

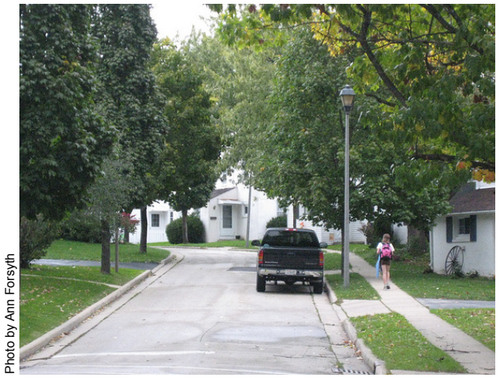

Photo by Ann Forsyth

Lower density, single use land use patterns are less accessible in terms of number of jobs and travel cost than more compact urban forms.

Things for Certain (or semi-Certain)

Urban form

Compact urban forms are more accessible in terms of number of jobs and travel cost (defined as a function of travel time and traffic flow, e.g. congestion) than more sprawling, low-density, single use land use patterns, even with slower travel speeds. However, most related research has been conducted in the U.S. rather than the world's highest density, most congested cities.

Example: Levine et al. (2012) created an intermetropolitan (52 metropolitan regions in the United States) GIS gravity-based accessibility metric to study the opposing influences of speed and proximity. The authors found, "Denser metropolitan regions have slower travel speeds but greater origin-destination proximity. The former effect tends to degrade accessibility while the latter tends to enhance it. Despite theoretical reasons to expect that the speed effect dominates, results suggest that the proximity effect dominates, rendering the denser metropolitan areas more accessible" (Levine et al. 2012, 157). Additionally, they conclude, "Where land use policy frequently seeks to support low-development densities in part in an attempt to maintain travel speeds and forestall traffic congestion, our findings suggest that compact development can often improve transportation outcomes" (Levine et al. 2012, 157).

In order to make travel times faster to destinations, and therefore increase geographical accessibility, communities sometimes widen roads or build new ones with the goal of reducing congestion. However, research has consistently shown that widening roads or building new ones is not a long-term solution for congestion issues (related to fast growth, in residents or car ownership) (Goodwin 1996; Hansen and Huang 1997). Over the long term, there is an "induced demand" effect, and congestion increases.

This underlies the importance of having transit options, as well as compact and mixed-use communities, as solutions to increase geographical accessibility.

Transit options

It is useful to provide people with multiple options for getting around. For those unable to drive, including the young and the old, transit can play an important role.

Urban areas are for the most part going to have the full range of community resources relatively nearby their residents. The question is often how quickly and easily can residents reach those destinations. Also, can they be reached without using a car? Populations for whom the most intervention is required are those who cannot drive (because they are too young, too old, have disabilities, or cannot afford a car). For these populations transit, cycling, and walking are key options. Providing only automobile access also runs counter to many other topics related to healthy cities, including air quality, universal design, and mobility issues related to aging. See the related HAPI Research Briefs for more details.

Things up in the Air

It is possible to map and compare different areas' access to a range of community resources thought to be important to health. However, which measures are most important and how they are ultimately measured in the literature varies. In addition, other factors such as the costs of transport, physical disabilities, cultural norms, and so on affect how accessible locations really are.

Example: Witten et al. (2003, 161) developed an area-based index of locational access to community services, facilities and amenities in order to "identify relationships between opportunity structures in the local environment and residents' health and well-being. The index is based on six domains: recreational amenities, public transport and communication, shopping and banking facilities, educational services, health services, and social and cultural services."

Example: Pearce et al. (2007) studied 38,350 census areas in New Zealand to determine patterns (if any) of neighborhood deprivation. Sixteen types of community resources were identified, grouped into five larger domains: access to health care provision, active recreational facilities, marae (Maori meeting places), food shopping facilities, and educational facilities (Pearce 2007, 350).

Example: Subramanian et al. (2006) used U.S. census data (1980) and Yellow Page information (1985), and surveyed 1,926 people, to conduct an statistical analysis on service-related neighborhood environments and elder health in New Haven, CT. Their measures of service density were defined as follows: "We distinguished four types of services: (a) services that promoted social organization (e.g. churches, synagogues); (b) services that promoted social interaction (e.g., beauty parlors, cafes, libraries); (c) services that were directly health related (e.g. hospitals, audiologists, pharmacies); and (d) services that may have adversely affected the reputation of neighborhoods and/or promoted deleterious health behaviours (e.g., liquor outlets, pawnbrokers, tattoo parlors, fast food outlets)" (Subramanian et al. 2006, S156).

Access to public facilities

It is not clear that there are populations universally disadvantaged in terms of access to community resources.

For example, low-income, older people and racially segregated individuals or communities may face greater accessibility challenges to community resources or employment. However, this is not always the case — it depends on the specific place.

Example: Pearce et al (2007, 348) in a study of 38,350 census areas in New Zealand found that for "15 out of 16 measures of community resources, access was clearly better in *more* deprived neighborhoods" (emphasis in original). Community resources included recreational amenities, shopping, educational facilities, health facilities, and Maori meeting places."

Implications

In these HAPI Research Briefs we aimed to find implications for planning and design at roughly the neighborhood or district scale. These could include quantifiable standards, more qualitative but yet evidence-supported insights, and other good practices. Not every topic has a full complement of these implications.

Standards and Insights

Generally speaking, places are more accessible when there is greater density and diversity of resources, and greater amount of connectivity via different modes of transport.

How planners pick what is an "accessible" distance or density may be based on what is desired, what seems reasonable, or what is documented as average for a given place or population. The two major urban planning factors for accessibility are the urban form and transportation availability.

Urban form

Examples of land use development strategies that promote more compact, mixed-use communities (with access to alternative forms of transportation):

Smart growth: incentivizes infill development and redevelopment away from open spaces and greenfields. Promotes mixed-uses through increasing proximity between housing and transportation choices, and jobs, schools, and community resources (Duany et al. 2011).

New urbanism: promotes compact, walkable mixed-use development (mix of housing and job types), active transportation and transit use (Talen 2013).

Transit oriented development: plans and zones for higher density (walkable) mixed-uses along transit lines (Ewing and Bartholomew 2013).

Retrofitting suburbs: promotes town centers versus strip development, mixed-use spaces (readapting former strip developments/ malls, etc.), adaptive reuse of existing structures, redevelopment, "re-greening", connecting cul-de-sacs, and integrating higher density via apartments and accessory units. (Dunham-Jones and Williamson 2011).

Transportation (Rail, Bus, Walking, Cycling)

People's willingness, mobility, available transit modes, and urban forms vary widely—therefore, it is useful to distinguish between what is a desirable for accessibility, and what people actually do. There is no "silver bullet" for what counts as an accessible distance. Table 3 describes some general good practices and sample "accessible" distances for walking and cycling, key forms of transportation that are accessible to a wide range of ages and provide physical activity benefits. However, the specific standards largely depend on the population and area being studied—and vary by such factors as socioeconomic group and location. Jarrett Walker's "Human Transit" blog and book also provide useful guidelines.

Photo by Ann Forsyth

Places are more accessible with greater density and diversity of resources, and greater amount of connectivity via different modes of transport.

Table 3. Implementation strategy and distances associated with walking and cycling[2]

Mode of transportation for able bodied adults	Implementation strategy	Distance example
Walking	• Community design (mixed-use, density) • Infrastructure availability • Combined strategies	• Conventionally, guidelines state 0.25 mile or 400 meters to destinations desired • However, people routinely walk further than 400m to reach destinations, especially when walking to transit (>800 m) • A more reliable threshold may lie between 300 and 600m (1000 and 2000 feet) • Goal: both work and residential environments contain transit stations within 1200m of all destinations, 750m is where there begins a considerable drop in walk-to-transit activity
Cycling	• Community design (mixed-use, density) • Infrastructure availability (mixed evidence for separated bicycle facilities) • Infrastructure of high quality, and combined strategies	• No agreed upon distance • Studies have reported people cycle around 2.5 km (1.5 miles) or less for transportation trips • Under 10 km (6.2 miles) for rail access trips and shopping • Up to 20 km (12 miles) for work commuting • Up to 30 (18.6 miles) to 40 km (24.8 miles) for fitness or recreation trips

2. Design for Health 2007, 6–8; Forsyth and Krizek 2010, 431, 434–435, 441; Iacono, Krizek, and El-Geneidy 2007; Ker 2003

For transit to be viable, it is critical that there is enough demand by area residents and employees for its services. This is created by having higher densities of residences, jobs and/or destinations (e.g. shopping) in an area.

As provided in the University of Minnesota "Design for Health" series, Tables 3, 4, and 5 summarize research based residential and employment center densities and walking distance recommended for transit service (Design for Health 2007, 5). The tables are based on the work of Pushkarev and Zupan (1977 and 1982), as well as subsequent work from the Transit Cooperative Research Program (1995).

Table 4. Recommended residential densities for transit service

Service Levels	Residential Density Thresholds (housing units per gross acre)
Bus: Minimum service (20 buses/day)	4 dwelling units/acre
Bus: Intermediate service (40 buses/day)	7 dwelling units/acre
Bus: Frequent service (120 buses/day)	15 dwelling units/acre
Light Rail: 5 minute peak headways	9 dwelling units/acre (25-100 sq. mile corridor)
Rapid Rail: 5 minute peak headways	12 dwelling units/acre (100-150 sq. mile corridor)
Commuter Rail: 20 trains/day	1-2 dwelling units/acre (existing track)

Sources: Design for Health 2007, 5; Pushkarev and Zupan (1977, 1982); Transit Cooperative Research Program (1995)

Table 5. Recommended residential densities and employment center sizes for transit service.

Minimum Service Level	Residential Density Thresholds (housing units per gross acre)	Employment Center Thresholds
1 bus/hour	4-6 dwelling units/acre	5-8 million sq. ft. commercial/office space
1 bus/30 minutes	7-8 dwelling units/acre	8-20 million sq. ft. commercial/office space
Light rail and feeder buses	9 dwelling units/acre	35-50 million sq. ft. commercial/office space

Sources: Design for Health 2007, 5; Pushkarev and Zupan (1977, 1982); Transit Cooperative Research Program (1995).

Other Good Practices

Using GIS to Measure Accessibility

There are many different ways of using GIS to measure accessibility. Results can vary significantly depending on which measurement method is used. Table 6. below provides some examples of different ways to measure accessibility using GIS (Forsyth 2012a, 2012b, Neutens et al. 2010).

Travel time can be a more useful metric than distance.

Example: Rodrigue et al.'s (2006) book, *The Geography of Transport Systems* explains, "Distance often tends to be interchanged with time when measuring the performance of transport systems, which is a conceptual error. While distance remains constant, time can vary due to improvement in transport technology or because of congestion" (Rodrigue et al. 2006, 5).

Case Study:

In *Towards Healthy Cities: Comparing Conditions for Change*, Otgaar et al. (2011) describe how the City of Udine, Italy has implemented a project for older people and disabled individuals called Services of Proximity or No alla Solit'Udine (No to Loneliness). The city has brought together the following resources: the Social Services department, voluntary associations, the police, the house building enterprise, and a phone call help service. "To improve access to services, the department has opened three public counters (one stop shops) and a free public phone line...via these counters citizens can get in contact with numerous suppliers of services in the field of health, transport, repair, library (books), shopping, legal advice, housing, etc." (Otgaar et al. 2011, 79)."

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