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.
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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Thanks to Heidi Cho, Lydia Gaby, Andreas Georgoulias, Emily Salomon, and Dingliang Yang for assistance.

Suggested Citation:
What the Research Says

Health Issues

Healthcare access is crucial to improving physical and mental health, preventing disease and death, extending life, and improving quality of life. Access to healthcare is commonly defined geographically, economically, or culturally (Gulliford et al. 2002, Ricketts and Goldsmith 2005). In a theoretical exploration, Fortney et al. (2011) have recently argued for the following dimensions of access: geographical, temporal, financial, cultural, and digital— to update the framework to include recent innovations in e-health technologies.

Geographic healthcare access refers to supply, diversity and distribution of services, and physical accessibility.

Temporal access includes the time it takes to be seen by a provider, times available at a provider, or time spent receiving treatment.

Economic or financial access refers to the affordability of services, insurance access, etc.

Social or cultural healthcare access tends to refer to acceptability of services, social norms, or language issues.

Digital access refers to recent innovations in e-health technologies.

Geographic healthcare access research typically focuses on non-geographical issues, e.g. cost, culture, and medical staff.

Place Issues

As further described in the “Things for Certain” section, greater distances to healthcare facilities or increased travel times discourage use of those healthcare facilities. Logically, this means that rural places face less geographical access to healthcare.
Vulnerable Groups

Issues of geographical accessibility affect certain groups more than others and these groups parallel those likely to suffer additional health problems due to physical vulnerability, lack of access to information, social marginalization, or those unable to afford proper healthcare.

Table 1 below describes a number of groups, which tend to have healthcare access problems.

Table 1. Groups vulnerable to low healthcare access

<table>
<thead>
<tr>
<th>Group</th>
<th>Dimensions of Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-literacy</td>
<td>Cultural, digital</td>
</tr>
<tr>
<td>Low-income</td>
<td>Economic, digital</td>
</tr>
<tr>
<td>Racial-ethnic minorities</td>
<td>Social, cultural, economic</td>
</tr>
<tr>
<td>Language issues: immigrants</td>
<td>Social, cultural, economic</td>
</tr>
<tr>
<td>Older people</td>
<td>Social, cultural, digital</td>
</tr>
<tr>
<td>Children</td>
<td>Social, cultural</td>
</tr>
<tr>
<td>People living in rural areas</td>
<td>Geographic, temporal</td>
</tr>
</tbody>
</table>

Low-income people, especially living in rural areas, tend to have low geographic access to healthcare.

China

Rural areas in China lack access to healthcare and have worse health outcomes.

Example: Anand et al. (2008) analyzed China’s quantity and distribution of healthcare workers, using province level data from multiple sources including the Chinese Ministry of Health, Ministry of Education, census data, and governmental population surveys. Anand et al. then calculated measures of inequality for density of health workers weighted by population. In their discussion Anand et al. describe three key findings from their analysis: “First, there is an apparent surplus of people trained as health workers but who are not employed as such… Second, China faces the challenge of educational programme diversity and skill mix so as to best meet the needs of its population…Third, like many countries, there is a severe maldistribution of health professionals, who tend to serve in provincial urban centres rather than in rural areas” (Anand et al. 2008, 6). Overall “China has higher than expected density of doctors but a lower than expected density of nurses” (Anand et al. 2008, 8).


Low-income and migrant-workers in China have difficulty affording (and physically accessing) healthcare.

Example: Liu et al. (2008) studied health-system performance for China by adopting WHO’s framework of useful coverage and catastrophic spending (30% household capacity to pay). Data sources include the China National Health Services Survey, the 2004 China Adult Chronic Risk Factors Surveillance Survey, and the China Statistics Digest. They found, “People with low income not only receive lower health-system coverage than those with high income, but also have an increased probability of either not seeking health care when ill or undergoing catastrophic medical spending” (Liu et al. 2008, 1).
Greater distances (and travel times) are a deterrent to using health services. Rural areas especially have less geographic access to healthcare services in terms of long distances and/or travel time to care and lower diversity of services available.

Example: Baker and Dawson (2013) systematically reviewed 19 articles on 24/7 emergency care facilities in rural, non-urban, or non-metropolitan areas in Australia, Canada, and the United States. One of their main findings was that nurses often treat patients without input from a doctor in rural environments. “Nurses saw many patients independently and managed others with phone advice from local physicians. On occasion, they cared for acutely unwell patients for many hours before physician review” (Baker and Dawson 2013, 259).

Example: Lovett et al. (2002) conducted a detailed GIS analysis of car travel time and accessibility by bus to general practitioner services in a relatively rural area of the UK (East Anglia).

Example: Jones et al. (1998) studied accessibility and health service use for asthma patients. This study analyzed questionnaire responses of 9,764 adults 20–44 years old, residents of the Norwich Health Authority (a rural county of England). After combining a GIS analysis of travel time with the questionnaire data (travel times ranged from 3 to 33 minutes by car), the study concluded, “Our finding of lower levels of health service utilization amongst some self-reported asthmatics living further from health facilities suggests that the condition of some individuals might be poorly treated, which could increase the risk of fatality” (Jones et al. 1998, 312).
Example: Gregory et al. (2000) conducted a historical cohort study of 55,659 New Jersey residents hospitalized for acute myocardial infarction (heart attack) between 1992 and 1996. Even in this small, densely populated area it was found that “shorter distance to services and availability of services at the nearest hospital were strongly related to increased utilization of cardiac revascularization services” (Gregory et al. 2000, 45).


Things up in the Air

Other social, economic, and environmental factors affect health outcomes, complicating the role of geographical healthcare access. Geographical access issues can be exacerbated and vary by medical problem type, car-ownership, public transportation access, and other issues. While the specifics of these problems may vary from place to place it is likely that there is great variation in the reality of healthcare access among people with different health problems, incomes, and so on.

Example: Fortney et al. (1998) analyzed geographic market areas for psychiatric and medical outpatient treatment for a rural Arkansas veteran’s medical center (n=23,293 patients). The study found that people will not travel as far for mental health care as they will for other medical care. This suggests that some rural patients in this area of the United States with mental illness may not have adequate geographic healthcare access.

Example: Using GIS and a geographically weighted regression, Comber et al. (2011) conducted a spatial and statistical modeling analysis linking health access, socio-economic factors and geography to healthcare access perceptions. Attitude data was gathered by a governmental survey of Leicestershire (a rural UK county) residents (n=8,530). GIS data was gathered from a national UK data center. The authors’ results indicate, “Respondent long term illness, reported bad health and non-car ownership were found to be significant predictors of difficulty in accessing GPs [general practitioners] and hospitals. Geographic distance was not a significant predictor of difficulty in accessing hospitals but was for GPs” (Comber et al. 2011, 44).

The number of providers within 30 minutes of travel time is a common convention for measuring geographic access in the U.S. and U.K. Rural areas, however, may have a larger health facility catchment standard. Further there is not a clear rationale anywhere for the 30-minute standard and it will obviously make more sense in some situations (normal care) than others (health crises). However, the implication for planning and design is it is good to have nearby services.

Example: Fortney et al. (2011, S642) conclude, “The degree of local provider choice (e.g., number of providers within 30 minutes) may also be an important dimension of actual geographic access (Fortney et al. 2001)” (Fortney et al. 2011).

Example: British Columbia defines its standards of accessibility to acute care services as within one hour travel time for 24/7/52 emergency services, two hours travel time to acute inpatient hospital services, and within four hours to core specialty services (BC Ministries of Health Services and Health Planning 2002, 5).

Example: The U.S. Department of Health and Human Services 1993 Guidelines for Primary Medical Care/Dental HPSA Designation defines contiguous resources as “excessively distant” when they are “greater than 30 minutes travel time for primary medical care, greater than 40 minutes for dental and mental health” [http://
They also specify that, “In inner portions of metropolitan areas travel time by public transportation will be used. By this is meant those inner city neighborhoods with significant poverty levels (20 percent or higher) indicative of a dependence on public transportation. In those city neighborhoods with relatively low poverty levels (where residents may elect to use public transportation), driving times will be used” [http://bhpr.hrsa.gov/shortage/hpsas/designationcriteria/medicaldentalhpsaguidelines.html].

**Example:** Michigan’s Department of Community Health defines a “limited access area” as “geographic areas containing a population of 50,000 or more based on the planning year and not within 30 minutes’ drive time of an existing licensed acute care hospital with 24 hour/7 days a week emergency services utilizing the slowest route available as defined by the Michigan Department of Transportation (MDOT)” (Michigan Department of Community Health 2009, 2).

**The digital divide may create health access barriers in the near future.**

**Example:** “Although more and more patients have broadband Internet access and are using smartphones, the digital divide may create connectivity barriers for low income, minority, rural, and older adult patients” (Fortney et al. 2011, S645).

**Planners can use geographic information systems (GIS) as a useful tool for determining best location, capacity, and cost of new healthcare facilities.**

**Example:** The Design for Health’s (2008) review of the literature on healthcare access concludes that, “Healthcare facility planning can benefit from geographic information system (GIS) optimization modeling, which determines the best location, capacity and cost of new facilities. This is a common decision support tool for forecasting new hospital locations and determining underserved areas. Planners already use GIS data for other tasks and could use it to examine access to healthcare facilities (from clinics to hospitals)”(Design for Health 2008, 4).

**Geographic information systems (GIS) is an effective tool for determining the best locations for future healthcare facilities.**

**Example:** Fortney et al. (2000) tested GIS as an alternate method of measuring geographic access to health services. Using a cross-sectional study (n=435 patients, n=3,419 providers, and n=1,035 mental health specialists in Arkansas), they determined the number of providers within 30 minutes travel time of each subject. The study concluded: “Results indicate that Geographic Information Systems can be used to accurately measure geographic access to health services in a cost effective manner” (Fortney et al. 2000, 173).

**Mobile-health technologies can modestly improve health care service delivery to patients (e.g. appointment reminders), but tool quality for clinicians can have issues (e.g. ECG readouts are not clear).**

**Example:** Free et al. (2013) systematically reviewed 42 articles and also conducted a meta-analysis using information from 10 articles focused on the usefulness of mobile-health technologies to improve health care service delivery. They conclude, “SMS reminders have modest benefits in increasing clinic attendance and appear similar in their effects to other forms of reminder. There is no evidence that SMS reminders influence appointment cancellations” (Free et al. 2013, 17). However, their findings of using mobile technology for diagnosis were not as positive, “Two trials showed reductions in the quality of clinical assessment using mobile technology based photos when compared to a gold standard and one trial reported a reduction in quality of ECG print outs delivered via mobile phones” (Free et al. 2013, 17).
Example: Free et al.'s (2013) review of mobile-health technologies and Krishna et al.'s (2009) systematic review of 25 articles on effects of healthcare support via cellphones see some benefits. As Krishna et al. (2009, 231) conclude: “enhancing standard care with reminders, disease monitoring and management, and education through cell phone voice and short message service can help improve health outcomes and care processes have implications for both patients and providers.”

Digital technologies “cell phones, smartphones, interactive voice response, text messages, e-mails, interactive video, web-cams, personal monitoring devices, kiosks, personal health records, web-based portals, social networking sites, secure chat rooms, and on-line forums” may be a way to increase geographic access, but not necessarily for vulnerable populations (Fortney et al. 2011, S640).

Implications

In these HAPI Research Briefs we aimed to find implications for planning and design at roughly the neighborhood level. 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

Improving physical healthcare access is a larger policy issue with only a small role to be played by urban planning and design. The following listing provides some guidance:

Generally it is better to be close to healthcare providers. New developments should be sited near to existing facilities (typically in towns and cities). They should also provide space for healthcare providers.

A common convention for measuring geographic access is the number of providers within 30 minutes of travel time.

For those who do not drive (old, young, low incomes, inner cities, certain disabilities), regular transit service enhances healthcare access.

As the HAPI Research Briefs on access to community resources notes, transit operates most reliably when there is a sufficient density of people to use it (so it can be operate frequently and without empty vehicles). In some cases special paratransit may be more appropriate but regular transit should be the first assumption.

Electronic medicine can supplement face-to-face visits but planners and designers should assume that for some time face-to-face visits would be needed.

Alternatives to traditional general practitioner services can increase access.


Example: Lewin et al. (2006) conducted a systematic review (included 48 studies) of lay workers in primary and community health care. They conclude, “The use of lay health workers [LHWs] in health programmes shows promising benefits, compared to usual care, in promoting immunization and breastfeeding uptake; in reducing mortality and morbidity from common childhood illnesses; and in improving TB [tuberculosis] treatment outcomes. Little evidence is available regarding the effectiveness of substituting LHWs for health professionals or the effectiveness of alternative training strategies for LHWs” (Lewin et al. 2006, 4).

Transit is an important way for those who do not drive to reach their healthcare appointments.
Sources


