Healthy Cities and Sustainable Innovation

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1. Synonyms
Fit, Well-being, Equal

2. Definitions

The concept of 'healthy city' has had a long establishment in public health management literature. It was initially used to describe the living conditions of cities in developed economies (Duhl, 1986). In late 1980s, The World Health Organization (WHO)'s European Office initiated a major new project known as 'Healthy Cities' – the time the term started to draw both researcher and policy-maker attentions and became widely-used. It was used to support public health promotion at the city level. The city being often the lowest administrative level is thus believed to have the power to marshal the resources as well as the political mandate and authority to develop and implement integrative approaches to health (Ashton, J., Grey, P. & Barnard, K., 1986). It was only since the 1990s that scholars and public bodies started to consider it in the context of developing countries. For example, between 1995 and 1999 the WHO Geneva undertook healthy city projects in Cox's Bazar, Bangladesh, Dares Salaam, Tanzania, Fayoum, Egypt, Managua, Nicaragua, and Quetta, Pakistan. These projects marked the shifting political mentality of increasing attention to peripheral regions of the world in terms of improving their living conditions (Harpham, T., Burton, S. & Blue, I., 2001; Ramaswami, A., Russell, A. G., Culligan, P. J., Sharma, K. R., & Kumar, E., 2016).

3. Main Text

Introduction

In this chapter, the conceptualization of healthy city including its characteristics and societal benefits are discussed. To build and sustain healthy cities, a well-established approach found in literature is reviewed. Furthermore, more recent literature has been calling for more effective city-level systems to deal with constant and fast-changing city health conditions as city-immigration is hitting global record high and thus the challenge is ever more difficult. A particularly debated area is the impact of foreign direct investment (FDI) on health of cities of host countries. Recent emerging trend identifiable in recent literature is the seeking and promotion of building technologically-smart and resource-sustainable cities. The chapter concludes by highlighting some important future considerations for public policy bodies.

Healthy cities

In literature, cities are increasingly encompassing fast growing immigration (International Council for Science, 2013). It is estimated that during the next three decades, global city populations is likely to grow by 3 billion. This extraordinary development will impact on the health of cities worldwide in an unprecedently manner. For instance, there are issues of exposure to pollutants, safety, crowding, shelter and sanitation, levels of physical activity, food choices, and social connectivity (Corburn, 2009; Ramaswami, A., Russell, A. G., Culligan, P. J., Sharma, K. R., & Kumar, E., 2016). At the micro level, these issues are considered causes of common health problems for individuals (including injuries, respiratory diseases, heart disease, diabetes, cancers and mental disorders, as well as an array of infectious diseases) in modern days. Within each city, inequity in access to infrastructure and resources including transport, education, food, employment creates barriers to maintaining good health. At the macro level, the way people live in and choose to structure cities have direct impact on the environment, such as loss of biodiversity, changes to ecosystems, and greenhouse gas emissions (International Council for Science, 2013). Subsequently, these environmental changes impact reversely on health at the micro level.

Hence, for a city to be considered 'healthy' at both micro and macro level, it generally embeds eleven key characteristics, according to The WHO (1995) and Corburn (2009). They are:

1) A clean and safe physical environment of a high quality (including housing)
2) An ecosystem that is stable and sustainable in the long term
3) A strong mutually supportive and nonexploitative community
4) A high degree of participation, and control, by the citizens over the decisions affecting their lives, health, and well-being
5) The meeting of basic needs (i.e. food, water, shelter, income, safety, and work) for all
6) Access to a wide variety of experiences and resources, with the chance for a wide variety of contact, interaction, and communication
7) A diverse, vital, and innovative economy
8) The encouragement of connectedness with the past, with the cultural and biological heritage of city dwellers, and with other groups and individuals
9) A form that is compatible with and enhances the preceding characteristics
10) An optimum level of appropriate public health and sickness care services, accessible to all
11) High health status (i.e. high levels of positive health and low levels of disease)

Major societal benefits of healthy cities

There are many benefits identifiable in literature to having healthy cities regardless of the country. In particular, healthy cities are recognized by scholars to play the role of addressing effectively some of the most pressing issues, which can include zero hunger, clean water and sanitation, sustainable cities and communities, responsible consumption and production climate change, and peace, justice, and strong institutions. Each of these issues and benefits is discussed next.

Zero hunger. The first benefit of a healthy city is that it can ensure access to safe, nutritious and sufficient food by all through increased access to healthy options (e.g. organic foods market); provide individuals with clear information to make healthier choices (e.g.

food labelling); and restrict or disincentivise the availability of unhealthy foods and beverages (Rice, M., Franceschini, C., Wallerstein, N., Mercer, R., Cimmino, K., Rodriguez, L., & Groot, A. M. M., 2017; Vaudrin, N., Lloyd, K., Yedidia, M. J., Todd, M., & Ohri-Vachaspati, P., 2018).

Clean water and sanitation. The second benefit of a healthy city is that it can ensure efforts and attention of public bodies are given to increase access to safe drinking water and improved sanitation for large segments of the population. It also provides, in place, appropriate waste disposal and pollution management to minimize damage to human health and the natural environment (Njoh, A. J., 2016; Rietveld, L. C., Siri, J. G., Chakravarty, I., Arsénio, A. M., Biswas, R., & Chatterjee, A., 2016).

Sustainable cities and communities. The third benefit of a healthy city is that it ensures better housing, reduced overcrowding, and more habitable residential areas. This helps to minimize the risk of airborne illnesses as a result of substandard housing, as suggested by research evidence. A healthy city encourages better city planning to prioritize increased access to safe transport systems, green and public spaces, and emergency responses to natural disasters, which together reduce road traffic deaths, improve air quality, and promote physical activity (Sallis, J. F., Bull, F., Burdett, R., Frank, L. D., Griffiths, P., Giles-Corti, B., & Stevenson, M., 2016; Vuchic, V., 2017; The WHO, n.d.).

Responsible consumption and production. The fourth benefit of a healthy city is that it ensures unsustainable consumption and production patterns that can harm the environment and human health is minimized, if not eliminated. The harm can potential result from either air pollutants, contaminated water supplies or food losses. A healthy city sets in place rigorous environmental regulations to ensure that both local and foreign companies' processes and products are not gained through causing irreversible damage to either human health or the environment. Such as city pushes local and transnational corporations, and support individuals, to adopt sustainable practices for the health of both the planet and its people (Crane, A. & Matten, D., 2016).

Climate action. The fifth benefit of a healthy city is that it recognizes severe weather can cause significant impact on health, as a result of for example disruption to food supplies or spread of water borne illness. A healthy city can reduce the environmental damage caused by excessive carbon emissions and improve air quality by promoting physical activities (e.g. walking or cycling). It is often considered a major pathway toward climate change mitigation (Campbell-Lendrum, D. & Corvalán, C., 2007; Harlan, S. L. & Ruddell, D. M., 2011).

Peace, justice and strong institutions. The sixth benefit of a healthy city is that it offers peace and inclusion. It eliminates physical and mental violence to all in the way of providing safe places to live, work, and play. It also sets in place easily accessible justice support for those who are marginalized or disadvantaged (Mitchell, D., 2003).

The policy-oriented approach to managing healthy cities
With an effort to build and sustain healthy cities, it has been noted in the literature that policy makers and urban planners have been paying particularly attention to several key policy-related dimensions. These include policies covering four key areas: population health, places, processes, and power (Corburn, 2009; Schon & Rein, 1994). The reason that the

political lens was viewed as necessary and useful by scholars was because it allowed for establishment of effective urban development policies and it was generally believed that how policy issues were framed at the outset affected the quality of solutions to having a healthy city (Shon and Rein, 1994). Next, the four areas are discussed.

Population health. Population health is concerned with assessing and addressing reasons behind some social groups being healthier than others while paying attention to how social inequalities determine health inequities (Evans and Stoddart 1990; Corburn, 2009). Two central questions raised by scholars in the field were: 'what explains the distribution of disease and well- being across populations? and 'what drives current and changing patterns of inequalities in well-being across population groups?' By emphasizing distribution as distinct from causation, population health concerns how social, political, and economic forces shape which groups get sick, die earlier, and suffer unnecessarily (Corburn, 2009; The WHO, 2008). It calls for policies which address the differences in health conditions as a result of conditions such as social status, level of education, employment status.

Place. The influence of place is increasingly recognized as major, if not the most important, determinant of human well-being (Diez-Roux 2001; Geronimus 2000). City characteristics, such as affordable housing, access to healthy food, employment opportunities, quality education, public transportation, social networks, and cultural expression, are social determinants of health and so fall within the domain of urban management (Corburn, 2009). However, it is noted that the role of place in urban planning and policy remains controversial, particularly in debates over whether place-based policies can address urban and regional inequality (Dreier, P., Mollenkopf, J. H., & Swanstrom, T., 2004).

Processes. This policy dimension seeks to move practice beyond a focus on people and places by emphasizing the processes that shape health promoting opportunities for people and place-based characteristics (Corburn, 2009). Urban policy making has long debated whether to focus either on improving opportunities for individuals or the qualities of places (Bolton 1992). In a world of limited resources, people-based and place-based policies are often pitted against one another (Corburn, 2009). However, some later research seems to suggest a discourse by emphasizing that not only are policies focused on people and place critical for healthy cities, but that greater attention needs to be paid to the institutional processes that shape these policies. Institutions are not just the formal structures or procedures of government but rather an established way of addressing certain social issues (Healey 1999). The institutionalist view examines when established processes (such environmental impact assessment) might best promote the goals of a healthy city (Corburn, 2009).

Power. The fourth political dimension concerns resolution of power inequalities in cities. Questions of who has power, where it derives from, how it is deployed, and to what ends are seminal in urban politics (Banfield 1961; Dahl 1961). Power in healthy city policy making includes the ability to affect institutional, disciplinary, and bureaucratic changes (Corburn, 2009). Power relationships can place constraints on group or individual abilities to resist exposure to material and social health hazards. For example, any effort to improve the quality of life in cities must also address the power inequities perpetuated by structural racism or misplaced social privilege (Massey and Denton 1993; Greenberg and Schneider 1994).

The debate on impact of FDI on city environment

One of the most debated areas in economic literature is the impact of FDI on host locations, which concerns predominantly developing countries. FDI takes place when a multinational corporation from one country establishes a business operation in a particular city of another country, through setting up a new wholly-owned affiliate, or acquiring a local company, or forming a joint venture in the host economy. While these types of operations make distinctive contributions to host city welfare, they also cause distinctive dangers or harmful threats to host city and thus pose distinctive policy challenges to local governments (Moran, 2012). In recent years, China has experienced rapid export driven economic growth enhanced by large investment flows originated overseas. According to Cole et al. (2011), since 2000 economic growth rates have consistently exceeded 8% (World Bank, 2007), whilst China now receives more FDI than any other developing economy and by 2005 ranked among the world's top 3 recipients with inflows of $72 billion (UNCTAD 2007). However, it is generally accepted that these economic gains have come at a cost as out of the 25 most polluted cities in the world, 17 of them are in China. Resultantly, a significant number of people die prematurely each year as a result of air pollution.

In line with finding answers to cases such as China, much literature has examined the impact of economic growth on the environment of cities using panel data and results have been mixed. Drawing on the work of Cole et al (2011), on the one hand early studies claimed to find an inverted-U shaped relationship between income and pollution, known as an environmental Kuznets curve. On the other hand, more recent studies have subjected the curve to growing scrutiny and generally urge caution when interpreting results (Harbaugh et al. 2002, Stern 2001). Thus far, only a limited number of studies investigate the role played by FDI in cities of developing economies. These studies incorporate the FDI location decision with environmental regulations in play as well as the impact on environmental pollution at city level. Their results show very limited impact on industrial SO2 emissions (Cole et al., 2011). Similarly, other studies examine the environmental impact of FDI in cities by suggesting a 'pollution halo' around multinational corporations. This means those firms are in fact less pollution intensive than domestic firms (Cole et al., 2011). Possible reasons behind multinationals corporations being 'greener' than domestic firms include access to more innovative technologies and management systems to meet increasingly environmentally-conscious consumers (Pinkse and Kolk, 2010).

This view was shared by Meyer (2004) who notes that multinational firms are concerned with reputation and being seen to be corporately responsible, or the potential dangers of damaging their global brand as a result of possible scandals in developing economies. He argues that emergence of globalisation increases institutional and customer pressures on reputable firms to surpass local requirements in developing economies. The transfer of modern, environmentally friendly technology and production processes by these firms, which improve the standards prevalent in the host economy – a pollution halo effect. These firms employ their innovative technology and systems can better realise economies of scale in engineering standards for design, equipment purchases and maintenance, integrate global value chain, and reduce liability from regulatory changes (Meyer, 2004). More

examples include the study by Eskeland and Harrison (2002) which shows that foreign investors are more efficient in using energy, an important aspect of environmental impact.

However, there is another side to the argument which is that many multinational FDI are made in cities for the reason of much less-regulated conditions. For instance, Meyer (2004) suggests that the impact of multinational corporations on the cities of host economies can also be negative. It is believed that these multinational corporations choose to transfer outdated technology to much less-regulated cities– a pollution haven effect. It is suspected that multinational firms evade strict environmental standards in their home countries and locate to pollution havens, thus triggering a 'race to the bottom' in environmental standards (Meyer, 2004). However, this view is increasingly out of date as compliance costs are small relative to total costs of production, and legal changes in developing countries have narrowed the regulatory gap that may have existed in the 1970s. Thus, there is reduced incentive to escape environmental regulation at home country as an important motivation for FDI (Jaffe et al., 1995; Dasgupta et al., 2002; Meyer, 2004).

Recent shift towards innovation for smart and sustainable cities

Infrastructure design and socio-spatial disparities within cities are emerging as critical determinants of human health and well-being (Ramaswami, A., Russell, A. G., Culligan, P. J., Sharma, K. R., & Kumar, E., 2016). It has been noted in more recent literature that cities are presented with several health risks pertaining to infrastructure, including inaccessibility to food and water by households, designs of residential areas that inhibit active living, clean air and water, or severe weather conditions contributed by climate change. It is noted that socioeconomic disparities often shape exposure to the various risk factors and mediate and modulate the health outcomes. Addressing these diverse social, environmental, and infrastructural risk factors represents a new paradigm for urban public health. For example, The WHO and the Centres for Disease Control and Prevention in the United States recommend community-based participatory health planning that connects local capacities with infrastructure. Making these connections is challenging, calling for frameworks that can connect diverse data and processes across scales to support action. In particular, one of the influential works is by Ramaswami, A., Russell, A. G., Culligan, P. J., Sharma, K. R., & Kumar, E. (2016) who proposed eight principles for transforming cities into smart, sustainable, healthy ones. In reference to their work, the eight principles are discussed next.

1) Focus on providing and innovating basic infrastructure for all. Affordable water, energy, sanitation, and transportation have long been recognized as important for all cities but have been difficult to attain in some cases, often because of rapid in-migration, unplanned urban expansions, and challenges in infrastructure financing. For instance, with 30% to 40% of the population in several cities in Asia living in slums, a healthy city must prioritize basic infrastructure for all. Many smart-city discussions focus on innovative and equitable solutions such as fit-for-purpose point-of-use household water treatment in Chinese cities, automatic water dispensers in Indian cities, and prioritization to support nonmotorized transportation in compact mixed-use urban neighbourhoods.

2) Pursue dynamic cross-sector health improvements, with attention to eliminating inequities. Cities need to strive to address health priorities in way of considering infrastructural, environmental, and sociocultural factors. Such an approach could lead to weather and air pollution forecasts that can provide customized messaging to vulnerable populations, neighbourhood-level health interventions, more equitable access to nutritious food and green spaces, and greater attention to sociocultural assets that enhance quality of life and human well-being.

3) Focus on cross-sector synergies for improved resource efficiency. As city populations grow, consumption is likely to increase and thus impact on environment. To address this, cities must be able to enhance their resource efficiency. Research suggests that an optimally dense urban form, with a high intensity of diverse co-located activities, creates opportunities for systemic cross-sector infrastructure interventions, yielding the highest-efficiency gains. Advanced district energy systems that use energy cascading, exchange, and storage across industries, power plants, buildings, transportation, water, solid waste management, and renewable energy production offer tremendous potential.

4) Recognize diverse strategies for resource efficiency in different types of city. A technology-oriented view of smart cities can result in translating high-efficiency solutions from one country to another, where they may not work as equally effective. For example, for tightly insulated, highly instrumented, all-day centrally cooled and heated buildings which are energy-efficient for countries such as United States, it may not be considered efficient when applied to the more vernacular architecture and informal user practices of Chinese apartments, which tend to be spot-cooled over short periods of time, which thus greatly reduces resource intensity.

5) Integrate vernacular technologies. Cities can seek local knowledge and systems-level understanding of different solution configurations. For example, local plants that convert solid waste to energy are not as effective in cities of developing countries. The waste streams have lower calorific value, having been sifted through by the informal sector of waste pickers who recycle extensively waste paper and plastics, which creates greater systems efficiency in terms of material cycling while also promoting local livelihoods. Formalizing and integrating the expertise of waste pickers with state-of-the-art information and waste-to-energy technologies can create hybrid solutions, illustrated, for example, by India's recently revised solid waste management regulations.

6) Apply transboundary systems analysis to inform decisions about localized versus larger-scale infrastructure. Driven by goals of local self-reliance, efficacy, and anticipated health and well-being benefits, cities are increasingly focusing on more localized infrastructures, such as rooftop solar installations, community-supported city farms, and apartment-scaled wastewater treatment plants. Improved information about transboundary environmental footprints and local well-being impacts are critical to clarify synergies and trade-offs between local versus larger-scale infrastructure networks.

7) Recognize coevolution of infrastructures and institutions. Matching the scale of engineered infrastructures with that of the institutions with which they must operate is key. For example, neighbourhood-scale city farms, solar gardens, and waste management systems will require new levels of coordination among homes, neighbourhood associations, businesses, and local governments. At the same time, technology can change institutions; for example, widespread deployment of sensors is enabling remote surveillance of distributed water and wastewater systems.

8) Create capacity and transparent infrastructure governance across sectors. Some cities have created sustainability offices that are empowered to convene multiple city departments, and many are leveraging multi-level and cross-national policy-exchange networks. With the smart-city agenda requiring high-technology expertise, greater involvement of the private sector in infrastructure delivery is inevitable. Many cities are initiating public-private partnerships and special financing for smart-city development (Ramaswami, A., Russell, A. G., Culligan, P. J., Sharma, K. R., & Kumar, E., 2016).

Conclusion
While it is acknowledged that the intended consequences of healthy-city policy interventions are likely to be beneficial to all, unintended, negative consequences are also likely to occur. For example, it is noted by International Council for Science (2013) that the increasing use of household water tanks to collect rainwater in urban areas – for human consumption and other purposes. If not well managed, these water tanks can become breeding sites for mosquitoes capable of transmitting dengue virus and other pathogens. Another example is the potential for allergy to some species of flowering trees and plants using in urban greening campaigns. Thus, a well-planned and carefully-implemented management programme, supported by effective data-gathering, can help to mitigate such unintended consequences. Public bodies and policy makers must ensure they are capable of dealing with all emerging urban issues as population in cities continue to grow to record level.

4. Cross-references
Sustainable Development, Urban Planning, Smart City

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