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Commentary

City planning as preventive medicine

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ABSTRACT

The health and well-being of rapidly growing urban populations is a global health issue. Cities in the global north and south are faced with rising health inequities — or avoidable differences in health determinants and outcomes based on place, social status and ethnicity. This commentary suggests that focusing only on treatment interventions in cities is likely to fail because populations will be forced to go back into the urban living and working conditions that likely made them sick in the first place. City planning as preventive medicine includes taking a relational and systems approach to urban health, requiring health assessments for all urban policy making, promoting neighborhood health centers as engines of community economic development and gathering place-based health indicator data to track progress and adapt interventions over time as conditions change.

Introduction

The 21st century is the century of the city, as the world's population now lives predominantly in urban areas. Where you live and how that place is governed can determine when and if you get sick, receive medical treatment, experience disability and die prematurely. Another way to think about city governance is called city or town planning, and this ought to be understood as a strategy of preventive medicine.

Today, most urban health interventions are focused on bringing social services, primary care, economic opportunities and physical improvements to urban residents or their neighborhoods. Interventions tend to focus either on people or places, but rarely both at the same time. Interventions are generally conceptualized and led by experts, and focused on one disease, one risk factor, one hazardous exposure, one population group, or one suspected 'cause' of poor health, such as poverty (Corburn, 2009). More care, more places offering care, more prevention and more services tend to be intervention targets. This is the *health in cities* approach, and while life has become better for most urban residents using this approach, the strategy has largely failed to address the spatial (and ethnic/racial) inequities in health (EU, 2013). In this commentary, I argue for a more integrated and holistic approach to 'city planning as preventive medicine,' where interventions combine attention to physical, social and institutional factors that shape urban health. This integrated approach will require a new urban health science that embraces complexity, a systems framework, and borrows from ecological adaptive management. The International Council for Science (ICSU) recently met to launch a global urban health and well-being strategy also grounded in a systems science framework, and this commentary aims to engage clinicians, population health practitioners and urban officials in how this strategy ought to move forward (Kinver, 2014).

Rightfully or not, medical professionals often have a societal status that gives our voices greater credibility but by building new alliances with city planners, could improve preventive medicine. For instance, clinicians might regularly grapple with the disease consequences of poverty on a case-by-case basis in the exam room and do their best to treat people. Yet, these patients too often return to the living and working conditions that contributed to their illness in the first place. City planners are increasingly being asked to 'design' healthier communities, but frequently lack the political influence or biomedical knowledge to do so. Conceptualizing city planning as preventive medicine would bring the medical, public health and community development sectors together to:

- Integrate health impact assessments into all urban development policy decisions — from new housing to transport to budgeting;
- Develop new indicators of 'healthy and equitable' places that consider cities as integrated health systems, rather than fragmented 'parts,' and;
- Re-orient the health sector to be a leader in community development, poverty alleviation and reducing place-based social inequalities in cities.

The remainder of this commentary offers some brief background about how characteristics of the urban environment, including physical, economic, social and cultural features, combine to shape health outcomes and then provides greater detail for the city planning as preventive medicine strategies.

How 21st century urbanization shapes health

Physical and built environments

The physical environments of cities still matter for health, such as whether there is access to safe and affordable drinking water, sanitation, drainage, and garbage collection. Urban air and noise pollution remain

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critical health determinants in highly industrialized cities of Europe and Latin America as well as developing cities in China and Sub-Saharan Africa (Harpham, 2009). Urban air pollution is linked to thousands of premature deaths each year and more specifically, particulate matter is associated with cardiovascular death and asthma. Noise pollution, a common urban nuisance, is associated with hearing impairment, hypertension, and ischemic heart disease. Exposure to environmental pathogens in urban air and water can contribute to both infectious (i.e., parasitic diseases, diarrheal diseases, intestinal parasites, etc.) and non-infectious diseases.

Pedestrian conflicts with motor vehicles are one of the leading causes of injuries in urban areas. When a new development project includes new housing and commercial activity, pedestrian activity increases and this can lead to an increase in injuries. However, greater pedestrian activity can promote physical activity that reduces heart disease, stroke, and mental illness and increase functional status and the longevity of independence among the elderly. Creating new opportunities for pedestrian activity can also improve well being by increasing the likelihood of social interactions that can reduce feelings of isolation. However, the construction of highways contributes to vehicular air pollution and suburban sprawl, while the lack of or inadequate transport inhibits access to employment and health promoting services, especially for the urban poor. Highways and streets can limit green open space, which can act as a site for physical activity, social interactions, and an urban heat sink, reducing the likelihood of adverse human health impacts from climate change induced urban heat islands.

Social environment and urban health

The physical and social environments of cities frequently interact and cannot be disassociated when trying to understand and improve urban health inequities. The urban social environment includes the institutions that shape the structure and characteristics of relationships and opportunities among people and different population groups within a given community (Healey, 1999). Perhaps the most well researched aspect of the social environment that influences health is economic status or class. While debate continues whether absolute or relative poverty matter more for influencing health, there is agreement that being poor in any city increases ones likelihood of a range of health risks across the life-course, from infant mortality and low birth weight, to stunted physical and cognitive development to early on-set chronic illnesses and higher rates of infections (Marmot et al., 2012)(Table 1).

The economic 'environment' also influences well being. Neighborhoods with high concentrations of liquor stores also have high rates of addiction. However, local businesses can act as a source for employment and culturally-appropriate food and other services. Displacement of local businesses can adversely impact health by altering the availability and affordability of essential goods and services and the type of local employment possibilities. Business displacement can also contribute to physical blight — the tooth — gaped landscape all too common in poor neighborhoods where widespread property abandonment has taken hold. Property abandonment can adversely influence health by increasing the likelihood of illegal dumping of garbage and hazardous wastes.

The social environment also influences health through a variety of other pathways, including the support of individual or group behaviors that affect health, buffering or enhancing the impact of stressors, and providing access to goods and services that influence health (for example housing, food, informal health care). Limited social supports may predispose persons to poorer coping and adverse health. High levels of social stressors such as social isolation and violence are also known to adversely impact the health of urban residents. In cities, the greater spatial proximity of one's social networks may accentuate their role in shaping individual and population health (Friel et al., 2011).

Perhaps the most crucial social and political force in cities that influences health is spatial segregation. Many cities worldwide are highly

Table 1
Urban health resources and risks.

Health resource	Urban physical & social influences on health (examples)
Environmental quality, including noise, air, soil and water pollution	Vehicle emissions exacerbate respiratory disease & increase cardio-pulmonary mortality, while indoor allergens exacerbate asthma. Chronic noise exposure adversely harms sleep, temperament, hearing & blood pressure, all of which can lead to developmental delays in children. Trees & green space remove air pollution from the air & mitigate the urban heat island effect.
Access to high quality transit and safe roadways, sidewalks and bicycle lanes	Vehicle/pedestrian injuries are most severe where sidewalks & crosswalks are non-existent. Sidewalks & bicycle lanes facilitate physical activity, reducing heart disease, diabetes, obesity, blood pressure, osteoporosis, & symptoms of depression. Public transit provides access to employment, education, parks, and health care services.
Access to quality childcare, education & health care facilities	Quality childcare can build disease immunities & increase likelihood of future educational attainment & earnings. Education can enhance health literacy about preventive behaviors and services. Timely access to primary health services prevents serious illness.
Affordable, safe, stable & socially integrated housing	Crowded and substandard housing conditions increase risks for infections, respiratory disease, fires & stress. Unaffordable rents or mortgages result in trade-offs between housing, food & medical care. Racial residential segregation limits economic & educational opportunities, concentrates disadvantage & increases social distance between racial/ethnic groups.
Access to safe and quality open space, parks, cultural and recreational facilities	Clean & safe parks can increase the frequency of physical activity. Cultural activities can promote cross-cultural understanding, decrease violence & enhance social cohesion.
Employment providing meaningful, safe, and living wage jobs	Higher income is associated with better overall health, reduced mortality and higher emotional stability. Unemployment is a source of chronic stress, while job autonomy increases self esteem.
Access to affordable and quality goods & services	Neighborhood grocery stores support nutritious diets. Local financial institutions help families create and maintain wealth.
Protection from crime & physical violence	Indirect effects of violence and crime include fear, stress, anxiety and unhealthy coping behaviors, over-eating, smoking, &alcohol/drug abuse. Fear of crime can force children to stay indoors, increasing exposure to toxic indoor air & allergens, and limiting physical activity outside.
Social Cohesion & political power	Physical and emotional support buffers stressful situations, prevents isolation, contributes to self-esteem & reduces the risk of early death. Stress from severed/lack of social ties/support can contribute to low birth weight, which increases risk of infant death, slow cognitive development, hyperactivity, breathing problems, overweight, and heart disease.

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segregated with discrimination against certain racial, ethnic, caste or tribal groups often acting as justification. Spatial segregation can have multiple effects, including the enforcement of homogeneity in resources and social network ties and suppressing diversity that may benefit persons of lower socioeconomic status. Persons who live in segregated communities may have disproportionate exposure, susceptibility, and response to economic and social deprivation, toxic substances, and hazardous conditions.

An integrated approach to healthy city interventions

The proposal for City Planning as Preventive medicine would focus on how the above described health resources act in combination and interact — across both space and time — and contribute to health outcomes for different population groups living across urban neighborhoods. This is what I call a 'relational' view of healthy place making. A relational view of place is crucial for understanding healthy city planning because social processes, such as power, inequality and collective action, are often revealed through the construction and reconstruction of the material forms and social meanings of places (Cummins et al., 2007).

Preventing toxic stress

Consider the now well-documented idea that social and environmental stressors can be toxic to the human body, especially when place-based stressors are chronic and cumulative across one's lifetime (McEwen, 2007). The physician who treats stress-induced hypertension may focus exclusively on the patient's response to drug therapy, aiming to control blood pressure such as prescribing a beta-blocker to counteract the effects of the adrenaline. Treatment does not address the potential 'root causes' of the toxic stress, such as living in a racially segregated neighborhood that has few healthy food options, poor quality housing, environmental pollution and constant threats of violence. Just as the body does not neatly partition these experiences — all of which may serve to increase risk of uncontrolled hypertension and related morbidity and premature mortality — city planners could work with physicians to better address these spheres through public policy and administrative practices (Corburn, 2013).

For example, city planners could operate on the principle that development projects — new roads, transit, housing, etc., should first 'do no harm' to already vulnerable communities. Health equity impact assessments, done with medical and public health practitioners, could be required that take a holistic approach to anticipating the health benefits and drawbacks from urban policy decisions. City planning could use these assessments to keep development and city expansion away from areas at risk for such things as flooding, landslides and other hazards that put already vulnerable urban populations under greater threat for disease and death.

Adaptive urban health science

As complex systems, cities and urban neighborhoods present challenges for planners to know which combination of place-based resources will prevent illness and promote health, particularly since population health needs will vary from here to there. An adaptive urban health science approach would include new systems of monitoring place-based indicators that measure resilience and risk (Corburn, 2013). Adaptive management acknowledges the failures of linear processes where narrow disciplinary scientists have aimed to develop complex models, predict long-term outcomes and suggest one-time policy standards. Instead, adaptive management begins with an acknowledgement of the inherent complexity and uncertainty within systems, that this complexity demands an iterative, ongoing learning process among a range of expert stakeholders, and policy interventions must be adjusted to reflect newly acquired knowledge (Lee, 1999). The urban health risks from climate change offer one example, since we may not know how these will change in the next ten or twenty years. An adaptive approach lets us prevent vulnerability today while monitoring progress and adjusting strategies as new information emerges.

The health sector as community development

City planning as preventive medicine must find ways to combine the resources invested in the health care sector with efforts to reduce place-based poverty, hazardous living conditions and social exclusion that contribute to health inequities in cities. One example of this is the community health center model, used around the world in both urban and rural areas to offer primary care and promote population well being. Community health centers (CHC) are not a new idea, but they have languished outside the purview of city planning as a potential strategy to improve places and populations. Around the world, opportunities exist for community health centers to serve multiple, disease prevention services.

For example, Brazil's national health system, Sistema Único de Saúde (SUS), delivers most of its services through neighborhood-based Family Health Clinics (Programa de Saúde da Família), where nurses and lay health workers address community-specific health needs. The widely hailed program is administered by municipal governments and prioritizes programs in urban favelas, or slums, that are typically the domain of city planning, such as violence reduction, transportation and food access, housing rights, and youth employment (Paim et al., 2011). In India, a new National Urban Health Mission, which will also be administered by municipal, not national government, agencies will provide health care to slum dwellers and also focus on improving place-based determinants of health, such as drinking water, sanitation, education, gender rights, poverty alleviation and other social issues (http://nrhm.gov.in/nhm/nuhm.html).

In the United States, neighborhood health centers are an integral part of the Patient Protection and Affordable Care Act (ACA), which provided $11 billion to expand CHCs across the United States and created a new School Based Health Center Program (Krisberg, 2014). In addition to primary care, mental and dental health services, CHCs also offer what are called "supportive services" that include food access, translation services, legal aide especially around housing, transportation subsidies and shuttle services, and all include a community planning board that aims to prioritize locally defined health promotion needs.

CHCs also contribute to community economic development, directly by employing local people, such as lay community health workers and center-related jobs, but also by purchasing goods and service from local businesses and non-profits. The economic benefits of CHCs also indirectly support the local economy and wealth of families by reducing the costs of health care and increasing local spending (Kotelchuck et al., 2011). City planners could help link community development processes with governmental resources already targeted for urban community health centers. In the US, city planners and clinicians could collaborate on "community health needs assessments" that are now required by the ACA and the IRS for all tax-exempt hospitals and ensure these processes include community residents and target the needs of the most vulnerable local populations (CHNA, 2014). For example, in Hartford, Connecticut, planners aligned community development, health care service delivery and land use planning into an integrated plan that also included extensive public participation (Hartford, 2013).

This commentary has offered ideas for re-conceptualizing city planning as preventive medicine that includes new health assessments within urban policy making, developing place-based health indicators, and linking health services with community and economic development. These strategies in combination represent a systems and adaptive management approach to healthy cities; rather than focusing on fixing 'parts' of the city or one diseases at-a-time, urban health must work to identify and address root causes through learning-by-doing that includes monitoring progress toward health equity. As the world's population is increasingly living in cities, we hope this commentary

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has stimulated dialogue about how different conceptions of city planning can become the 'start-ups' for a healthier planet.

Conflicts of interest statement

The author declares that there are no conflicts of interest.

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