

The Role of Urban Planning in the Spread of Communicable Diseases

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ABSTRACT

19th-century urban areas were defined by rapid population growth and industrialization that created filthy living conditions and poor health outcomes. Despite dramatic improvements to living conditions, cities remain a hotbed for the spread of communicable diseases. This paper seeks to highlight planning processes and actions – with a focus on urbanization, globalization, and land use planning – in order to show the impact urban planners can have on preventing the spread of diseases including cholera, the Spanish Flu of 1918, Severe Acute Respiratory Syndrome (SARS), and Ebola Viral Disease (EVD). Cities would not exist without the people who inhabit them; therefore it is imperative that city planners prioritize the health of residents.

I have seen the greatest wonder which the world can show to the astonished spirit.

- Poet Heinrich Heine on
London, 1827¹

During the 19th century, London emerged as a center of commerce and industry. As the city urbanized, the population rapidly grew from one to six million residents. This unprecedented growth resulted in London becoming an “infamously filthy”² city complete with cemeteries “bursting with stinky corpses,”³ air filled with soot, and streets lined with feces.^{4,5} These concerns were not simply aesthetic; the dirt and filth that defined 19th-century London caused serious health complications, including the spread of cholera.^{6,7,8}

Three cholera epidemics struck London between 1832 and 1866, killing tens of thousands.⁹ Cholera can induce vomiting and diarrhea so severe that they lead to dehydration, and death can occur within hours. During the early 19th century, the prevailing theory was that cholera was an airborne disease that resulted from foul odors.¹⁰ Physician John Snow – familiar with the effects of gases through his studies on anesthetics – rejected this theory, hypothesizing instead that cholera was spread through invisible germs in food or water. To prove this, Snow conducted a survey of an infected neighborhood by drawing a map outlining all cholera-related deaths, finding a water pump at the center of the outbreak. Snow recommended the pump be removed, and the outbreaks ceased.¹¹ Later, it was discovered that the water was being piped from a section of the Thames River contaminated with fecal matter.¹²

While the focus in high-income countries has shifted to the prevention and treatment of

diseases such as obesity, diabetes, and heart disease, communicable diseases – infectious diseases that are transmissible by direct contact with an affected individual, through the individual’s discharges, or by indirect means, such as a vector¹³ – make up seven of the top ten causes of death in low-income nations.¹⁴ An increasingly globalized world has opened all nations up to the possibility of a deadly disease outbreak, even nations that previously believed these communicable diseases to be eradicated. In this paper, I expand upon the impact our increasingly urbanized and globalized world has on the spread of the flu, diarrheal diseases, and Severe Acute Respiratory Syndrome (SARS). Additionally, I discuss how land use planning can increase the exposure and spread of Ebola Viral Disease (EVD). By highlighting the unintended health consequences of urbanization, globalization, and land use planning, I will connect the urban environment to negative health outcomes to show that urban planners need to take an active role in working to prevent the spread of communicable diseases.

URBANIZATION

Efforts to improve “pathogenic and disorderly” cities inspired the fields of both urban planning and public health.¹⁵ Overcrowded housing conditions and poor sewage infrastructure were just some of the health-related conditions that inspired planners to come up with new visions for cities. For example, Ebenezer

Howard incorporated population density and air quality in his comparison of urban and country living in his famous book, *Garden Cities of To-Morrow*.¹⁶ Clarence Perry envisioned walkable neighborhoods filled with parks and green spaces in his Neighborhood Unit model.¹⁷ And the City Beautiful movement, which focused on civic grandeur and landscape architecture, emerged in response to the “dirt and disorder” that characterized cities.¹⁸

The advantages to living in urban areas (e.g., higher levels of social support, potential for political mobilization, and increased access to resources) are now well-documented. However, cities can also facilitate the transmission of disease, and city planning initiatives have been essential during disease outbreaks.¹⁹ One example is the Spanish Flu of 1918, which decimated a staggering five percent of the world’s population. Taking lessons from past outbreaks, New York City’s health commissioner Royal Copeland developed a multi-pronged approach to tackle the flu. Copeland’s approach policed spitting in public spaces, complete with fines and the possibility of jail time, and included public health campaigns that advised on the proper way to cover a sneeze. However, Copeland was most creative in creating a schedule that staggered workdays – and therefore transportation times – by industry. By staggering transportation times, Copeland helped decrease some of the physical interaction people might have with the infected, limiting the spread of disease. Additionally, Copeland was able to avoid a sense of public chaos that might come with a large-scale shutdown of the City by keeping businesses, schools, and other spaces open.²⁰ While Copeland was the City’s public health commissioner, reaching across disciplines to incorporate urban planning interventions allowed him to restrict the

spread of disease while also maintaining a sense of routine during a time of extreme crisis.

GLOBALIZATION

Increased urbanization made connections between cities common, facilitating interregional trade. Technology and innovation during the 20th century also dramatically increased the scale, magnitude, speed, and impact of social interaction across regions.²¹ As a result of the process of globalization, cities that act as economic centers of the world have emerged, representing distinct points in an ever-expanding network of travel. But these cities do not only facilitate the exchange and spread of information, people, commodities, and capital; they also act as potential points for the spread of communicable diseases.²²

Toronto was one city unprepared for the globalized spread of a disease. After a Canadian woman returning home from a vacation in Hong Kong died of SARS in 2003, the city was brought to an abrupt stop; everyday routines were disrupted as schools and workplaces were shut down to prevent the spread of the disease, creating a state of panic.²³ While this was the first recognized case of the disease in Toronto, SARS eventually spread to an additional 225 people in the city, killing 38. The World Health Organization went so far as to take the exceptional measure of issuing a travel advisory for Toronto. While this advisory was in place for less than a week, it resulted in a loss of \$260 million tourism dollars.²⁴ In addition, the Province of Ontario spent an estimated \$12 million on quarantining potentially infectious individuals, protecting the jobs of those quarantined, and setting up services for people who took time off to

quarantine themselves.²⁵ Toronto was “a city under siege,” completely unprepared and ill-equipped for a disease outbreak, which resulted in both population and economic loss.²⁶ Living in a globalized society ensures that the threat of transmission of communicable diseases no longer occurs only at the local level but at the international level as well. Planners often work to find creative solutions to emerging problems in urban areas and have a unique opportunity to prioritize preventing the spread of diseases such as SARS in their work.

LAND USE PLANNING

In the mid-20th century, landscape architect Ian McHarg published *Design with Nature*, in which he argues for using ecological systems as a basis for planning. For McHarg, understanding the factors unique to a specific area is crucial in determining environments conducive to the development and expansion of cities. *Design with Nature* addresses health in a chapter on Philadelphia that details the impact of the physical environment on health outcomes, including syphilis, tuberculosis, diabetes, and heart disease. While McHarg’s mapping of these diseases is compelling, there is a lack of emphasis on how planners can then work to prevent these diseases.²⁷ Additionally, McHarg does not specifically address the increased potential for transmission of zoonotic diseases – caused by infections that are spread between animals and humans – as a result of planning, despite the fact that zoonotic diseases have been present for centuries.²⁸ Land use planners have the opportunity to work with public health officials not only to better understand where diseases are, but also to work to responsibly manipulate the physical environment in order

to prevent the spread of these diseases. The spread of EVD in the Democratic Republic of the Congo (DRC) as the result of deforestation and infrastructure development is one example of what happens when disease transmission is not accounted for in the planning process. The DRC is an incredibly biodiverse country, which makes it susceptible to the emergence and spread of zoonotic diseases, but these diseases only spread to humans if they are exposed to infected animals. Of particular concern is the traditional practice of hunting bushmeat, which includes non-domesticated animals such as bats and monkeys that often live in forests.²⁹ EVD is spread through bodily fluids, which present many opportunities for transmission during the hunting process. Rates of deforestation increased at alarming rates during the 20th century.³⁰ As the forests disappear, animals may come out of the furthest recesses of the forest in search of resources, and humans may go farther into remaining forests to hunt. By eliminating a physical barrier such as a forest that serves to separate humans from wildlife, humans can inadvertently expose themselves to contact with disease-infected wildlife.³¹

Additionally, deforestation allows room for new transportation infrastructure, connecting previously unconnected cities and allowing for the rapid spread of disease.³² In 1995, an outbreak of EVD in Kikwit in the DRC killed 245 people but was largely isolated because of natural geography and a lack of transportation infrastructure. At the time, it would have taken more than a week to travel from Kikwit to the capital of the DRC, Kinshasa. By 2014, new infrastructure had shrunk travel time between the two cities to a mere eight hours. Kinshasa has a population of over 12 million, and there are international flights from the city every day. It is not beyond the realm of possibility that

someone could hunt in Kikwit and travel to Kinshasa to sell the kill, inadvertently supplying infected meat and exposing others who might then take an international flight, spreading EVD globally.³³ Land use planning can serve to connect cities for trade of information, capital, and commodities; these connections can influence positive health outcomes by increasing social support networks and access to health care. Planners can also build on McHarg's work and incorporate knowledge of potential disease reservoirs into preparation for land use planning initiatives such as deforestation and infrastructure in order to avoid the unnecessary exposure and spread of deadly diseases.

REINTEGRATING URBAN PLANNING AND PUBLIC HEALTH

Public health and urban planning have common origins rooted in an understanding of cities as unsanitary and disorganized spaces, requiring intervention strategies focused on creating cleaner and more restrained environments.³⁴ This article aims to highlight the impact that an increasingly urban world has on the spread of communicable diseases by examining the role of urbanization, globalization, and land use planning on the spread of the Spanish Flu, SARS, and EVD. As planners, we are responsible for forming the spaces in which people live, work, and play. Because these environments impact our health, we need to prioritize health throughout the planning process.

While the fields of planning and public health diverged during the 20th century, there is much that can be done to work across disciplines to help prevent the spread of

communicable diseases.³⁵ During a potential disease outbreak, planners can work with public health officials to map transportation networks in order to predict the spread of disease. This can alert cities to the potential danger of a disease and help to avoid another situation like the spread of SARS in Toronto. Public health and planning officials can also work more closely to address the impacts of climate change on water and food systems planning. As climate change-related scenarios such as droughts occur with greater frequency, planners and public health officials will need to coordinate on everything from disaster relief initiatives to global food systems failures. Last, planners can return to their roots in addressing the "dirt and disorder" of cities by focusing on building sewage infrastructure for all.³⁶ Until communication and collaboration are improved between these fields, the threat of another large-scale disease outbreak looms; by working in an interdisciplinary manner, planners and public health officials can focus on prevention rather than on treatment. ■

ABOUT THE AUTHOR

Sam Henstell is a dual Master of Public Health and Master of Urban and Regional Planning candidate at the University of Michigan. She received a Bachelor of Arts in Public Health and a Bachelor of Science in Society and Environment from the University of California, Berkeley in 2012. After graduating from Berkeley, Sam taught high school in Washington, D.C. and worked at an education non-profit in Los Angeles. Sam is interested in how the built environment impacts health.

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