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COVID-19 reveals the systemic nature of urban health globally

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ABSTRACT

Statement by the scientific committee* of the International Science Council's Programme on Urban Health and Wellbeing, on critical elements of urban health action in response to the epidemic.

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An approach to emergency response that takes advantage of the scale of urban systems, could have mitigated some of the disastrous impacts of the COVID-19 outbreak. We consider what cities can learn from one another about containing a pandemic and how principles for urban health in the Xiamen Call for Action (Ebikeme *et al.* 2019) can be applied to help cities better prepare for and mitigate the impacts of future outbreaks.

Urban health refers to the health of people living in cities and the healthy functioning of cities. This includes how they are managed, planned and built as urban (eco) systems to provide a range of goods and services to their populations. It is determined by the interplay of people and their social, built and natural environments. People and cities work symbiotically. Principles for sustainable urban development can be developed that promote the health and wellbeing of people. Urban residents are active participants in the management and delivery of essential goods and services. They can contribute to ensure development supports the health of all population groups and communities.

In 2018, 55% of the world's population lived in urban areas and by 2050 this is expected to increase to nearly 70%. Cities are the places with highest population densities and throughout history, cities have been the sites of infectious disease outbreaks (Jones 2020), and outbreaks in cities present unique challenges, as was evident in Ebola, SARS, MERS and now Covid-19. However, cities are also the sites of solutions to arrest the spread of infectious diseases and improve population health. Yet, how effectively and equitably a city is

managed as a system, is a critical factor for whether and how epidemics like COVID-19 will spread, and which urban populations will be the most affected.

Despite there being an overall decline in infectious diseases, the typical infectious diseases of density and poverty, show marked inequalities in who is vulnerable, even in developed countries and within cities (Baker *et al.* 2012). There has been an overall decline in deaths from infectious diseases over the last decades. These declines may be largely attributable to advances in sanitation and living conditions, and in biomedicine, especially the availability of antibiotics and vaccines. But there are currently no anti-viral medicines to treat COVID-19.

There is also a strong causal relationship between overcrowded, poor quality housing and settlements and the incidence and prevalence of infectious diseases, which should not be overlooked (WHO 2018). With continuing population growth there is a huge urban infrastructure financing gap for housing, clean water, green and recreational space, and sanitation, exceeding 1 trillion USD/year (Ebikeme *et al.* 2019).

For instance, the number of urban slum dwellers has reached 881 million today and is expected to reach 2 billion in 2030 (WUC 2020). Cities, especially those in low- and middle-income countries, do not have adequate resources to provide the goods and services necessary for building and maintaining the social and physical infrastructure needed to support health and well-being. Without

on-going sustainable urban management and infrastructure development, urban health advantages are at risk of being lost. As the current COVID-19 outbreak clearly demonstrates, the health of cities is the backbone of global health but also at the heart of sustainable development.

The current global outbreak of the novel coronavirus COVID-19 was first officially reported on December 31st, 2019 in the city of Wuhan, Hubei Province, China and spread quickly to other cities throughout China and the world. It is no coincidence that a city was the origin of its spread. Peter Daszak (NYT 2020), explains that humans made the virus by disrupting the natural environment's ecosystems.

The G20 health ministers have recently recognized COVID-19 as a systemic disease and ss such it requires a systemic response guided by principles such as outlined in the Xiamen Call for Action which has been developed in response to key features of cities, which all complex systems have in common:

- (1) they can be planned, designed and built by better understanding their composition and dynamics;
- (2) they are self-organising; and
- (3) they have emergent properties which emerge unpredictably during which radical uncertainty prevails.¹

Accordingly, the systems approach requires two strands of action. First, a good scientific understanding of the urban social, ecological and technological infrastructure and the urban system goods and services produced and provided. In case of an urban health emergency like COVID-19, it is key to understand all aspects of the virus's transmission paths and infectiousness. Second, a strategy for political leadership, community involvement, communication and transfer of knowledge to action must be in place. Eventually a strategy for regional, national and global action that promote and support effective local initiatives are critical to long term success.

The six principles of building systems governance for urban health of the Xiamen Call to Action (Ebikeme *et al.* 2019) include:

- (1) Clear leadership and mandate to deal with urban health issues in an integrated manner.
- (2) Inclusiveness: including human rights; mutually beneficial for sectors.
- (3) Inter-sectorality: various urban sectors, such as transportation, energy, housing, including primary health care, work, and achieve urban health outcomes together.
- (4) Health and wellbeing as performance indicators which need to be measured centrally and locally in all policies.

- (5) Risk sharing: stakeholders investing in and benefiting from cross-sectorial collaboration also share the costs
- (6) Pre-cautionary principle: it's about both the curative and preventive dimensions of health.

Box 1.

One of many examples of how scholars at the Centre for Global Healthy Cities, UC Berkeley (healthycities.berkeley.edu), have attempted to implement the systems approach to urban health.

Toxic stress stress' (McEwen and Bulloch 2019) is the constant worry and adverse social events that wear away and damage people's immune systems. It can be prevented and reversed through investments in core physical and social infrastructure in cities that supports health and immune systems; this can mean building and maintaining basic life-supporting infrastructure, like water, sanitation, electricity and housing as primary prevention.

Urban health with a systems approach for addressing infectious diseases/epidemics needs to include a community-based systems focus, so we know where and how to trace contacts, where and how to approach social distancing interventions while limiting undue and unintended consequences to mental and physical health, to involve those most impacted to keep information transparent, and how to support communities (economically, socially, etc.) when/if a quarantine strategy is used. Our community-involved systems science recognizes that important variables in systems lie and interact across levels and must be integrated to better understand health outcomes and design more significant interventions. Our systems approach improves knowledge and capacity of both residents and professionals, including those in the health sector. This can be crucial when fear and mis-information spreads fast during an outbreak.

We, the Scientific Committee of the International Science Council's global science programme on Urban Health and Wellbeing, conclude that in order to respond to global health emergencies such as COVID-19, it is essential to build 'the brain of the city', as suggested in the Xiamen Call for Action 2019. Further, health needs to be put into the center of urban planning and sustainable development by taking into account:

- (1) The mutually dependent relationship of people and their urban and global environments is most obvious in cities. Cities are urban systems which are globally interconnected, and the health of cities defines the health of the planet. The ways in which our cities and their hinterlands are managed, planned and built, critically determines a potential pathogen spillover and the severity of an infectious disease outbreak, long before the first emergency response actions are taken.
- (2) The earliest possible emergency response critically defines the speed and severity of an outbreak

and thereby also its impact on health systems and economies. Similarly, addressing the outbreak at its specific geographical and socio-ecological origin, is paramount while fostering platforms for cities to better learn from each other. This includes better surveillance and monitoring of human pathogens in urban environments.

- (3) The dynamics of cities as complex social, ecological and technological systems need to be better understood in order to adequately respond to future health emergencies. This includes mapping and modeling various aspects of infectious disease dynamics.
- (4) The innovative potential of cities and the capabilities of their inhabitants need to be continuously promoted by increasing urban infrastructure financing.
- (5) The human and social capital of cities and among cities worldwide has great potential of achieving a collective intelligent response, reactive and proactive, to future health emergencies.

Note

1. Despite expert knowledge and big data, it is not entirely possible to predict exactly how urban development will affect the health of a city's population and how lethal an infectious disease like the novel coronavirus, will be.

Disclosure statement

No potential conflict of interest was reported by the authors.

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References

- Baker, M., *et al.*, 2012. Increasing incidence and inequalities in infectious diseases in a developed country. *The Lancet*, 379 (9821), 1112–1119. doi:10.1016/S0140-6736(11)61780-7.
- Ebikeme, C. *et al.*, 2019. Xiamen call for action: building the brain of the city—universal principles of urban health. *Journal of urban health*, 96 (4), 507–509. doi:10.1007/s11524-018-00342-0.
- Jones, D.S., 2020. History in a crisis — lessons for Covid-19. *New England journal of medicine*, 382 (18), 1681–1683. doi:10.1056/NEJMp2004361.
- McEwen, B.S. and Bulloch, K., 2019. Epigenetic impact of the social and physical environment on brain and body. *Metabolism*, 100, 153941. doi:10.1016/j.metabol.2019.07.005

NYT (New York Times), 2020. We made the coronavirus epidemic, opinion by David Quammen. <https://www.nytimes.com/2020/01/28/opinion/coronavirus-china.html>

UN, 2018. <https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html>

WHO (World Health Organisation), 2018. Housing and health guidelines. Geneva: WHO.

WUC (World Urban Campaign), 2020. Up for Slum Dwellers. Available from: www.worldurbancampaign.org/psup/about-slum-dwellers [Accessed 12 March 2020].