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Urban Health Systems: A neglected frontline of 21st Century epidemics and pandemics.

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Authors:

Irene A Agyepong¹, Mahua Das², Helen Elsey³, Tim Ensor²

1 Ghana College of Physicians and Surgeons

2 Nuffield Centre for International Health and Development, University of Leeds

3 Department of Health Sciences, University of York

Correspondence

CHORUS@leeds.ac.uk

Urban Health Systems: A neglected frontline of 21st Century epidemics and pandemics

Cities have been the frontline of the COVID-19 pandemic and as the world still struggles to emerge from Covid-19, scientists predict that more epidemics and pandemics lie ahead. Yet are the current urban health systems ready to respond to these challenges? Strengthening cities and the health systems requires whole systems thinking, multi-sectoral approach alongside strong inter-sectoral collaboration and comprehensive funding if we are to better protect not only the health, but the social and economic wellbeing of populations in the 21st century.

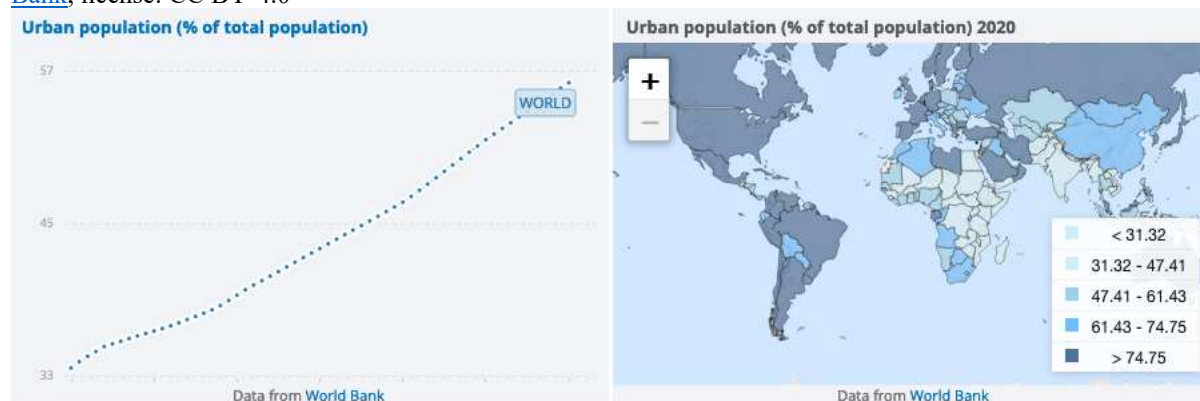
Why are cities a frontline?

Cities, that is metropolitan and municipal localities, have been the frontline of the Covid 19 pandemic across the globe in countries at all levels of income. And cities are likely to remain a major frontline of current as well as future epidemics and pandemics in the 21st century for various reasons.

More and more of the world's population live in cities and move between rural and urban

Firstly, as global populations have increased over recent decades the percentage of populations living in urban localities have steadily increased and cities have increased in number and size.

Figure 1 (Growth in urban population) and 2 (Global distribution of urbanization in 2020). Source: [World Bank](#), license: CC BY-4.0



From time immemorial, infectious disease agents have perpetuated themselves by moving from person to person as people live together and interact with each other in their normal day to day lives. The high population density in urban areas makes human to human contact more intense, social distancing harder and potential human to human transmission of pathogens easier. In poorer countries the high population density of cities may also place pressures on water and sanitation, increasing the potential of infectious disease spread. In LMICs, poor, semi-skilled and unskilled migrants moving in from deprived rural areas in search of a better life often create sprawling urban slums with high vulnerability

populations. There appear to be few studies of differences in the basic reproduction number which shows the transmission potential of a pathogen (R_0) between rural and urban in low, lower middle and upper middle-income economies. One [study](#) from Hubei province China where the Covid 19 pandemic started did not show a significant difference in R between rural and urban. Given the limited comparative data on R_0 not only between rural and urban, but also between segments of the population in urban areas such as crowded poor urban slum neighbourhoods versus wealthier better planned and spaced neighbourhoods many questions remain unanswered. For example, does averaging out of R_0 mask vulnerability of the poor? It is hard to be conclusive on how living arrangements and population density affect transmission. What is clear is that Rural-urban networks linked through families working in urban areas and returning frequently to rural areas have been a major mode of rapid transmission of Covid 19 from cities to rural areas in LMIC. Lockdowns in cities as part of the response to the pandemic have sometimes fuelled this migration. [For example in Ghana](#), the brief three week lockdown at the start of the epidemic saw poor rural migrants whose income was based on daily wages as head porters in markets etc. rushing out of the city back to the rural areas and in some cases [carrying the virus back home](#). Poor migrants returning to Nepal from India in response to lock downs may have helped in the spread of the [Delta variant to Nepal](#). The situation has been mirrored in high income countries. For example, in the USA there is [evidence](#) that Covid peaked quickly in urban areas but was then transmitted widely to rural.

Encroachment on and destruction of wildlife habitats

Secondly, infectious disease agents can jump from animal to human populations. Increasing population and related urbanization has led in some instances to encroachment by people on wildlife habitats to seek food, for exploitation of natural resources, and or to make room for human settlements. Climate change also causes destruction of wildlife habitats. All these activities increase the potential for pathogens previously restricted to animal populations to jump to human [populations](#).

Travel networks

Thirdly, from time immemorial, infectious disease agents have spread themselves by hitching rides from one geographical location to another on the people and animals that host them. Whether it is traveller for business, trade or leisure or wildlife being traded and exported for whatever reason, the potential for infectious agents to move along also is there. In the 21st century the whole world is highly interconnected, travel is rapid within and between countries and sub-regions. Many people increasingly leave, arrive and transit through airports located in cities. 'Round the world in eighty hours' rather than 'Round the world in eighty days' might well be a more contemporary title for the adventure story by French writer [Jules Verne](#) in 1872 if he was to have written it today, almost 150 years later. Cities as international [travel hubs](#) are a frontline. The 2019 SARS COV 2 (Covid 19) outbreak started in the metropolis of Wuhan and rapidly seeded around the world through [air travel](#). It has been theorized that the pattern of spread of the pandemic reflects air travel links and volume. [Sigler et al.](#) in a study of the drivers of geographical diffusion of Covid 19 globally over a six-week period between March and April 2020 using regression analysis of routine data; suggest that human mobility may best explain sustained disease diffusion.

In the 2014 West African Ebola outbreak, air and ground travel made it possible for multiple nations sometimes far away to be affected. The original cases spread from remote rural areas to the urban centres of Monrovia, Freetown and Conakry by road travellers. Once in these urban centres with global air travel links, the cases in Nigeria, USA, UK, Europe all arrived via air travellers.

We are likely to see more rather than less of this kind of rapid spread of infectious disease pathogens once they hit urban areas with high density populations and national and international travel links. Understanding urbanization and how to develop strong and resilient urban health systems, responsive to the needs of dynamic urban communities, will be key to preventing and containing future pandemics

In the last decade both Ebola and Covid 19 have shown us that introduction of a highly infectious and lethal communicable disease pathogen into urban populations is like a spark in a forest in the dry season.

Interconnectedness between Non-Communicable and Communicable disease

Fourthly is the interconnectedness between Non-Communicable Disease (NCD) and Communicable disease (CD). Already existing NCD morbidity such as hypertension and diabetes increasing vulnerability to CD such as SARS COV2 (Covid 19). Urban lifestyles increase NCD risk, incidence, and prevalence. During the Covid pandemic, people with existing co-morbidities such as hypertension and diabetes have had significantly higher risk of [morbidity and mortality](#). Sedentary lifestyles and calorie dense fast foods increase obesity and diseases such as diabetes and hypertension. That people are living longer is not necessarily related to urbanization, but it does create populations in cities as well as outside cities who are older, have more co-morbidities and therefore increase vulnerability to infectious diseases.

Rural-Urban differences

As in rural areas, once an epidemic arrives in an urban area how quickly and effectively it is dealt with (or not) can be a major game changer. However, the challenges of epidemics and pandemics in urban areas can be different from those in rural areas. Communities are differently structured, people live on top of each other, global networks and connections are easier. For example, before the West African epidemic of 2014, Ebola had been around for over four to five decades and had only flared up periodically in remote rural areas in Central Africa. Once it moved from the remote rural area of Guinea where it originated in the West African epidemic and arrived undetected in the urban centres of Conakry, Freetown and Monrovia, its containment and effects required modified approaches and were much more difficult. By the time it was finally controlled; [it was estimated](#) to have cost about 53 billion dollars and killed over eleven thousand people – more than had died in all the previous Ebola outbreaks combined. Knowledge and evidence needs to be generated and converted into practice as to how to have an effective frontline against epidemics and pandemics in urban areas.

The next epidemic

The next epidemic is not a matter of “if” but a matter of “when” and “what”. Even as the world is still struggling to emerge from Covid 19, scientists predict that potentially more epidemics and pandemics lie ahead. With more and more of the world’s population living in cities and the percentage increasing, particularly in Africa and Asia, it is ever easier for epidemics to spread. Urbanisation itself is now seen as a determinant of health, with risk factors associated with urban living driving syndemics of non-communicable and communicable diseases. Habitat loss due to climate change and human encroachment on wild animal habitats increases the risks of pathogens jumping from animal populations to human populations. Rapid and improving global networks and travel mean that a communicable disease agent that emerges in one part of the world can arrive in another part in a matter of hours. And it is likely to arrive in an urban travel hub such as an airport.

What do we do?

How ready are current urban health systems in LMIC to respond to this 21st century challenge? In the 21st century, we ignore the strengthening and maintenance of urban health systems to be an effective frontline defence against and during epidemics and pandemics at our peril. It is urgent and imperative for the nations of the world to pay attention to strengthening urban health systems. This should be not just from the perspective of the health security agenda, but also to ensure comprehensive well-funded public health systems that support universal health coverage and are underpinned by strong inter-sectoral collaboration between local government, central government and across the public and private sector. To better strengthen cities as one of the important frontlines of 21st century epidemics and pandemic requires a whole system thinking and multi-sectoral approach. Early detection and containment at community and sub-municipal level in urban areas will be critical to stop another global pandemic with the disastrous sub-national, national and global impacts that the world has suffered from Covid 19. It is not impossible. Island states like [Singapore](#) and [Taiwan](#) that are 100% urban have mounted some of the most effective Covid 19 responses in the world.

Effective pandemic preparedness and response systems should involve but go well beyond the health system to the multiple sectors that are important in communicable disease prevention and control. Ensuring communities can take greater control to prevent diseases and improve health in the complex neighbourhoods where they live is a key part of the solution. For example, in Paraguay where citizen science approaches using a combination of a mobile phone mapping app, community engagement and the energy of young people in some of the most vulnerable communities in [Asunción](#) have successfully reduced dengue mosquito habitats.

As the world has seen during this pandemic, the response has required a mobilization of sectors well beyond health and the effects have not only been on health, but also on economic and social well-being. Governments have been caught between walking a fine line between the morbidity and mortality directly caused by the virus and the strain these put on health systems and the social and economic shocks indirectly caused by the virus and the impact

these place on livelihoods, economies and social life. Health and wellbeing in its fullest sense as defined at Alma Atta have been affected. Thus, although national lockdowns have been effective in breaking the chain of infections, many governments have been hesitant to introduce or re-introduce them because of their potential socio- economic impacts.

Further Questions?

How can we make sure that interventions such as lockdowns, if necessary, are well supported by the other sub-systems (livelihood and economic especially if we are talking about urban settlements) for maximum benefits? How can urban systems be designed and redesigned to make a balanced response to the next threat more possible? What are some of the lessons that have been learned about how to make cities a more effective frontline in the prevention, response, containment and control of epidemics and pandemics? In a series of blogs, we explore some of the evidence and learning from the work of the CHORUS consortium in its work on Covid and Cities in Ghana, Nigeria, Bangladesh and Nepal; and its collaboration with the work of the CATALYSE consortium on Covid and West and Central African Health Systems in Ghana and Nigeria on these and other questions.