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COMMENTARY AND DEBATE

Urban health and health equity in Latin American cities: what COVID-19 is teaching us

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ABSTRACT

Latin America is the most unequal and urbanized region of the world. The physical and social environments of Latin American cities, the lack of public health and health-care infrastructure, and pronounced social and health inequities make these cities especially vulnerable to COVID-19. It is too soon to know the true impact of the pandemic and how it will compare to the many ongoing health and environmental challenges facing Latin American cities. In this commentary, we highlight a few key lessons with major implications not only for COVID-19 but for urban health and health inequities, that are beginning to emerge.

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Over 80% of the population of Latin America lives in urban areas, and more than 90 million people live in megacities of more than 10 million inhabitants. The region is home to 19 of the world's 30 most unequal cities (U. N. Habitat 2013). Over 30% of the population lives in poverty, and 24% live in what the United Nations defines as informal settlements (Economic Commission for Latin America and the Caribbean 2019). High proportions of the population are engaged in the informal economy without formal contracts, social security, healthcare coverage, or sick leave (Herranz 2020). The region is known for its high levels of violence. Cities in the region are characterized by high population densities and overcrowding. Urban areas have grown in often chaotic ways and have experienced dramatic increases in automobile traffic and high levels of air pollution. Latin American cities are also characterized by large health inequities, as recently illustrated by the SALURBAL study which documented significant inequities in life expectancy within cities (Bilal *et al.* 2019).

At the time we are writing, Latin America has experienced over 3,320,000 cases and nearly 143,000 deaths from COVID-19 (Pan American Health Organization (PAHO) 2020) and has become one of the epicenters of the pandemic. Given the high levels of urbanization in the region, the vast majority of cases and deaths are in cities. However, data are likely incomplete because of limited access to diagnostic tests and because of challenges in attributing deaths to COVID-19. Almost all countries have implemented stay-at-home orders, some even including strict curfews (Horwitz *et al.* 2020). Despite limited data it is clear the evolution of the pandemic is heterogeneous across countries, with some countries like Brazil, Peru, Chile, Mexico, and Colombia experiencing a greater impact of COVID-19 than others (at least at the time we are writing this).

The health consequences of the pandemic extend well beyond the viral infections themselves. Stay-at-home orders are having socioeconomic consequences that are superimposed on highly inequitable social conditions: dramatic increases in unemployment, income losses; loss of tax revenue and reductions in already limited social services; delayed health care for non-COVID causes, including preventive services; children missing school; and the social and mental health implications of stay-at-home orders in the context of crowding and substandard housing. A recent report from the Economic Commission for Latin America and the Caribbean estimated severe economic impacts of the pandemic in 2020 (Economic Commission for Latin America and the Caribbean 2020) including significant increases in unemployment, poverty, and income inequality.

On the other hand, reduced mobility and economic activity across cities have resulted in substantial reductions in air pollution and automobile traffic with possible consequences for health and injuries (although increases in speeds linked to less congestion could offset some of the reductions in traffic-related injuries) (Inter-American Development Bank 2020). The need

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for physical distancing in transportation is prompting infrastructure for sustainable modes of transport like cycling and walking. Some reports suggested reductions in violent deaths in cities of Latin America linked to stay-at-home orders, although cases of domestic violence may be increasing (Sigal *et al.* 2020).

The full impact the pandemic and how it will compare to the many ongoing health and environmental challenges facing Latin American cities cannot be reliably predicted at this time, but a few key lessons with implications not only for COVID-19, but also for urban health and health inequities in the region are beginning to emerge.

Urban physical and social environments as key determinants of the impact of the pandemic

COVID-19 has provided yet another illustration of how the physical and social structures of Latin American cities impact health and contribute to health inequities. Physical environments including density, overcrowding, forms of transportation (including long and crowded commutes), and access to water impact the transmission of the virus and the possibility (or impossibility) of social distancing. Social environments including access to jobs, reliance on the informal economy, and labor and social policies also affect the impact of the virus, the ability of residents to implement social distancing, and the consequences of social distancing itself.

Strong residential segregation by social class, ethnicity, and migration status leads to large differences in these physical and social environments within cities, resulting in spatially patterned social and biological vulnerability to COVID-19. There is strong clustering not only of social and economic disadvantage but also of pre-existing health conditions, lack of food and physical activity resources, higher levels of environmental hazards like air pollution, and lack of access to quality health care. Access to information and the ability to act on that information are also socially patterned. Selected features of Latin American cities that may affect the impact of the pandemic are shown in Table 1 (Quistberg *et al.* 2019).

Interrelated nature of multiple health threats

The pandemic is superimposed on existing health threats in cities of Latin America including the high burden of noncommunicable diseases, persistent threats from other communicable diseases, and high

Table 1. Selected characteristics (median, 25th–75th percentile) of 371 Latin American cities in the SALURBAL Study (Quistberg *et al.* 2019).

	Categories of city population					Total
	<250 k	>250-500 k	>500 k-1mill	>1mill-5mill	>5 million	All
Number of cities	172	98	53	41	7	371
Population density (people per km^2)	5661, (4569–8030)	6593, (5195–8535)	6343, (5138–8221)	7418, (5717–9442)	11,086, (9632–16,163)	6218, (4979–8610)
5 year population growth rate (%)[a]	5.3, (3.3–8.2)	5.7, (3.1–7.7)	5.8, (4.5–7.7)	6.5, (5.0–7.8)	4.4, (3.39–7.65)	5.7, (3.46–7.77)
% households piped water in dwelling	98.5, (93.9–99.4)	97.9, (92.8–99.3)	98.3, (95.4–99.3)	97.8, (94.5–99.1)	97.6, (96.1–99.6)	98.2, (93.7–99.3)
% households with sewage system connected to municipal network	74.0, (51.2–88.7)	76.4, (57.2–90.0)	80.4, (61.0–90.4)	76.7, (52.7–87.3)	88.0, (82.3–95.9)	76.7, (54.7–89.8)
% adults >25 with complete secondary education	36.6, (31.5–40.8)	38.0, (34.1–42.7)	40.0, (36.9–45.8)	43.0, (37.0–45.3)	46.7, (39.5–48.0)	38.4, (33.7–43.0)
% poor[b]	25.3, (15.5–45.3)	33.0, (20.0–42.5)	32.7, (18.6–41.9)	33.6, (21.7–40.8)	23.1, (17.4–27.2)	28.3, (17.1–42.3)
Gini coefficient[c]	0.51, (0.43–0.54)	0.47, (0.43–0.54)	0.47, (0.43–0.58)	0.50, (0.45–0.63)	0.48, (0.43–0.63)	0.50, (0.43–0.55)
Patch density (patches per km^2)	0.24, (0.086–0.43)	0.26, (0.11–0.44)	0.35, (0.19–0.58)	0.62, (0.42–0.83)	0.57, (0.44–0.91)	0.30, (0.12–0.57)
Street density (km)	1479, (1280–1689)	1596, (1400–1778)	1622, (1365–1763)	1534, (1369–1626)	1488, (1447–1902)	1512, (1330–1715)
Travel delay index	0.1, (0.1–0.2)	0.2, (0.1–0.3)	0.2, (0.2–0.3)	0.2, (0.2–0.4)	0.3, (0.3–0.7)	0.2, (0.1–0.2)
$PM_{2.5}$ (μg/m3)	11.6, (8.3–17.0)	13.8, (9.0–16.6)	12.6, (9.0–17.3)	9.6, (7.8–12.5)	17.8, (16.6–28.8)	11.8, (8.6–17.0)

City population size is defined by the population in 2010.
Population growth for the period 2010–2015.
Percent poor is defined as the proportion of the population living in households with household income below the national income poverty line.
A Gini coefficient of 0 indicates perfect equality.
Patch density is a measure of urban fragmentation (higher density more fragmentation).
Street density is total length of streets divided by the area of the city.
Travel delay index measures the increase in travel times due to congestion in the street network. An index of X means travel time in traffic is (1 + X) times the travel time without traffic.
$PM_{2.5}$ is defined as the arithmetic mean of $PM_{2.5}$ Grid Point centroids in the area in micromilligrams per cubic meter (μg/m3).
Street density, travel delay index, and $PM_{2.5}$ are calculated for built-up areas.
[a]5 cities with missing data
[b]31 cities with missing data
[c]55 cities with missing data

levels of violence. It is well known that the severity and mortality of COVID-19 is significantly increased in persons with underlying chronic diseases. Dengue has emerged as a major urban health problem in the region and various countries are experiencing measles outbreaks. Violence, including gender-based violence, also remains highly prevalent. These other health threats may magnify the impact of COVID-19 and a focus on COVID-19 may detract resources from more silent killers that persist or may even increase as a result of the pandemic.

Lack of core health care and public health infrastructure as a critical challenge in urban areas

The organization of health care is variable across countries, but common features include incomplete and inequitable access and variable quality. This will impact not only the response to COVID-19 but also morbidity and mortality from other health problems. Another critical aspect is the lack of a robust public health infrastructure needed to characterize public health threats, monitor their impact, and guide policy. In many cities public health surveillance systems are underdeveloped and public health resources and expertise have not been prioritized. Although this challenge is especially stark in the context of COVID-19 it is a much broader problem that affects the ability of cities to respond in an evidence-based way to all health threats.

Inequality within cities as a driver of the pandemic

Last but not least, the pandemic is making even more visible the health equity challenges facing the cities of the region, rooted in structural inequities and racism. Though the virus was imported to the region by wealthy travelers it is quickly transitioning to poor neighborhoods and there is little doubt that the pandemic will have the greatest impact on the poor. Workers in the informal sector, domestic workers, indigenous groups, afro-descendants, and migrants are especially vulnerable. This social patterning results from many factors including living and working conditions that facilitate exposure and impede social distancing, the presence of underlying health problems, inadequate access to health care, and social and economic vulnerability to the consequences of stay-at-home orders. COVID-19 has become yet another contributor to health inequities in cities of the region, highlighting and magnifying the impact of other health inequities.

Can we leverage the pandemic experience to create cities that are healthier, more equitable and environmentally sustainable?

The physical and social environments of Latin American cities, the lack of public health and health-care infrastructure, and pronounced social and health inequities make these cities especially vulnerable to COVID-19. Dramatic illustrations of this vulnerability are emerging. The experience of Guayaquil, Ecuador is a case in point. Approximately 70% of the country's cases have been identified within the city of 2.3 million, in a country where 36% of the urban population lives in informal settlements and one in four city residents lacks access to running water (Borja 2020). The result has been overrun hospitals, corpses abandoned in streets, and mass graves. Manaus (Brazil) has seen a similar experience. In Lima (Peru), scores of residents have decided to leave the city, often on foot, fleeing the virus and the social and economic consequences of the pandemic.

Despite the prospect of dire impacts of the pandemic on Latin American cities, it is tempting to think that there could be a silver lining: unprecedented attention and increased funding for public health; recognition of the critical need for coordinated multisectoral government interventions to protect health; interventions to redistribute wealth, improve working conditions, and expand social safety nets; demonstrations of what cities could look like with less traffic, more sustainable modes of transport, and less air pollution; and last but not least growing awareness of the pervasive health consequences of social inequality and racism. At the same time the pandemic response is also illustrating potential threats to human rights and civil liberties, the stigmatization of vulnerable groups (Bachelet 2020), the prospect of mass migration from cities to rural areas, and the possibility of reduced investments in high-density cities and in public transportation because of their perceived infectious disease threat and abandonment of the many benefits that well-managed urban living can bring for health and quality of life.

The pandemic has also created unprecedented opportunities for research and for novel thinking about urban policies. Heterogeneities across cities in the responses to the pandemic have created opportunities for research on the health and environmental impacts of interventions such as street closings and expansions of bike lanes (Wray 2020) or payments to individuals who are unable to work (Gobierno de Chile 2020). The crisis has also created an opportunity to rethink the trade-offs of various urban policies, transcending false dichotomies (such

as high population density is good or bad) but rather identifying the conditions under which the beneficial effects of policies can be maximized (e.g. maximizing the multiple benefits of high population density while minimizing any adverse effects using appropriate urban and transport design). Most importantly the pandemic has shone a bright light on the need for urban policies that specifically address social and economic inequities across people and neighborhoods within cities in order to improve health.

Highly urbanized and highly unequal Latin America is especially vulnerable to the adverse social, economic, and health impacts of COVID-19. Yet the cities of the region have also at times shown remarkable resilience and innovation. Will the pandemic pass and leave cities of the region worse? Or will it energize new ways of thinking about the links between cities and well-being across the region and lead to the structural changes needed to make cities healthier, more equitable, and environmentally sustainable? It is too soon to tell, but today both outcomes are possible. Through science and advocacy, we have the opportunity to make a difference.

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Project description and data sharing statement

Salud Urbana en América Latina (SALURBAL), Urban Health in Latin America, is an international collaboration that studies how urban environments and urban policies impact the health of city residents and environmental sustainability throughout Latin America. SALURBAL's findings inform policies and interventions to create healthier, more equitable, and more sustainable cities worldwide. Learn more at www.lacurbanhealth.org. The SALURBAL project welcomes queries from anyone interested in learning more about its dataset and potential access to data. To learn more about SALURBAL's dataset, visit https://drexel.edu/lac/or contact the project at salurbal@drexel.edu.

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Notes on contributors

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