



Urban health research in Latin America

Workshop report

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Preface

In 2018, more than half the world's population, 4.2 billion people, were estimated to be living in urban areas, and this figure is projected to rise to 70% by 2050. Much of this increase is being driven by the migration of people from rural to urban areas in search of economic opportunities. While average levels of health are higher in urban areas, these advantages are being eroded as rapid urbanisation generates a multiplicity of health hazards and overloads urban health systems.

Health challenges are exacerbated by high levels of inequality. Urbanisation typically involves the creation of informal settlements with a limited supply of domestic services, low access to healthcare, and high levels of exposure to unhealthy environments.

These issues are particularly pressing in Latin America, one of the most rapidly urbanising regions in the world. Already, 80% of the population in Latin America lives in cities, and 19 of the 30 cities in the world with most inequality can be found in the region.

On 9 and 10 March 2020, the UK Academy of Medical Sciences (AMS), the National Academy of Medicine of Brazil and the Brazilian Academy of Sciences organised a joint meeting to explore the major urban health issues facing the region, priority research questions, and potential ways to advance urban health research. The meeting was funded by the AMS, through the Global Challenges Research Fund.

The workshop programme was developed by the organisers and a steering committee chaired by Academician Paulo Hilário Nascimento Saldiva, Director of the Institute of Advanced Studies, University of São Paulo, Brazil, and Professor Frank Kelly FMedSci, Head of the Department of Analytical, Environmental and Forensic Sciences, King's College London, UK (Appendix 1). This report provides a summary of the key themes to emerge at the workshop. It reflects the views expressed by participants at the workshop and does not necessarily represent the views of all participants, all members of the Steering Committee, the AMS, the National Academy of Medicine of Brazil, or the Brazilian Academy of Sciences.

Executive summary

Latin America is one of the most urbanised regions of the world, and the number of people living in urban areas is projected to rise still further. By 2030, more than 90% of the population of Latin America is likely to be living in cities, including a small number of 'megacities' with more than 10 million inhabitants and a much larger number of smaller cities.

Cities offer financial opportunities and are typically more economically productive, driving inward migration and leading to uncontrolled population growth. However, the financial benefits are unevenly spread. Cities in general, and Latin American cities in particular, are highly socially patterned according to socioeconomic status. Incoming migrants with limited assets often establish temporary dwellings with little or no access to household services and healthcare.

Marked socioeconomic stratification in cities is mirrored in deeply-rooted health inequalities. Despite their advantages, cities can have a wide range of health hazards. These include poor air quality, limited access to safe drinking water and effective sanitation services, and low levels of access to green spaces. Latin American cities also experience high levels of violence. Densely populated areas and unhygienic settings favour the spread of infectious diseases. Nearly all of these health hazards have a greater impact on the socially disadvantaged, who therefore have a lower life expectancy and a greater burden of non-communicable and infectious diseases.

Urban health is therefore emerging as a distinct field, and one of particular relevance to Latin America. Research has a key role to play in generating data to support evidence-based policymaking to improve urban health and reduce health inequalities, yet the full potential of research has yet to be fully realised in Latin America. Policymaking is insufficiently informed by evidence from research, and research is insufficiently geared to the needs of policymakers.

To begin to address these issues, workshop participants discussed current activities in urban health research in Latin America, and the challenges and opportunities. These discussions have been used to generate a high-level framework for taking forward a more coordinated approach to urban health research spanning the following key areas:

- 1. Defining the scope of urban health research:** Developing a shared definition and conceptual framework to provide a foundation for collaboration, alignment and political engagement.
- 2. Identifying the key influences on urban health:** Generating a deeper understanding of the many factors – spanning the physical environment, social environment, health behaviours and access to healthcare, and the interactions between them – that affect the health and wellbeing of people living in urban areas.
- 3. Identifying the drivers of health inequalities:** Documenting and analysing the full range of factors leading to health inequalities and their interactions.
- 4. Exploring interventions:** Developing and evaluating policy-level and other interventions to improve urban health and reduce health inequalities.
- 5. Influencing policy:** Strengthening links between researchers and policymakers to ensure a stronger emphasis on policy-relevant research and on evidence-informed decision-making.

Participants also identified a range of **enablers** to urban health research. These included:

- Increased national, regional and global funding.
- Capacity building in areas such as interdisciplinary research, policymaker engagement and community engagement.
- The development of international networks, data platforms and data standards, to facilitate comparative studies.
- The development of new methodologies to assess health and economic consequences, and to model the impact of interventions.
- Additional data on exposures to health risks and their health consequences.
- Political and policymaker advocacy, including integration with other aligned agendas such as sustainability and climate change.

A range of potential next steps was also identified:

Networking: The creation and strengthening of urban health research networks across Latin America.

Urban health research agenda: Further consultation and dialogue to establish a regional urban health research agenda, with an agreed definition, goals and research priorities.

Evidence collation: The synthesis of existing evidence on urban health to inform the development of the regional research agenda.

Political engagement: The strengthening of links with existing city-level political networks to mobilise political support.

Policymaker engagement: The strengthening of links with national policymakers to promote greater involvement in research and commitment to evidence-informed decision-making.

North–South networks: Exploring opportunities for collaboration on topics of common interest with Europe, including the UK, and high-income countries in other regions.

South–South networks: Exploring opportunities for South–South collaboration, for example comparative studies with Asia or sub-Saharan Africa, and to facilitate the exchange of innovations.

Introduction

The world is rapidly urbanising. An estimated 4.2 billion people, half the world's population, already live in urban areas,¹ and this figure is projected to rise to 70% by 2050.² Much of the increase will occur in low- and middle-income countries, particularly in densely populated informal settlements.

Much of the growth will be seen in already large 'megacities', with populations of more than 10 million. These are projected to grow in number from 33 in 2018 to 43 in 2030.¹ However, substantial growth will also be seen in smaller urban centres. In 2000, 371 cities had 1 million or more inhabitants; this had risen to 548 by 2018 and is likely to rise to more than 700 by 2030.¹ In fact, the vast majority of cities have fewer than 5 million inhabitants. In 2018, 467 cities had between 1 and 5 million inhabitants, and a further 598 had populations of 500,000–1 million.

Latin America is at the forefront of urbanisation. In 2018, the region had six megacities and 66 cities of between 1 and 5 million inhabitants.¹ By 2030, while no new megacities are expected to emerge in the region, the number of large cities is projected to rise to 82, while fewer than 10% of the population will be living in rural areas.¹

The reasons behind urbanisation are complex and varied, but economic factors are clearly significant. The industrialisation of farming reduces the need for human labour in rural areas, and cities are noted for their higher levels of wealth creation and productivity, offering economic opportunities to migrants.

However, while cities may have advantages in terms of wealth creation, that wealth is usually unequally shared. This is particularly true in Latin America, which historically has been the region with the highest levels of socioeconomic inequality.³ Eight countries in Latin America are in the world's top 20 countries with the most inequality.⁴ Although inequalities have been falling since the turn of the millennium, progress has significantly slowed in recent years.⁵ An estimated 30.1% of the population (185 million people) were living in poverty in 2018, with 10.7% (66 million people) living in extreme poverty, with numbers projected to rise further.⁵ As a result, cities are typically highly heterogeneous, with marked social stratification by socioeconomic status. Although some progress has been made during this century in reducing these inequalities in the region, they remain large and widespread.

The rapid growth of cities has far-reaching consequences for human health and wellbeing. Although average levels of population health are better in urban than in rural areas, these advantages are not shared by all. They are being challenged by the impact of uncontrolled urbanisation, which is also raising exposure to a multitude of health hazards and lack of access to health services and basic infrastructure (housing, employment, water and sanitation etc).

1. United Nations, Department of Economic and Social Affairs, Population Division (2018). *The World's Cities in 2018—Data Booklet (ST/ESA/SER.A/417)*
2. United Nations, Department of Economic and Social Affairs, Population Division (2019). *World Urbanization Prospects 2018: Highlights (ST/ESA/SER.A/421)*. <https://population.un.org/wup/Publications/Files/WUP2018-Highlights.pdf>
3. <https://ourworldindata.org/income-inequality#all-charts-preview>.
4. World Bank Group (2018). *World development indicators 2018*. <https://data.worldbank.org/products/wdi>.
5. Economic Commission for Latin America and the Caribbean (ECLAC) (2019). *Social Panorama of Latin America 2019*. Santiago de Chile: ECLAC. Available at <https://www.cepal.org/en/pressreleases/eclac-region-has-underestimated-inequality>.

The **social determinants of health model**⁶ (Figure 1) emphasises the importance of considering the full range of factors that affect health and wellbeing over the life course. These include the **physical environment**, such as exposure to air and noise pollution, access to green spaces, opportunities for physical exercise, the potential for road traffic injury, and the provision of clean water supplies and sanitation; the **social environment**, including social connectedness and exposure to violence inside and outside the home; **health behaviours**, such as smoking, diet and physical exercise; and **access to health services**, from public health services such as vaccinations to emergency medical care.

What goes into your health?

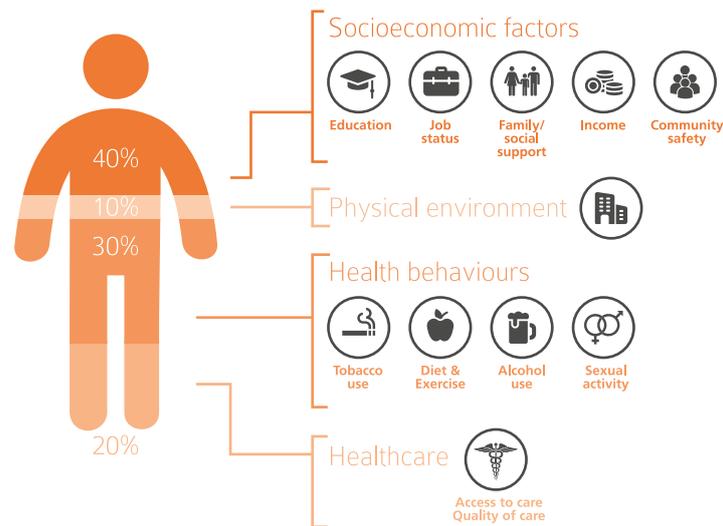


Figure 1: The social determinants of health and contributions to health status (adapted from the Bridgespan Group, and based on an analysis by the Institute for Clinical Systems Improvement⁷)

These factors interact and affect the risk of **infectious diseases**. The physical environment can create niches in which mosquitoes and other vectors of disease can multiply, while poor hygiene and sanitation practices provide opportunities for the spread of water-borne diseases. Changing land use can expose inhabitants to new threats as cities encroach into forest or other natural environments.

The social determinants of health model provides a framework for understanding profound **health inequalities** in urban areas. Socially disadvantaged populations are typically exposed to more harmful physical environments, including higher levels of pollution and less secure access to clean water and sanitation, green spaces and a healthy diet. They are also more exposed to social stressors and violence. In many settings, they are less likely to have access to quality health services, because of physical and/or financial barriers.

The health consequences of these risk factors are manifold.⁸ Living in cities is associated with an increased risk of injury due to road traffic accidents and violence. Air pollution has multiple impacts, not just on respiratory conditions but also on cancer, due to exposure to carcinogens, and cardiovascular disease; there is also growing evidence of associations with neurodegenerative disorders such as Alzheimer's disease. Urban-associated lifestyles increase the risk of a large number of non-communicable diseases, while poor sanitation and high population densities promote the rapid spread of infectious diseases. As well as the impact on physical health, the challenges of urban living can have major detrimental impacts on mental health.

6. WHO. *Social Determinants of Health*. www.who.int/social_determinants/en/.

7. Institute for Clinical Systems Improvement (2014). *Going Beyond the Clinical Walls White Paper – Solving Complex problems*. Bloomington: Institute for Clinical Systems Improvement. Available at <https://www.icsi.org/going-beyond-clinical-walls/>.

8. WHO. *Urban Health*. www.who.int/health-topics/urban-health.

Moreover, because of the socioeconomic patterning of risk factors, socioeconomic inequalities translate into major health inequalities.⁹ Life expectancy can vary by many years across cities. The incidence of medical conditions typically shows marked heterogeneity within cities, with many conditions strongly associated with social deprivation.

Importantly, social determinants of health do not act independently of each other. Cities are made up of highly interconnected systems through which changes can ripple and have multiple, often unforeseen consequences. The interplay of different risk factors means that more system-level thinking has to be applied to urban health in order to determine the likely impact of interventions

A further challenge is presented by likely future trends. Urbanisation is projected to continue in Latin America, exacerbated by the impact of climate change and environmental degradation. Climate change will have its own health impact on cities, for example increasing the risks of heat stress, exacerbating pollution and placing additional demands on domestic service infrastructures. In addition to global climate change, urban morphology and design may amplify health stress by creating urban heat islands, as well as areas at high risk of floods or landslides, a natural consequence of a lack of green areas and high-density urbanisation.

Globally, the challenges presented by urbanisation are well recognised. The **Sustainable Development Goals** include a specific goal on cities (SDG11, sustainable cities and communities).¹⁰ Across the world, multiple sustainable cities and healthy cities initiatives have been launched, driven by policy at national or metropolitan level. These initiatives can also be framed within the broader concept of **planetary health**,¹¹ which focuses on the interdependency between human health and wellbeing and the natural environment, and cities inevitably have a major impact on this.

Within this complex context, in March 2020, the UK Academy of Medical Sciences (AMS), the National Academy of Medicine of Brazil, and the Brazilian Academy of Sciences organised a joint meeting to explore the urban health challenges facing the region and responses to them. It brought together academics, clinicians and other stakeholders from across the region and the UK to discuss the health challenges, and the policy initiatives and other interventions to address them. Its key aim was to develop a framework for identifying priorities in urban health for the region and to identify opportunities to enhance research in this critical area.

9. WHO, UN-Habitat (2016). *Global Report on Urban Health: Equitable, healthier cities for sustainable development*. Geneva: WHO. Available at <https://unhabitat.org/global-report-on-urban-health-equitable-healthier-cities-for-sustainable-development>.
10. UN. *Sustainable Development Goals Knowledge Platform: Sustainable Development Goal 11*. <https://sustainabledevelopment.un.org/sdg11>.
11. Whitmee S, et al. (2015). *Safeguarding human health in the Anthropocene epoch: report of The Rockefeller Foundation-Lancet Commission on planetary health*. *Lancet* **386(10007)**, 1973-2028.

Emerging themes

Discussions at the meeting focused on three key areas; transportation, air pollution and episodic diseases. Wider issues related to urban health, research and the coordination of research efforts were also considered. These discussions identified a range of important themes:

1. Defining the scope of urban health research

One important conclusion was that there is a need for a common understanding of urban health and of urban health research. It was recognised that the concept of urban health needed to be broad, encompassing the key points discussed above, and interpreted within a regional context.

The SALURBAL project (see Box 1) and the Pan American Health Organization (PAHO, Regional Office for the Americas of the World Health Organization) has proposed a definition for urban health:

Urban health: *The health and wellbeing of people living in cities and urban areas, as influenced by multiple characteristics of the urban social and built environment, and by policies related to land use and planning, transport, housing, employment and income, education, energy, water and sanitation, and other sectors.*¹²

Given the need to also address health inequalities in the region, this could be incorporated into a definition of urban health research:

Urban health research: *Research into the biological, environmental and social factors affecting the health and wellbeing of people living in cities and urban areas, the causes and consequences of health inequities in such areas, and the policy and other interventions to improve urban population health and reduce health inequalities.*

It was agreed that further discussion is required to develop a consensus definition and to establish the core principles needed to underpin urban health research. Discussions so far concluded that it was widely felt to be strongly interdisciplinary and to have an intimate connection to policymaking.

Having a shared understanding and definition of urban health research would provide an important foundation for establishing collaborations across disciplines, sectors and countries. It would also support coherent and coordinated engagement with other stakeholders, particularly politicians and policymakers.

2. Identifying the key influences on urban health

Multiple factors affect the health of people living in cities. Understanding which of these have the greatest impact, and the routes by which they affect health, will be essential to the design of interventions to protect health.

Given the wide range of influences on health, a key challenge is to establish systematic approaches to 'urban epidemiology'. Work is needed on the patterns of disease and risk factors, spanning the key areas of the social determinants of health model. These need to be integrated into models that capture the complexity of interactions between risk factors and the indirect routes through which risk factors often act. The SALURBAL project, for example, shows how the analysis of data from multiple cities in Latin America can provide insight into the factors influencing the differences both between and within cities (see Box 1).

12. Diez Roux AV, et al. (2018). A novel international partnership for actionable evidence on urban health in Latin America: LAC-Urban Health and SALURBAL. *Glob Chall* **3(4):1800013**.

Box 1: SALURBAL

The SALURBAL network,^{13,14} funded by Wellcome in 2017, brought together 14 partners, mainly from Latin America, to create the evidence base needed to make Latin American cities healthier, more equitable and environmentally sustainable. It is also engaging with policymakers and the public, and creating a platform for further collaboration and the sharing of data and experiences.

More specifically, SALURBAL has four key aims:

- To identify the drivers of poor health in urban areas and causes of health inequalities.
- To evaluate policies and interventions addressing urban health issues and inequalities.
- To apply systems thinking and modelling to explore interconnections and the potential impact of policy or other interventions.
- To engage with policymakers and the public to share knowledge and inform programme activities.

To create a solid foundation, the programme established a coherent data system, including classification systems for cities and areas within them and for variables in health and other sectors.¹⁵

Analyses of these data have already revealed large heterogeneities between cities. Mortality from communicable, maternal, neonatal and nutritional conditions, for example, ranged from 5% to 50%; deaths from violent injury ranged from 0% to 22%; and mortality from non-communicable diseases ranged from 32% to 71%. Other analyses explored issues such as the factors associated with deaths in road traffic accidents, infant mortality, life expectancy,¹⁶ and commute patterns and depression.¹⁷ Future analyses will focus on areas such as the impact of green spaces, and the links between heat and health, air pollution and health, and the built and social environment and non-communicable diseases.

Evaluations focused on four areas: mobility and emissions control, social inclusion, comprehensive urban development, and the promotion of healthy behaviours. Funding is sufficient for six evaluation projects.

Systems thinking activities¹⁸ focused on two areas, transportation and food. A participatory approach was used to gather stakeholder input on the interconnectedness of factors that influence the behaviour of city inhabitants. This provided input for agent-based modelling to examine how interventions in different areas might affect commute behaviour and the consumption of ultra-processed food.

To disseminate its findings, and more generally promote stronger connections between policymakers and the academic community, the programme organised a major forum event as well as more specific policymaker workshops. It also developed a range of policy briefing notes and a media and communications strategy, and undertook capacity-building events with researchers.

13. Drexel University. SALURBAL: Salud Urbana en América Latina (SALURBAL) project. Available at <https://drexel.edu/lac/salurbal/overview/>.
14. Diez Roux AV, et al. (2018) *A novel international partnership for actionable evidence on urban health in Latin America: LAC-Urban Health and SALURBAL*. *Glob Chall* **3(4)**:1800013.
15. Quistberg DA, et al. (2019). *Building a data platform for cross-country urban health studies: the SALURBAL study*. *J Urban Health* **96(2)**:311–337.
16. Bilal U, et al. (2019). *Inequalities in life expectancy in six large Latin American cities from the SALURBAL study: an ecological analysis*. *Lancet Planet Health* **3(12)**: e503–e510.
17. Wang X, et al. (2019). *Commute patterns and depression: Evidence from eleven Latin American cities*. *J Transp Health* **14**:100607.
18. Langellier BA, et al. (2019). *Using community-based system dynamics modeling to understand the complex systems that influence health in cities: The SALURBAL study*. *Health Place* **60**:102215.

Workshop participants identified a range of challenges in this area. These include a lack of data on health conditions or risk factors, as well as inconsistencies in data, which make comparisons difficult. Due to academic compartmentalisation, it was felt it was difficult to carry out interdisciplinary research and hard to obtain funding for it. Gaps in knowledge are also key – for example, air pollution is a complex mix of physicochemical entities, which have differing impacts on different aspects of human health. This complexity further emphasises the need for interdisciplinary research.

Participants also identified a range of opportunities that could improve understanding in this area. These include greater use of public health ‘observatories’ in urban areas to gather systematic data on the health of populations and exposure to risk factors. Geographic information systems, satellite imaging and remote-sensing technologies provide increasingly sophisticated opportunities to map physical and chemical environments in urban areas.

Other technological opportunities include using ‘wearables’ and other digital technologies to gather data on the physiology and behaviour of large numbers of inhabitants of urban areas, potentially used in combination with data generated by ‘smart city’ technologies.¹⁹ Such initiatives could generate potentially useful ‘big data’ resources that could be used to explore associations with health outcomes.

Further technological opportunities exist in the use of big data to generate models linking social, environmental and behavioural variables to health outcomes. These would have potential as predictive models and forecasting tools, for example to identify times when there is a high risk of infectious disease outbreaks or poor air quality, and to inform mitigation efforts or more efficient allocation of healthcare resources.

3. Identifying the drivers of health inequalities

A deeper understanding of urban epidemiology and risk factors would also help to generate a clearer picture of the extent, causes and consequences of health inequalities. While poverty is a known risk for many conditions, it affects health indirectly through multiple pathways. A better understanding of these pathways could help identify priority areas for interventions that best mitigate the effects of poverty.

Since poor health is itself a risk factor for poverty, creating a vicious cycle in which health problems reduce economic opportunities or act as a drain on household resources, targeted interventions that improve health could help to break this cycle.

Inequalities have a strong association with social unrest and insecurity. Unsurprisingly, therefore, Latin America experiences high levels of violent crime. Homicide is a leading cause of death in the region – Latin America is home to 8% of the world’s population but accounts for a third of total homicides. Young adults bear the brunt of this premature mortality, which in some countries accounts for a significant proportion of lower life expectancy compared with high-income countries and even declining life expectancy.²⁰ Addressing violence-related injury therefore requires a cross-sectoral approach that also encompasses poverty and socioeconomic inequalities (see Box 2).

19. Ellsmoor J (2019). *Smart Cities: The Future Of Urban Development*. <https://www.forbes.com/sites/jamesellsmoor/2019/05/19/smart-cities-the-future-of-urban-development/#54e15fee2f90>.

20. Canudas-Romo V & Aburto JM (2019). *Youth lost to homicides: disparities in survival in Latin America and the Caribbean*. *BMJ Glob Health* **4(2)**:e001275.

Box 2: Violence reduction

A multisectoral initiative has achieved significant reductions in violence in Cali, Colombia.

Violence is a major social and public health problem in Latin America. The top 10 cities in the world with the highest homicide rates are all in Latin America.

Cali is a city of 2.4 million people that experienced rapid population growth through the 20th century. By the 1990s, homicide was a leading cause of death in the city.

A strategy to tackle this high rate of homicide adopted a public health model, identifying a range of factors spanning multiple sectors that were contributing to the problem. These included the ready availability of firearms, problematic alcohol consumption, and deficient law enforcement. Policy measures were put in place to address these issues.

A further important factor was poverty – there was a strong correlation between levels of socioeconomic disadvantage and violence. In collaboration with communities, a major poverty reduction programme was developed and implemented, again involving actions across multiple service sectors, including health provision. The programme, which has cost around US\$80m a year, has reduced poverty and inequalities at a faster rate than across Colombia more generally.

Collectively, these activities contributed to an 82% drop in Cali's homicide rate between 1993 and 2018.

4. Exploring interventions

The challenges of rapid urbanisation have led to considerable innovations in urban planning and development. Many cities have introduced new transport systems, including cable cars as well as more conventional mass transit systems. Faced with major air quality issues, Mexico City introduced a suite of changes designed to reduce air pollution levels (see Box 3). In addition, NGOs and community groups have launched initiatives to encourage people to undertake more physical exercise or to restrict traffic in residential areas (see Box 4).

Often, these initiatives are driven by quality-of-life considerations, particularly those aiming to reduce air pollution, with the goal of making cities more attractive places in which to live. Economic factors, such as the impact of car congestion on productivity, may also be important drivers of action. Recently, sustainability has emerged as a powerful element in urban planning, as cities aim to reduce their ecological footprint. In these cases, impacts on health are often seen as secondary or co-benefits. They may be cited as part of the rationale for action but impacts on health are rarely assessed.

Whatever the driver, workshop participants suggested that urban innovations were not always strongly informed by evidence and were rarely evaluated effectively. This leads to a disconnect between research and policymaking, where decisions may be made in the absence of evidence, and when evidence is available it does not inform decision-making.

Box 3: Mexico City

Over the past three decades, Mexico City has adopted a strategic multisectoral approach to counter dangerously high levels of air pollution.

Mexico City expanded dramatically in the 20th century. The Mexico City Metropolitan Area is now home to 21 million people, and is associated with a high population density and extensive urban sprawl. Its altitude, high exposure to solar radiation and surrounding mountains create unique atmospheric conditions that affect air quality.

The growth in vehicle use and industrial activities has had a major impact on air quality, leading to the launch of concerted efforts in the 1990s to reduce pollutant levels. Successive air quality management programmes targeted transport, the industrial sector and households.

These programmes have led to a marked drop in the levels of many pollutants. However, levels have plateaued in recent years, and the levels of particulates and ozone remain of particular concern. A further challenge is to extend air quality initiatives to the Mexico City 'megalopolis', an area covering 31 million people, or 25% of the national population; this involves multiple administrative and legislative jurisdictions that require strong regional coordination.

Air quality monitoring and emissions inventories have proven essential for assessing the success of air quality management programmes. Ongoing monitoring and air quality forecasting are used to trigger action when levels of certain pollutants breach target thresholds, reducing public exposure.²¹ Other important lessons include the need for strategies to be based on scientific, technological, social and political considerations. Public communication is also essential, to raise awareness of health benefits and of climate-health co-benefits.

21. Gobierno de la Ciudad de Mexico. *Mexico City air quality and health index*. <http://www.aire.cdmx.gob.mx/default.php>.

Box 4: Health promotion

The Ciclovía Recreativa and Recreovía initiatives have raised levels of physical activity in Latin American cities.

Obesity is a major problem in urban settings. Without dedicated spaces, opportunities for physical exercise may be limited. Concerns about safety may also discourage physical activity outside the home.

Ciclovía is a global initiative in which streets are periodically closed to road traffic and given over to cyclists and pedestrians. There are nearly 500 programmes in 24 countries, many of them in Latin America.

The Bogotá programme is based on a multisectoral collaboration across nine departments.²² Around 130 km of roads are closed for seven hours. About 70 events a year are held at a cost of US\$1.2m. Although road closures are predominantly in affluent areas, most participants are from middle- and low-income households.²³ Evaluations have found that participation is associated with increased levels of physical activity, particularly among women and children.²⁴

The Recreovía initiative is based on a similar principle, with public spaces being given over to physical exercise classes. The creation of new sites in Bogotá provided an opportunity to evaluate a natural experiment, allowing new sites to be compared with existing sites and with those without Recreovía activities. This found that new sites did lead to increased physical activity, particularly among women, although levels did not reach those seen in well-established sites.²⁵ There was also some evidence that the initiative increased social connectedness.

Participants identified a range of ways in which evidence could be generated. For example, post hoc analyses could be undertaken to explore health and other impacts after changes in urban policy or practice (taking advantage of 'natural experiments'). In collaboration with policymakers or other stakeholders, evaluations could be integrated into new initiatives to assess their impact, providing opportunities to plan data gathering in advance. Pilot studies could also be undertaken, generating learning to inform wider rollout.

Cost-effectiveness studies can provide a quantitative measure of the economic as well as health benefits of interventions. Modelling studies also have great potential for assessing, comparing and prioritising potential interventions to inform decision-making.

A major challenge in this area is that many interventions are targeting impacts beyond health. This calls for an interdisciplinary and cross-sectoral approach so that multiple outcome measures are assessed and a more integrated picture of impacts is obtained. A further challenge is that many health outcomes are long term, and it may be years before interventions can have a measurable impact on conditions such as non-communicable diseases. Good proxy measures or biomarkers that are reliably predictive of health gains are therefore required. These could be metabolic but also behavioural, e.g. activity- or diet-related.

22. Meisel JD, et al. (2014). *Network analysis of Bogotá's Ciclovía Recreativa, a self-organized multisectoral community program to promote physical activity in a middle-income country*. *Am J Health Promot* **28(5)**: e127–36.

23. Sarmiento OL, et al. (2017). *Reclaiming the streets for people: Insights from Ciclovías Recreativas in Latin America*. *Prev Med* **103S**:S34–S40.

24. Triana CA, et al. (2019). *Active streets for children: The case of the Bogotá Ciclovía*. *PLoS One* **14(5)**:e0207791.

25. Sarmiento OL, et al. (2017). *The Recreovía of Bogotá, a community-based physical activity program to promote physical activity among women: baseline results of the natural experiment Al Ritmo de las Comunidades*. *Int J Environ Res Public Health* **14(6)**. pii: E633.

Box 5: Moderating traffic speed

Speed restrictions and other mechanisms to reduce traffic speed can be an effective strategy for reducing injury and death from road traffic accidents.

Globally, 1.4 million people died in road traffic accidents in 2016 and many more suffered life-changing injuries. Road traffic accidents are the leading cause of death among people aged 15–29 years and the second leading cause for children aged 5–14 years.

Speed is a major factor in the causes and consequences of road traffic accidents. The risk of serious injury rises dramatically with the speed of impact. There is a need to address both excessive speed and inappropriate speed, for example, exceeding speed limits in built-up areas.

Good evidence has been obtained on the effectiveness of measures to slow traffic, such as speed limits, speed cameras and traffic calming measures.

Through the Bloomberg Initiative for Global Road Safety, several new programmes have been introduced and evaluated in Latin America. After speed reduction initiatives were launched in São Paulo, Brazil, a retrospective analysis of their impact was undertaken, taking advantage of the fact that measures were introduced in different areas at different times. This revealed that the initiative was associated with an decreased risk of injury and fewer hospital visits – therefore providing a double benefit by freeing up hospital resources for other critical care.

Notably, while slower speed restrictions were initially introduced on the main multi-lane highway in São Paulo, the Marginais, these were reversed for political reasons in 2017. Across São Paulo as a whole, road traffic injuries fell by 15.5% between 2016 and 2017, and the number of deaths fell by 7%, but for the Marginais they increased by 25.7% and 52% respectively.

Fortaleza in Brazil also achieved impressive reductions in traffic-related injuries following the introduction of speed cameras, speed restrictions and traffic calming measures. Over four years, these halved average speeds and led to a 46.5% reduction in the number of road traffic accident victims treated at trauma centres.

Fortaleza's efforts were associated with strongly supportive media coverage, emphasising the importance of effective communication to mobilise public and political support for public health measures.

The **public health approach**²⁶ provides a conceptual model linking understanding to action (Figure 2). The framework incorporates surveillance to understand the nature and scale of a health problem; causal analysis to identify risk factors (and protective or resilience factors); the development and evaluation of interventions; and the implementation and scale-up of evidence-based interventions. Closing the circle, surveillance activities can be used to assess impacts and inform refinements of interventions.

Ideally, these activities need to be conducted in a **multisectoral context** and in an **interdisciplinary way** in order to explore multiple different quantitative and qualitative indicators. Participants suggested that there is a need for the medical profession and health academics to pay more attention to urban determinants of health and to take a more active role in research to ameliorate negative impacts.

26. Bibby J & Lovell N (2018). *What makes us healthy? An introduction to the social determinants of health*. Health Foundation: London. Available at <http://reader.health.org.uk/what-makes-us-healthy>.

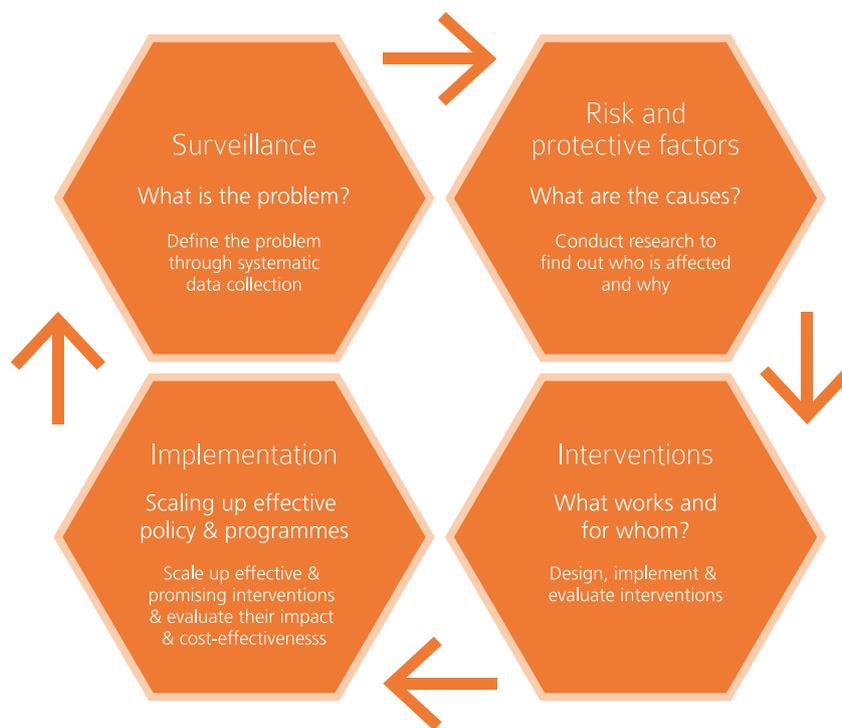


Figure 2: The public health approach model

Participants also identified the critical importance of **community engagement**. Liaison with communities is vital for determining local concerns and priorities, which are not necessarily the same as those of policymakers with limited experience of life in socially disadvantaged settings. Engagement can also be used to inform the design of interventions and of research studies to evaluate them. Communities can also be considered as resources that can be mobilised to deliver interventions rather than just as passive recipients.

Effective community engagement can therefore play an important role in ensuring community ownership of interventions, increasing their chances of success and promoting longer-term sustainability.

5. Influencing policy

Participants recognised that influencing policymaking, particularly at the city level but potentially also nationally, was the main route for achieving impact. It was also noted that connections between the research and policymaking communities needed to be strengthened. This will require greater promotion of evidence-informed decision-making by policymakers, but also greater sensitivity among researchers to the needs of policymakers.

For example, it was suggested that policymakers should be involved in the early stages of research, to help prioritise research questions and to shape the design of studies. This would help to ensure greater relevance of research and greater ownership of research among policymakers, increasing the likelihood that research findings inform policy.

Researchers are also well placed to catalyse stronger connections between policymakers and communities, through existing or new community links. The research community can also build intersectoral collaborations across government departments, helping to overcome departmental or political barriers. Ideally, it could promote a **'health in all policies'** approach,²⁷ where possible health consequences are considered for all policy initiatives across all government departments.

27. Shankardass K, et al. (2018). *The implementation of Health in All Policies initiatives: a systems framework for government action*. Health Res Policy Syst **16(1):26**.

Box 6: Political engagement

The Pan American Health Organization (PAHO) has been working to align health and other initiatives in the region.

One notable feature of the urbanisation agenda is the converging interests of public health and sustainability. Many of the initiatives that benefit sustainability also promote better public health and vice versa. There are therefore opportunities to coordinate and align activities to collectively achieve greater impact.

One example is the coordinated efforts by PAHO to develop a joint approach across urban mobility and public health. Integrated strategies for transport will deliver co-benefits to the environment and health, with impacts in areas such as air quality and levels of physical exercise. A draft regional document was produced in February 2020.

PAHO has also been working on other regional initiatives to create an enabling and integrated policy environment. An overarching framework is provided by the Strategy and Plan of Action on Health Promotion within the Context of the Sustainable Development Goals 2019–2030.²⁸

In addition, the Healthy Municipalities, Cities and Communities (HMCC) of the Americas movement provides a context in which to promote local planning that incorporates the 'health in all policies' approach. HMCC includes national networks, subnational networks and smaller-scale movements within countries. Other existing organisations and networks also provide opportunities to promote urban health, such as National Healthy Argentina and the National Health Municipalities Network in Cuba.

These activities are being consolidated with further political engagement, for example through FLACMA, the Latin American Federation of Cities Municipalities and Associations of Local Governments. A key aim has been to establish health as one of FLACMA's core interests.

Participants noted that policymaker engagement presented **dissemination and communication** challenges. Researchers typically disseminate findings through academic papers – outputs that may not be appropriate for policymakers with limited time to absorb new information and with limited specialist knowledge. It was suggested that alongside academic papers, policy briefing papers and other types of output need to be produced, potentially supported by dissemination events.

Participants also noted that the **mainstream media** offered an alternative and potentially powerful route through which findings could be communicated and pressure exerted on policymakers. Community engagement can also empower communities to exert pressure and hold political authorities accountable.

28. PAHO (2019). *Regional Strategy and Plan of Action on Health Promotion within the Context of the Sustainable Development Goals*. Washington, DC, USA: PAHO. Available at <https://iris.paho.org/handle/10665.2/51391>.

City mayors were seen as key stakeholders, with the power to enact major changes in cities. This may be particularly true of mayors of megacities, although it was noted that, given their scale, these may form a distinct group. Different solutions may be needed for the much larger number of smaller-scale cities. Clearly, there is a need to consider national and local political and decision-making contexts, which vary across the region according to factors such as the degree of decentralisation.

Participants also noted that joined-up intersectoral decision-making presented many practical and conceptual challenges. Sophisticated tools and approaches are being developed to incorporate different perspectives and goals in decision-making, such as multi-criteria decision analysis.²⁹ There are research opportunities that could explore how such approaches can be applied in urban health decision-making in the region.

6. Facilitators/enablers

Workshop participants identified a range of factors that could facilitate urban health research in Latin America:

Funding: It was recognised that additional funding from national, regional and global sources was required to support a wider range of urban health research studies.

Capacity building: There is a need to build the research community's capacity in key areas such as interdisciplinary working, policymaker engagement and community engagement.

Networking: Wider collaboration was felt to be essential to support larger-scale and comparative studies, and to facilitate the sharing of experience and expertise. Research could also be facilitated by standardised data collection and the creation of platforms for data sharing and analysis.

Methodology development: New research methods are required across all areas, for example to facilitate a wider range of data collection, to generate more integrated economic evaluations, and to improve modelling and forecasting.

Additional data: Research could be facilitated by additional data, in a consistent format, on all forms of exposures and risk factors in urban settings and on health outcomes.

Political advocacy: It was noted that raising awareness of the importance of urban health, and of urban health research, among politicians and other individuals in positions of influence was needed to promote greater consideration of physical and mental health in urban planning.

29. Hansen P & Devlin N (2019). *Multi-criteria decision analysis (MCDA) in healthcare decision making*. Oxford Research Encyclopedias: Economics and Finance. Available at <https://oxfordre.com/economics/view/10.1093/acrefore/9780190625979.001.0001/acrefore-9780190625979-e-98>.

Conclusions and next steps

The workshop provided an opportunity for participants from a wide range of academic and national backgrounds to come together to discuss their experiences and common interests. The stimulating discussions resulted in the development of a conceptual framework that could be used to guide future discussions with the aim of generating a research agenda that identifies the priority research questions for urban health research in Latin America.

Participants identified a range of potential next steps:

Networking: The creation and strengthening of urban health research networks across Latin America.

Urban health research agenda: Further consultation and dialogue to establish a regional urban health research agenda, with an agreed definition, goals and research priorities.

Evidence collation: The synthesis of existing evidence on urban health to inform the development of the regional research agenda.

Political engagement: The strengthening of links with existing city-level political networks to mobilise political support.

Policymaker engagement: The strengthening of links with national policymakers to promote greater involvement in research and commitment to evidence-informed decision-making.

North–South networks: Exploring opportunities for collaboration on topics of common interest with Europe, including the UK, and high-income countries in other regions.

South–South networks: Exploring opportunities for South–South collaboration, for example comparative studies with Asia or sub-Saharan Africa, and to facilitate the exchange of innovations.

Annex 1: Steering committee

Co-chairs

- Acad. Paulo Hilário Nascimento Saldiva, Full Member of the National Academy of Medicine of Brazil and of the Brazilian Academy of Sciences, and Director of the Institute of Advanced Studies, University of São Paulo, Brazil
- Professor Frank Kelly FMedSci, Head of the Department of Analytical, Environmental and Forensic Sciences, King's College London, UK

Members

- Acad. Marcello André Barcinski, Full Member of the National Academy of Medicine of Brazil and of the Brazilian Academy of Sciences, and Federal University of Rio de Janeiro (UFRJ), Brazil
- Acad. Paulo Marchiori Buss, Full Member of the National Academy of Medicine of Brazil and Director of FIOCRUZ Center for Global Health, Brazil
- Dr Audrey de Nazelle, Senior Lecturer, Imperial College London, UK
- Professor Majid Ezzati FMedSci, Chair in Global Environmental Health, Imperial College London, UK
- Dr Luisa Tan Molina, Massachusetts Institute of Technology, USA
- Professor Sally Sheard, Head of Department of Public Health and Policy, University of Liverpool, UK
- Dr Deborah Tasat, Professor at the University of Buenos Aires and at the National University of San Martín, Argentina
- Acad. José Gomes Temporão, Full Member of the National Academy of Medicine of Brazil and Oswaldo Cruz Foundation, Brazil

Annex 2: Participant list

Name	Organisation
Professor Frank Kelly FMedSci	King's College London
Dr Paulo Saldiva	University of São Paulo
Dr Paulo Buss	FIOCRUZ Center for Global Health
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Dr Deborah Tasat	Universidad de Buenos Aires
Professor Marcello Barcinski	FIOCRUZ Center for Global Health
Dr Alvaro Osornio-Vargas	University of Alberta
Dr Ana Diez Roux	Drexel University
Dr Juan Pablo Orjuela	University of Oxford
Professor Jimmy Whitworth FMedSci	LSHTM
Professor Catherine Law FMedSci	University College London/MRC
Dr Melissa Lennartz-Walker	MRC
Dr Caroline Culshaw	NERC
Dr Gerry Eijkemans	Pan American Health Organization
Mr Juan Jose Castillo	Pan American Health Organization
Professor Nelson da Cruz Gouveia	University of São Paulo Medical School
Professor Simone El Khouri Miraglia	Universidade Federal de São Paulo
Dr Maria de Fátima Andrade	Universidade Federal de São Paulo
Dr Ligia Vizeu Barrozo	Universidade Federal de São Paulo
Dr Ana Estela Haddad	Universidade Federal de São Paulo
Professor Waleska Teixeira Caiaffa	Federal University of Minas Gerais
Mr Pedro do Carmo Baumgratz de Paula	Vital Strategies Brazil
Dr Maira Caleffi	Hospital Moinhos de Vento Porto Alegre
Prof. Paolo Marinho Zanotto	Universidade Federal de São Paulo
Prof. Celso Ferreira Ramos Filho	Federal University of Rio de Janeiro
Dr Katia de Pinho Campos	Pan American Health Organization
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Roque Pedace	Universidad de Buenos Aires
Dr Paula Castesana	CONICET/Universidad Nacional de San Martín
Dr Sylvia Fischer	Universidad de Buenos Aires
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Dr Cesar Augusto Sanchez Cabezas	National Institute of Health of Peru

Name	Organisation
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Dr Ricardo Morales	Universidad de los Andes
Prof Olga Lucia Sarmiento Dueñas	Universidad de los Andes
Dr Gary O'Donovan	Universidad de los Andes
Dr Jorge Eduardo Pachón Quinche	Universidad de la Salle
Dr Rodrigo Guerrero	Former Mayor of Cali, Colombia
Dr Carolina Santamaría-Ulloa	University of Costa Rica
Dr Mario Matamoros	Universidad Nacional Autónoma de Honduras
Dr Omar Amador	Universidad Nacional Autónoma de México
Dr Patricia Segura Medina	Instituto Nacional de Enfermedades Respiratorias
Dr Marco Balam	Swisscontact
Dr Luis Abdón Cifuentes	Pontificia Universidad Católica de Chile
Alex Hulme	Academy of Medical Sciences
Dr Abigail Bloy	Academy of Medical Sciences
Ms Elizabeth Bohm	Academy of Medical Sciences
Mr Ian Jones	Jinja Publishing
Professor Francesco Forastiere	King's College London
Dr Luisa Tan Molina	Massachusetts Institute of Technology
Dr Horacio Riojas-Rodriguez	Instituto Nacional de Salud Publica/National Institute of Public Health

Annex 3: Summaries of breakout group discussions

Air Pollution

What is the current 'state of play' for urban health and health inequality research and policy regarding air pollution?

- Large health (access) inequalities
- Inequalities in exposure (not the same across the region)
- Limited access to information (e.g. air quality, health datasets, air quality/health analyses)
- Most of the available evidence comes from large cities

Success stories and commonalities

Success stories

- Improvement in fuel quality
- Implementation of air quality plans (limited)
- Investment in clean mass transit infrastructure:
 - TransMilenio (bus rapid transit)
 - Electric buses
- Uptake of improved technologies (catalytic converters, diesel particulate filters):
 - PROCONVE (Brazil emissions standards)
 - ProAire (Mexico City air quality management programme)

Commonalities

- Ongoing urban air quality challenges (not meeting WHO air quality guidelines yet)

Barriers and challenges

- Bringing together academia, populations and government
- Communicating with politicians and policymakers
- Lack of information:
 - Air pollution levels (small cities)
 - Emissions inventories
 - Linkage to health outcomes (morbidity)
- Funding and human resources for multidisciplinary research

Possible strategies to address the identified barriers and challenges

(a) Health service actions:

- Improve awareness of health effects

(b) Policy measures:

- Interaction between health and environment sectors to trigger alerts and action
- Better communication to populations and the media
- Climate action plans to include health programme
- Improve enforcement of existing regulations (update old regulations)

(c) Research structure and funding:

- Enhanced cooperation across the region's science base
- Intersectoral research and opportunities for long-term funding

Research and policy priorities in urban health

- Improve monitoring and satellite data utilisation
- Improve air quality forecasting
- Establish common methodologies for the improvement of emissions inventories
- Improve the collection of health data
- Carry out health impact assessments, with an emphasis on disadvantaged and vulnerable populations
- Examine impacts on productivity losses
- Explore the health effects and composition of complex pollutant mixtures
- Explore use of biomass
- Upstream interventions
- Include non-regulated organic air toxic pollutants

Resources needed

- Capacity building
- Enhanced research networks
- Financial support

Episodic disease outbreaks

What is the current 'state of play' for urban health and health inequality in episodic disease outbreaks?

- The urban environment is very heterogeneous, with neighbourhoods resembling small cities inside a big city. There is a diversity in housing, water and sanitation services, transportation, human characteristics, the socioeconomic status of inhabitants, violence, morbidity and mortality, demographics, race. Episodic outbreaks reflect this heterogeneity.
- Health research is generally financed by governments, with some foreign support. Research in health disparities is usually financed by governments and non-government organisations. In some cases, financial support is concentrated in specific disease areas such as HIV or tuberculosis, but not on episodic diseases. In some countries limited or no governmental financial support is available.
- Very little research is on the environmental causes of inequalities on episodic disease outbreaks in urban areas, and most of the research in this area is performed by NGOs with external (international) financing.
- All countries have experienced a decrease in funding.

Barriers and challenges

- Inadequate funding, since most funding is offered for addressing very specific research questions within a discipline, but not for broad, interdisciplinary approaches.
- Lack of interdisciplinary approaches.
- Lack of integration of different sectors (especially between policymakers and academia).
- Policies are not based on evidence.
- Research is carried out but does not influence policymaking.

Success stories and commonalities

- There was a difficulty in identifying success stories regarding the control of episodic disease outbreaks; one example with very poor success was dengue.
- The research responses to the Zika outbreak in Brazil; the success referred to the discovery of the role of the Zika virus in the unusual number of cases of microcephaly that occurred in that country.
- Using the municipal health posts in Quito for non-communicable diseases for the prevention of the COVID-19 outbreak.

Possible strategies to address the identified barriers and challenges

- Need to define the common determinants of health/disease outcomes.
- Need to integrate government and non-government organisations in the research process from the beginning, in order to address relevant questions that might help to decide policy. Some participants also highlighted the importance of the inclusion of the private sector, although there was no consensus about this.
- Carry out research projects to assess why the implemented policies (although sometimes sound and apparently appropriate) were not successful.
- The primary research should be on a local scale, considering the specific social, cultural and environmental aspects that are involved. This could be addressed by defining a strategic research agenda for a city or region (if local scientists and policymakers are involved, the probabilities of sustainability increase).
- The environmental determinants of disease outbreaks (i.e. dengue) should be included in the academic curriculum, especially for school-age children, in order to involve them in prevention activities.
- Address the need for better data, especially from epidemiological observatories.
- Define policies at local, national and regional levels, with strong interactions between the different levels.
- Need to integrate health data, environmental data and social data.
- Increase the number of political decisions that are informed by evidence; public organisations should build understanding between researchers and policymakers.
- When informing policymakers, the co-benefits of a certain policy should also be highlighted.

Commonalities

- Health research is financed mainly by governments with some foreign support.
- Health inequalities are not always a priority for governments.
- Communication difficulties (among disciplines and sectors) are a major barrier.

Research and policy priorities in urban health

- Research should focus on vulnerable areas, in order to assess the effects of interventions and provide evidence for public policy
- Transportation
- Air pollution
- Physical activity
- Child health
- Environmental determinants of disease outbreaks, and best prevention practices and policies
- Migration, internal and external, that might contribute to the emergence of disease outbreaks (e.g. measles, Chagas, TB, STIs)

How to scale up and build capacity

- Need to recognise urban health as a discipline
- Need to integrate different disciplines such as medicine, sociology, anthropology, public health, biology, economics, urban planning, geography, architecture, etc. to build interdisciplinarity
- Include school-age children, graduate and undergraduate students in urban health activities
- Communicate relevant research so it can be integrated into the policymaking process
- Need to integrate public service information (e.g. water, sanitation)
- Make the co-benefits of certain actions visible, and consider them in the policymaking process
- Support observatories
- Support regional initiatives such as IANAS (regional network of Academies of Science)

Resources needed

- Financing the research of observatories for monitoring
- Promote prevention through education in urban health
- Use organisations in the UK who may provide support (e.g. Wellcome, British Council, Medical Research Council)
- Geographic information systems
- Promote urban health as part of planetary health
- Develop institutional capacity with help from UK institutions, especially for grant management and proposal development
- Resolve language barriers to better access funding from Anglophone countries
- Build on the support and interest from PAHO, UN-Habitat and UNDP

Transportation

What is the current 'state of play' for urban health and health inequality research and policy in transportation?

- Rapid urbanisation combined with lack of urban planning.
- Socioeconomic and gender inequalities (inclusive and sustainable).
- Poor access to city services (e.g. medical centres, education, jobs).
- Relatively good mix of energy sources and renewable potential, but with slow progress on energy transitions and national targets that are not ambitious enough.
- No integration between transport and health policies.
- Multiple authorities within cities make it difficult to collect data.
- Policymakers do not incorporate scientific evidence in their decisions.

Success stories and commonalities

- We have a fair share of traditionally-defined sustainable modes (i.e. walking, cycling and public transport) but how do we keep it that way?
- SALURBAL offers a data platform to inform research and policy that can be built on.
- Other existing networks at city-level (e.g. C40 cities).
- Other examples of success stories:
 - Systems (bus rapid transit systems, Medellín's multimodal transport system, Cicloviacycling in Argentina, shared cycles in Mexico City)
 - Finance (Chile's financial model of public transport)
 - Urban planning (Argentina's TOD interventions, Belo Horizonte, Curitiba)

Barriers and challenges

- Produce unique and aligned agendas to communicate with governments.
- Improve relations with:
 - Communities and policymakers
 - Academia
- Create observatories or networks on transport and health that systemise the information (lack of support to make data sensible and accessible for Latin America).
- Stimulate research to improve cost-effectiveness in scenarios of limited resources.
- Acknowledge the complexity of the urban environment.
- The reduction in the use of cars and motorcycles has seen some limited success but are modes that are difficult to compete with (e.g. level of satisfaction and comfort based on surveys).
- Financial, political, and administrative barriers to clean transport transitions.

Possible strategies to address the identified barriers and challenges

(a) General action:

- Co-produce understandable research, *with* and *for* policymakers.

(b) Health service actions:

- Strengthen its capacity to interact with other sectors (environment, transport, etc.), including data and communication strategies.
- Improve accessibility to healthcare (more clinics, tele-medicine, etc.).
- Create conditions that allow people to move towards healthier mobility options.
- Quantify and monetise the health effects of transport externalities.

(c) Policy measures:

- Research on the use of multimodal mobility (e.g. cable cars, parking space for cycles, integrated tariffs).
- Developing pilots for healthier transport (e.g. car-free areas) and testing their results.

(d) Research structure and funding:

- Identify and create more Latin American funding opportunities.
- Encourage funding and research equity.
- Stimulate partnerships *within* the region for hands-on multidisciplinary training and capacity building.
- Encourage data exchange among Latin American institutions and the creation of a common language.
- Develop strategies to evaluate the effects of urban human interventions across different social segments.
- Strengthen research management offices and grant application processes.
- Address Nationally Determined Contributions (NDCs) for climate change mitigation (e.g. SLCP).

Research and policy priorities in urban health

- Define and quantify a baseline and its impacts for different social groups (gender, socioeconomic status, etc.).
- Evaluate and document health and economic impacts of sustainable transport actions.
- Define appropriate control groups for natural experiments in transport interventions.
- Carry out cost-benefit and multicriteria analyses for current and future scenarios.
- Stimulate stakeholder participation to facilitate science-based interventions.
- Identify transport connections and synergies with other key sectors (e.g. housing, health, economy) that may inhibit or facilitate healthy living.
- Address big data collection and availability in the region.
- Develop research to capture intra-city inequities using geo-statistical tools at multiple levels.

Resources needed

- Strengthen national and Latin American financing schemes
- Networking
- Recognition of transport health impacts in the international financiers' (e.g. WB, IADB, etc.) agendas
- Adequate communication and dissemination of funding opportunities
- Having a research agenda to capture additional resources
- Training and capacity building



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