LAC-URBAN HEALTH
Urban Health Network for Latin America and the Caribbean

SALURBAL
Salud Urbana en América Latina

MORTALITY AND LIFE EXPECTANCY
IN LATIN AMERICAN CITIES
Data from the SALURBAL Project

There is a high level of variation in life expectancy and causes of death across urban areas in Latin America [1]. Global and regional summaries of life expectancy and causes of death can hide significant variability across cities [2]. Studies that characterize mortality across heterogeneous cities are needed to inform urban policies. Urban environments that differ across neighborhoods, cities, and countries can have a major impact on life expectancy and causes of death.

This data brief overviews the experiences of the SALURBAL project in harmonizing and describing mortality data across 366 cities in 10 countries.

SALURBAL Mortality Data

SALURBAL compiled and harmonized mortality data for 366 cities of 100,000 residents or more in 10 countries. The harmonized data on deaths include a) age and sex, b) underlying causes of death, c) location of death, d) residence of the deceased, and d) maternal and birth characteristics in the case of infant death. In the future, SALURBAL will harmonize data for race and education level when available. Harmonized data on population counts include population estimations and projections for geographic units similar to those for which mortality data are available.

See **"Data in the SALURBAL Project"** for more information on city selection, geographic definition, and data sources. [3]

Key messages

There is **significant variability in life expectancy and causes of death across Latin American cities.**

Local authorities should invest in maximizing the **completeness and quality of death registrations** in order to improve the utility of the data for policy.

United Nations agencies and numerous international conventions recognize the vital role of civil registration systems, from birth to death, to promote and protect human rights – "the right of everyone to recognition everywhere as a person before the law" [4]. Investment in civil registration systems and the quality of mortality records can support the development of urban policies to reduce mortality and improve life expectancy.

Strategies to overcome data quality challenges

Coverage and undercounting

Some births and deaths are not registered, particularly in disadvantaged and isolated areas. In other cases, registration may be late or incomplete. Missing or incomplete registration is known as "undercounting" because it leads to the exclusion of populations from official records.

In some countries and cities undercounting remains a challenge. SALURBAL uses state-of-the-art demographic methods to estimate undercounting in Latin American cities and corrects records to reduce bias [5]. These methods include combinations of several death distribution methods, that use population and death counts by age and sex to obtain an estimation of how many deaths are missing from vital registration.

In **Figure 1** (left panel), we show an estimation of the degree of completeness of vital registration system in the 366 SALURBAL cities by country.

Coding causes of death

SALURBAL mortality data reflect causes of death reported on official mortality records grouped into categories based on the World Health Organization's Global Estimates study [6]. These categories reflect three large groups: 1) Communicable, maternal, neonatal, and nutritional; 3) non-communicable diseases; and 3) injuries.

However, some reported causes of death are labeled as "ill-defined diseases" or "injuries of ill-defined intent". These deaths lack important information to be useful to health and other local authorities in determining the burden of diseases and injuries.

The SALURBAL project redistributes ill-defined deaths to improve the quality of its mortality data. Researchers redistribute unassigned codes across existing disease categories, proportionate to the observed distribution of diseases by age, sex, country, and year. Figure 1 (right panel) shows the proportion of deaths in 366 SALURBAL cities by country that are classified as ill-defined and have been subsequently redistributed to more meaningful causes.
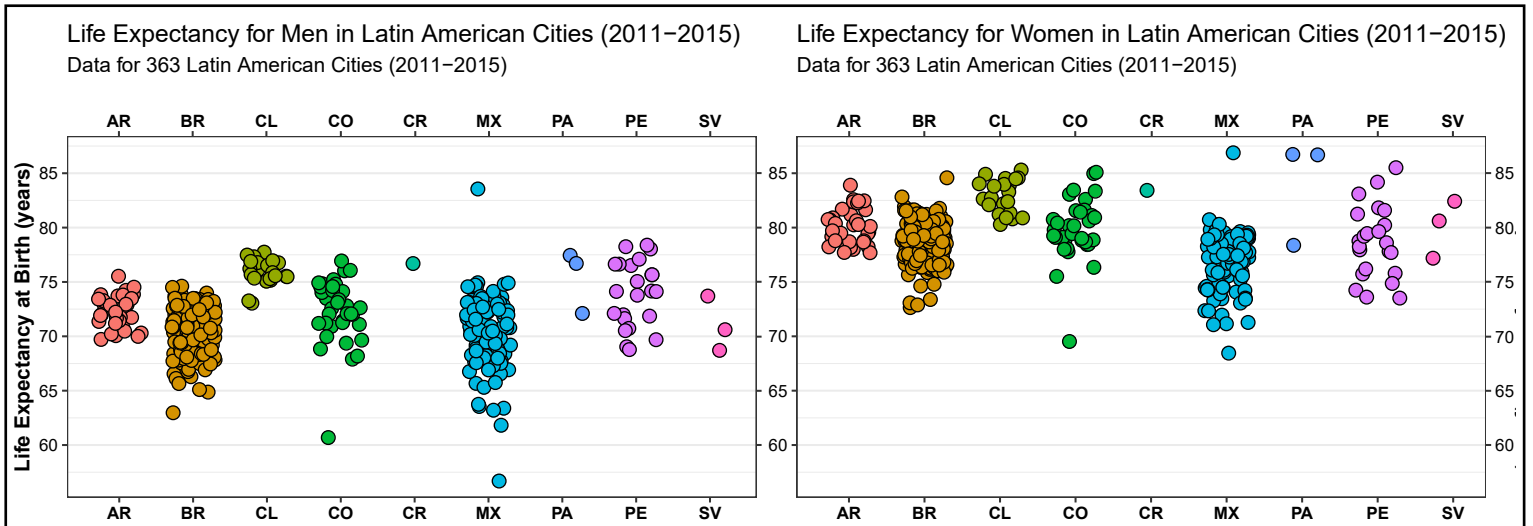
Figure 1
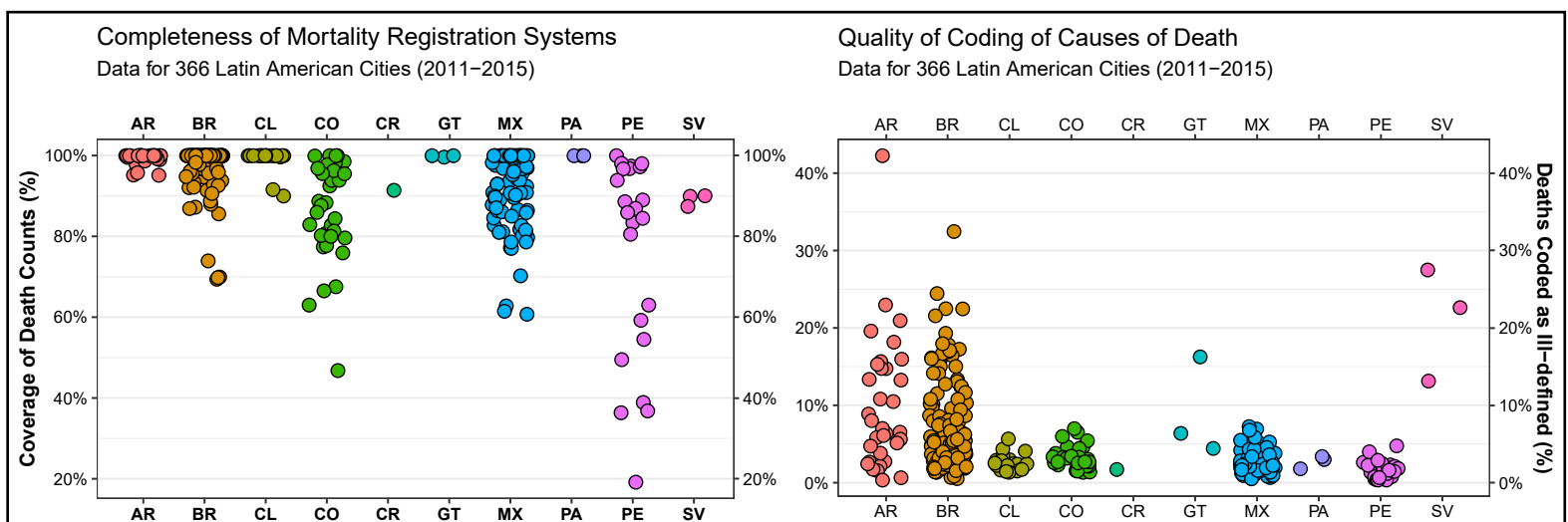
Above: Each circle represents one city. AR - Argentina; BR - Brazil; CL - Chile; CO - Colombia; CR - Costa Rica; GT - Guatemala; MX - Mexico; PA - Panama; PE - Peru; SV - El Salvador.

Variation in life expectancy across Latin American Cities

Life expectancy differs substantially among Latin American cities, even among cities in the same country. **Figure 2** below shows the distribution of life expectancy for men and women across 363 SALURBAL cities.
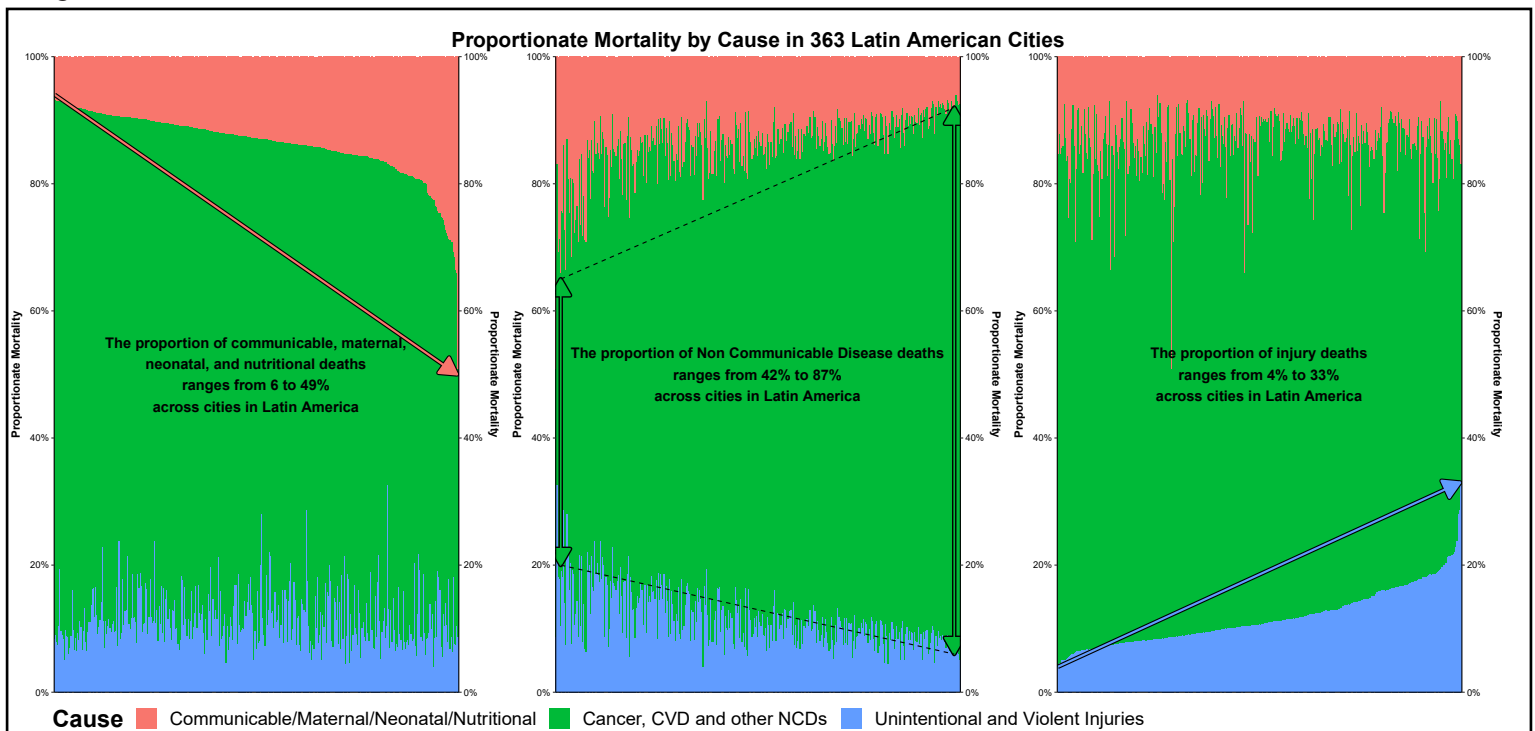
Figure 2

Above: Each circle represents one city. AR - Argentina; BR - Brazil; CL - Chile; CO - Colombia; CR - Costa Rica; GT - Guatemala; MX - Mexico; PA - Panama; PE - Peru; SV - El Salvador.

Variation in causes of death across Latin American cities

There is also important variability in causes of death across Latin American cities. **Figure 3** shows the proportions of deaths belonging to three categories. The proportion of deaths due to communicable, maternal, neonatal, and nutritional causes ranges from 6%-49%, the proportion of deaths due to non-communicable diseases ranges from 42%-87%, and the proportion of deaths due to injuries ranges from 4% to 33%.
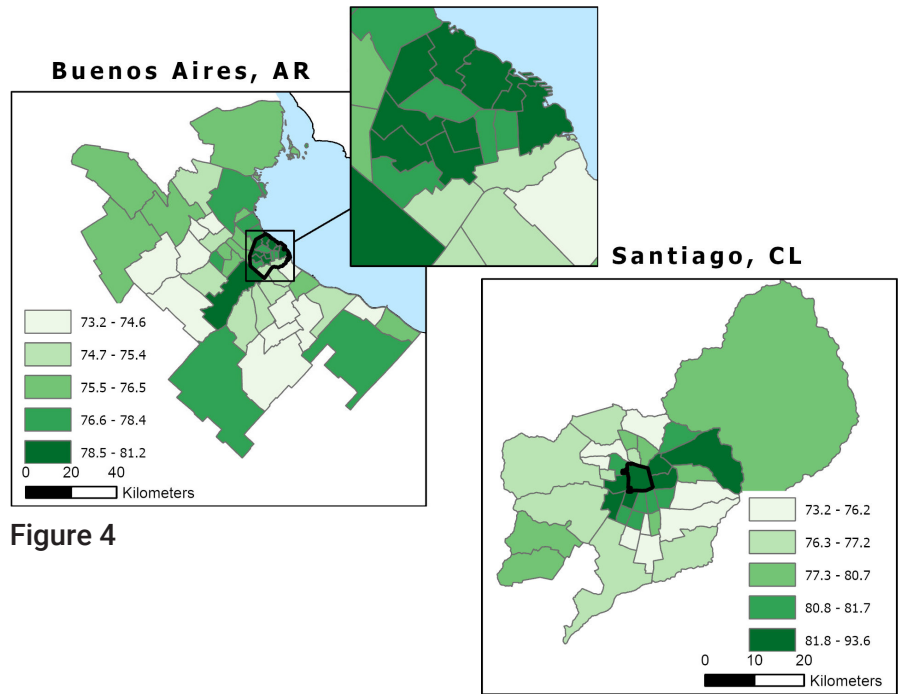
Figure 3

Above: Each bar represents one city.

Spatial inequities in life expectancy within cities

There are large differences in life expectancy across areas within cities. **Figure 4** shows differences in life expectancy across sub-city areas of Buenos Aires (Argentina) and Santiago (Chile). These differences are correlated with the socioeconomic and physical characteristics of areas. As geographic referencing of deaths advances, SALURBAL will examine variation in life expectancy across smaller areas within cities. These are likely to show even larger differences than the relatively large sub-city areas presented in the figure.

Buenos Aires, AR

73.2 - 74.6
74.7 - 75.4
75.5 - 76.5
76.6 - 78.4
78.5 - 81.2

0   20   40
Kilometers

Figure 4

Santiago, CL

73.2 - 76.2
76.3 - 77.2
77.3 - 80.7
80.8 - 81.7
81.8 - 93.6

0   10   20
Kilometers

Urban environments and death: SALURBAL studies

Features of urban social and physical environments – poverty and income inequality, housing and neighborhood quality, air pollution and green space, access to services and resources, built environments, and levels of violence, among others – can affect mortality for specific causes of death and in specific age groups.

The SALURBAL project has studies underway examining how certain features of urban environments may impact life expectancy or mortality from select causes or in specific age groups across and within Latin American cities.

STOP

Road traffic mortality in Latin American cities with >100,000 inhabitants

The issue:

In many Latin American countries, road traffic mortality is a leading cause of death and carries heavy economic costs. However, few studies have examined how road traffic mortality varies across cities or what city-level features are associated with higher or lower levels of road traffic mortality.

SALURBAL's approach:

SALURBAL researchers will explore road traffic mortality in cities with more than 100,000 inhabitants and describe patterns by demographic characteristics and variation across cities. Researchers will also investigate whether features of urban form amenable to policy (such as fragmentation or street density) are related to higher road traffic mortality.

The influence of the physical and social urban environment on infant mortality in Latin American cities

The issue:

Infant mortality can be impacted by living conditions. However, current approaches to studying infant mortality may hide the variation that exists within and across urban areas.

SALURBAL's approach:

SALURBAL researchers are investigating how the characteristics of urban physical and social environments relate to differences in infant mortality across cities. These characteristics include, air quality, green spaces, service provision, poverty, civic involvement, social cohesion, and women's empowerment.

Variation in homicide and violent death rates in youth and young adults across cities in Latin America

The issue:
Violence in Latin American cities remains a main public health problem with numerous drivers and consequences. Violence also disproportionately affects younger populations (ages 15-44). However, the role of city-level factors in shaping differences in violence-related deaths across urban areas has not been systematically investigated.

SALURBAL's approach:
SALURBAL researchers are describing homicides and violent death rates affecting youths and young adults (15-24, 25-39 years) across the SALURBAL cities. They will also investigate how city social and physical environments relate to homicides and violent deaths.

Effects of ambient air pollution on mortality in Latin American cities

The issue:
Air pollution is a major problem in Latin American cities. WHO estimates suggest that over 110 million people in Latin America breathe air that does not meet safety guidelines, but more attention is needed regarding the long-term effects of exposure to unsafe air.

SALURBAL's approach:
SALURBAL researchers are using city data on common pollutants to examine associations of levels of pollutants with cause -specific mortality.

The role of green space in reducing inequalities in life expectancy in urban Latin America

The issue:
Urban green spaces are known to provide health benefits, including buffering the effects of environmental stressors (i.e. pollution, heat), reducing anxiety and stress, and facilitating physical activity and social interactions.

SALURBAL's approach:
SALURBAL researchers are exploring associations between exposure to green space and differences in life expectancy across SALURBAL cities. The study will also assess whether a greater presence of green space might buffer the relationship between low socioeconomic position and shorter life expectancy.

Socioeconomic segregation and mortality patterns

The issue:
Latin American cities have high levels of socioeconomic segregation. Consequently, low-income and other vulnerable groups are frequently isolated from essential resources such as education, employment, health, transport, and other services. However, little is known about whether patterns of geographic segregation by socioeconomic status are related to mortality in cities.

SALURBAL's approach:
SALURBAL researchers are measuring socioeconomic segregation in SALURBAL cities and investigating whether segregation is related to mortality and inequities in mortality.

Follow SALURBAL's research and download available publications:
https://drexel.edu/lac/data-evidence/publications/

Conclusions

▸ There are substantial differences in life expectancy and causes of death across cities in Latin America. These differences may be linked to urban physical and social environments amenable to policy.

▸ There are also substantial differences in mortality across different areas or neighborhoods within cities. These differences may be linked to social and economic characteristics of residents as well as to neighborhood environments.

▸ SALURBAL's ongoing studies will provide further direction to local authorities and policymakers on how to mitigate some of the leading causes of death in urban areas in Latin America.

▸ Although much can be learned from careful analyses of existing data, continuous improvement of registration and coding of deaths and population projections is needed and will enhance the validity of the conclusions that can be drawn.

▸ There is a critical opportunity to integrate measures to improve health and reduce mortality within overall strategies to advance social equity and inclusion.

Recommendations

▸ Local authorities should invest in and strengthen systems to collect complete mortality and population data, eliminate "undercounting," and improve coding.

▸ Use of available data regarding patterns in mortality and life expectancy is needed to develop and implement targeted interventions to reduce inequities.

▸ Urban planning and governance strategies should be informed by the diverse health needs that might be present within the same city.

References

[1] Pan American Health Organization, Health in the Americas+, 2017 Edition. Summary: Regional Outlook and Country Profiles. 2017, Pan American Health Organization: Washington, D.C. [2] Corburn, J. and A.K. Cohen, Why We Need Urban Health Equity Indicators: Integrating Science, Policy, and Community. PLOS Medicine, 2012. 9(8): p. e1001285. [3] Lein, A., et al., Data in the SALURBAL Project in Data from Latin American Cities. 2018. [4] UN Human Rights Council, Birth registration and the right of everyone to recognition everywhere as a person before the law : resolution adopted by the Human Rights Council, in A/HRC/RES/28/13. 2015. [5] Hill, K., D. You, and Y. Choi, Death distribution methods for estimating adult mortality: Sensitivity analysis with simulated data errors. Demographic Research, 2009. 21: p. 235-254. [6] World Health Organization. Global Health Estimates (GHE). 2019; Available from: https://www.who.int/healthinfo/global_burden_disease/en/.

The Urban Health Network for Latin America and the Caribbean (LAC-Urban Health) seeks to promote regional and multisectoral collaboration in order to generate evidence on the drivers of urban health and health equity and translate this evidence into policies to improve health across cities in Latin America and the Caribbean.

Salud Urbana en América Latina (SALURBAL), Urban Health in Latin America, is a five-year project that studies how urban environments and urban policies impact the health of city residents throughout Latin America. Our objective is to create cities that are healthier, more equitable, and environmentally sustainable. SALURBAL is funded by the Wellcome Trust.

Learn more about LAC-Urban Health and SALURBAL