Comparison of Cities using the Urban Health Index:

An Analysis of Demographic and Health Survey Data from 2003-2013

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Executive Summary

We performed an analysis of 57 (mostly capital) cities in 54 countries using data available from the Demographic and Health Surveys between 2003 and 2013. Using the approach of the Urban Health Index(UHI), we computed the UHI using 9 indicators from three domains (environment, women's education, and childhood immunizations) to characterize the urban health of the 57 cities; the majority from Africa.

The city with the highest UHI score was Tirana, Albania and the two with the lowest UHI score were Port Au Prince, Haiti and Monrovia, Liberia. Cities in countries from the European Region had the overall highest UHI scores whereas cities in countries from the African Region had the lowest. Despite overall lower UHI scores, cities from countries in the African Region presented a wide range of values suggesting noteworthy regional variation that deserves more exploration.

We examined how the city level UHI score was associated with a country's Gross National Income (GNI) and Gini Index. As one might expect, a higher GNI is associated with a higher UHI score. However, more importantly, deviations from this trend suggest that some cities are capable of achieving a higher urban health score with fewer resources. Conversely, there are cities that have access to substantially more financial resources (as suggested by a higher GNI) yet struggle to improve urban health.

Inequality, when measured as Gini index, presents a slightly more complicated picture. Cities in the European Region are achieving a higher urban health score with lower city or country level inequality while cities in the Americas Region are still combating high country level income inequality despite achieving higher urban health. As might be expected, the variability was great in the African Region although some trend suggests that as cities in this region improve UHI score, the Gini index increases suggesting an increase in inequality.

Our work here suggests that in addition to documenting important global or regional trends in urban health, deviation from these trends (both positive and negative) are important to identify and understand. The influence of national, regional and local policies regarding health and inequality need to be more fully explored and documented to identify how deviations from these trends can serve as learning tools.

1.0 Introduction

1.1 The World Health Organization Centre for Health Development

As an integral part of the Secretariat of the World Health Organization, the WHO Centre for Health Development (also known as the WHO Kobe Centre/WKC) has been conducting research into the health consequences of social, economic, environmental and technological change and its implications for health policies since 1996. This research enhances WHO's capacity to address priority health issues that require coordinated multidisciplinary and intersectoral action. In recent years, the Centre has been focusing on urbanization as one of the key drivers of health outcomes and emphasizing the importance of improving health equity in urban settings.

1.2 URBAN HEALTH METRICS RESEARCH AT WKC

Health equity implies that everyone has a fair opportunity to attain their full health potential, and no one is disadvantaged from achieving this potential because of their social position or other socially determined circumstances; conversely, health inequities refer to health disparities that are systematic, socially produced and unfair.[1] Urban health metrics research encompasses the development of measurements and methods to quantify and monitor the various determinants of urban health, the health outcomes and the equity dimension of each. WKC recognizes urban health metrics as a prerequisite for developing the evidence base to promote research, policies and programmes that address urban health and equity. Specifically, WKC assesses inequities in health determinants and health outcomes in urban areas, globally; contributes to the development of urban health indicators; and promotes improving the availability of and access to global data on urban health and equity.

In an effort to promote assessment and monitoring of urban health equity and actions to reduce inequities, WHO/WKC developed the Urban Health Equity Assessment and Response Tool (Urban HEART) which guides local policy-makers and communities through a process of gathering relevant evidence on a set of core indicators and planning efficiently for appropriate actions to tackle health inequities. Building upon this work, WKC has been working to develop approaches to measure and monitor urban health, particularly summary indicators and indices, to enhance the capacity for understanding urban health problems and for guiding appropriate actions.

[1] Whitehead M, Dahlgren G. *Concepts and principles for tackling social inequities in health: levelling up part 1*. Copenhagen, World Health Organization Regional Office for Europe, 2006 (http://www.euro.who.int/__data/assets/pdf_file/0010/74737/E89383.pdf, accessed 7 September 2010).

1.3 THE URBAN HEALTH INDEX

In February 2011, WKC convened a consultation meeting with delegates from around the world with expertise in research and policy to review the challenges and opportunities for developing urban health metrics and to identify ways of improving urban health metrics for action. One of the background papers for this meeting provided a review of indicators and indices relevant to urban health, and an exploration of the possibility of developing a unitary, globally comparable urban health index.[2] During the consultation meeting, this topic was debated extensively. As a result, one of the recommendations from this meeting was to "pursue the development of alternative metrics for summarizing and comparing the health and health equity status of cities" with specific recommendations on how a globally relevant urban health index could be developed as one option.[3]

Since then, WKC has taken action on these recommendations to develop a methodology for constructing an Urban Health Index (UHI) as a flexible tool for local evaluation of the distribution of health indicators and their determinants in collaboration with the Georgia State University (GSU) School of Public Health (SPH).

The UHI methodology has now been developed.[4] In addition, a UHI toolkit was developed. The toolkit consists of a self-explanatory handbook and Excel-based calculation tool with example data sets that are available for free to download from WKC's website.[5]

The UHI has so far been tested with data from Atlanta (USA), Rio de Janeiro and Salvador (Brazil), Shanghai (China) and Tokyo (Japan) and is being examined for England to demonstrate diverse patterns of intra-urban inequalities in health and its determinants. In addition to the focus on social determinants of health, it is also being applied to examine disparities in exposures to environmental threats for two areas of Atlanta. Given that it is a standardized methodology, there is great potential to apply it to more cities using available datasets.

In view of the planned production of a follow-up report to "Hidden Cities" in 2015, the WKC Urban Health Team worked with GSU SPH to examine **inter-city and intra-city comparisons of the Urban Health Index (UHI) and their visualization for a selected number of cities around the world (prioritizing cities with populations of 10,000,000 inhabitants or more)**, which could be prominently featured in this new report.

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[2] Rothenberg R, Stauber C, Crampton J. An urban health and health equity index: problems, pitfalls and potential. Kobe, WHO Centre for Health Development, 2011.

[3] WHO Centre for Health Development. Report of consultation meeting on urban health metrics research. Kobe, WHO Centre for Health Development, 2011.

[4] Rothenberg R, Weaver SR, Dai D, Stauber C, Prasad A & Kano M. A flexible Urban Health Index for small area disparities. Journal of Urban Health, 2014, doi: 10.1007/s11524-014-9867-6.

[5] http://www.who.int/kobe_centre/publications/urban_health_index_toolkit/en/ (accessed 3/20/15)

2.0 Purpose

Under the guidance of WKC, the project aimed to produce two main data outputs:

(1) A comparison of UHI values *between* cities. To the extent possible, the UHI should be constructed using indicators relevant to monitoring Universal Health Coverage in order to link to a key issue on the global health agenda. Other indicators on health determinants and outcomes should also be explored to possibly construct different types of UHI. This analysis will primarily rely on city-level Demographic and Health Survey (DHS) data and will not be restricted to megacities, though inclusion of megacities is a priority. The results should be visualized using statistical figures/graphs and, where possible, maps. Correlations of city-level UHI with country level indicators of income and income inequality should also be explored.

(2) A comparison of UHI values *within* cities. This will build on (1), above, using mainly DHS data. Given the need for geocoded intra-city level data, the availability of indicators to construct the UHI and the number of cities that can be included in this analysis may be more limited (megacities to be prioritized). The results of this analysis can be presented in the form of UHI distribution plots (the inverted S-curve, as depicted by a ranked index plot), disparity statistics (disparity ratio or difference and disparity gradient) as well as smoothed, GIS maps of each city showing the intra-city distribution of the UHI.

3.0 Methods

3.1 Data selection and identification of cities from the Demographic and Health Surveys

The dataset selected was all data made available and collected or released through the Demographic and Health Surveys (DHS)[6] from 2003 to 2013. Requests for the data were made through the DHS website. Whereas data access was granted for all data available, only the most recently available data set from the country (collected between 2003 and 2013) was analyzed.

For each country, a capital city was identified. The datasets were then examined to determine which