Chapter 7

Assessing Urban Health Data: A Case Study of Maternal and Child Health Data in Cape Town, South Africa

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7.1 Introduction

All over the globe, urbanization is occurring as towns become cities and cities become megacities. Megacities are cities that have 10 million or more inhabitants (United Nations 2014). As of 2017, there are 37 megacities in the world (New Geography 2017). It is estimated that by 2025, 66% of the world's population will live in cities (UN 2014). A substantial portion of that growth, or 37%, is anticipated to come primarily from cities in India, China, and Nigeria (UN 2014). As urbanization persists, public and private organizations, as well as citizens, must grapple with the impacts and prepare for the future.

Although each city has its unique structure and dynamic, they all face the situation of areas of high population densities within city borders. Health services are often inaccessible for the urban poor due to a lack of financial resources and information, long distances to health services, or cultural and linguistic incompatibility. As a result, the urban poor can experience health and health system disparities (WHO 2010). Coordinating efforts to improve the health of the urban poor requires a detailed knowledge of the health needs of the urban poor in specific geographic areas of a city and comparing those needs to existing resources to identify gaps. Comprehensive information, including local-level data, is needed to improve the

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health of people living in urban areas. We explored the possibilities for obtaining urban health data in South Africa, focusing on maternal and child health, embedded within context. Similar to the layers of the ecological model, comprehensive urban health data requires information across multiple levels.

A number of international and national organizations promote the principles of healthy cities. Goal 11 of the United Nation's (UN) Sustainable Development Goals is to, "make cities inclusive, safe, resilient, and sustainable" (UN 2017). The goal has targets for housing, transport systems, inclusive participation, cultural and natural heritage, deaths caused by disasters, adverse environmental impact, green and public spaces, regional development planning, integrated policies and plans, and sustainable and resilient buildings. The World Health Organization (WHO) supports health and sustainable development in cities by not only focusing on the health and health care infrastructure in cities, but also on the contribution of health care facilities on waste, pollution, and energy consumption (WHO 2017). WHO, UN, and other organizations have available resources for the promotion of healthy cities and for facilitation of actors in urban health related decision-making.

Understanding the complex intersections of urbanization and health is therefore a major requirement for successful approaches to improve urban health. A comprehensive conceptual framework can help to orient academics, researchers, and health policy makers to the same page and a common language. Among various existing models, we follow Bronfenbrenner and Morris' (2006) conceptual model to explain the factors that affect urban health. Similar to other bioecological approaches, their model shows that health for an individual or a group is impacted by the following broad levels: individual, social and community networks, environment, and society.

Mothers and their children are a specific group that can be studied using this conceptual model. Maternal and child health is a major area of interest for health, medicine, and public health for international and national organizations, as well as non-governmental and governmental organizations. Maternal health is concerned with outcomes such as maternal mortality, birth and pregnancy-related outcomes, perinatal mental health, feeding choices, or teenage pregnancies. Child health concerns issues such as infant and child mortality, nutrition, growth and development, early childhood disease, and immunization.

In order to apply the model, individual factors such as age, gender, and race or ethnicity, need to be included. Social and community factors include family support systems and health facilities that are nearby. Environment factors include where a person lives, works, and engages in recreational activity. Societal factors include culture, socioeconomic, and government. The model shows that these levels are linked, and that they have mediating and/or moderating effects on health.

7.1.1 Data

Urban health data use, otherwise known as health informatics, is the intersection of information science and urban health. The three building blocks of informatics are: data, information, and knowledge. In the urban health context, these building blocks

and the interplay between them, can be quite complex. First, data must be generated and captured. Referring back to Bronfenbrenner's model it is clear that data from each of the factors is distinct. Environmental health data that describe the amount of indoor particulates is generated in a distinctly separate manner than spatial data on the amount of green space in a city. Each of the Bronfenbrenner factors has distinct data types that are generated and captured in a unique manner and by a variety of organizations. Issues that arise in the data are related to structure, standardization, accuracy, variability, integration, coordination, and costs of collection and processing.

An example of the need for integrated and coordinated data can be seen in monitoring the health of people living in urban areas. Suppose that a city wants to monitor the number of children who are not meeting basic standards for growth and development. It could be the case that one area of the city, perhaps a district within the city, has this data readily available and ready to use. However, this would only represent a small sample of the cities' children. In the absence of a mandate or widespread guidelines, districts might have collected the growth and development data based on different definitions, applying different methods for data sampling and handling, or otherwise. This would make it extremely difficult for the city to get a clear picture of the situation. One solution would be policies that allow for the integrated and coordinated management of growth and development data across the city. Although this seems straightforward, it can be costly, complex, and must compete with other health care priorities such as care delivery.

Once the data is collected, it needs to be converted to information. Again, for each of the Bronfenbrenner factors this is distinct. Public and private organizations direct the conversion of data to information based on their priorities. For example, the WHO publishes a Mental Health Atlas (WHO 2015b) that describes services available by country. Most of the conversion from data to information happens within the agency that collected the data as a way to address their own priorities. Issues on converting data to information are related to accuracy, availability, bias, access, adequacy, usability, transferability, dissemination, and costs related to processing.

The conversion of information to knowledge and further to an intervention in order to improve the situation is the final step and the ultimate goal. Data and information are used to gain knowledge and this knowledge results in advancement of urban health. In a public health approach, usually a cascade of steps is followed in a logical order to reach the goal (see Table 7.1). This is often demonstrated by testing interventions, or a variety of interventions about the same topic, over time. With each test, information is gained and overall this results in knowledge. An example from urban health is maternal mortality among poor urban women. Suppose one inner city hospital collects birth vital statistics for each birth (this is data). A researcher may notice poor women seem to have worse outcomes than those who are not poor. This can be investigated by comparing descriptive information of the average maternal mortality for poor versus non-poor women in the hospital for the past 5 years (this is information). Finding evidence that poor women have higher maternal mortality, the researcher tests whether having a midwife lowers maternal mortality. Assuming that the midwife intervention indicates that the result is positive, meaning maternal mortality is lower with a midwife (this is knowledge). The issues related to knowledge

Table 7.1 Public Health steps in the conversion of information to knowledge combining Public Health models based on Gibney et al. 2004 and Kroeger et al. 2004, adapted to a maternal health setting: From Information to an increase in Knowledge in Public Maternal Health

Step	Action		Example case study
1	Collect data		Hospital collects vital statistics for each birth
2	Identify health related problem		Compare maternal mortality between poor and non-poor city districts
3	Set goal		Reduce maternal mortality to one half in 10 years
4	Define objectives for goal		Achieve this reduction in mortality by midwife intervention
5	Create quantitative targets		Provide pregnant women with at least two antenatal health care and birth interventions by midwives
6	Develop program		Develop a net of community health units and promotion materials
7	Implement program		Send out health worker to inform families
8	Evaluate program		Recording maternal mortality, add a risk factor analysis by using demographic and socioeconomic data, analyse and discuss

are about how interventions can be tested, how to pool results from a number of interventions, dissemination, reproducibility, generalizability, and costs.

Of course, there is more to urban health data than these three building blocks Data-Information-Knowledge, for which the term of health informatics might apply better. Informatics is additionally concerned with the systems used to generate and capture the data. Systems are typically clinical, administrative, and public health. Clinical systems include electronic health records and pharmacy management, administrative include billing and human resources, and public health includes surveillance. Workforce is also important in informatics whereby there should be adequate numbers with appropriate skills. Programmers, developers, data analysers, and quality improvement managers are examples of jobs that are needed in urban health informatics. Finally, informatics is concerned with privacy, security, and governance. At the individual level, privacy is always a concern when dealing with health data. Citizens want to be sure that their data is used in a way that has the least risk for loss of confidentiality and that the minimal amount of information necessary is shared. Organizations must take steps to guard their data and this has become more important recently facing worldwide hacking attacks. In many countries national, state, and local laws exist that are specifically directed at health care

organizations with the intent to protect personal and sensitive health data. Ethical review boards also seek to ensure that researchers protect the privacy of participant data and their confidentiality. As informatics creates data, and then converts that data to information and knowledge, issues of privacy and security are of the utmost importance.

Governance refers to the chain of ownership of data and its accessibility. This is an area in urban health informatics that is rarely addressed, but is critical. For example, data on traffic related deaths might be collected by the Department of Motor Vehicles. However, if this data is needed for an urban health research project then it needs to be accessible. This is often difficult in that agencies are protective of their data, limit use of their data, and often do not make it publicly available. Even when data can be accessed, the urban health researcher must have a comprehensive data dictionary, particularly if the data come from a field that is unfamiliar. Governance also comes into concern when researchers want to match datasets. Suppose that two data sets are available at the individual level, it would be optimal to match those datasets but identifying information is needed. Matches made on name, birthdate, and address alone are not as accurate as those are where a unique identifier is also included. However, in countries where there is a large number of informal workers, personal identifiers might not be used in a high enough frequency or even available. More common is the case where researchers want to match data on a geographic level. For example, if a researcher wants to describe an outbreak of malaria in an urban poor area it might be good to do so by neighbourhoods or a unit smaller than district. This can be difficult as available data, and even the manner in which data are collected and processed, might not be accessible at the neighbourhood level. In general, the smaller the available units the more useful the data are for urban health.

7.2 Urban Maternal and Child Health as a Focus

Evolutionary aspects play an important role in changing environments such as urban challenges are. Adaptation to environments via genetic selection processes, leading to an adaptive increase in population frequencies of those genes who provide the carrier with beneficial traits, help to guarantee survival in the long run. Whereas the development of genetic and behavioural coping strategies are crucial for an optimal environmental embedding, evolutionary adaptation trends are often slow adaptive procedures over many generations, and do not contribute to an understanding of how urban populations are able to cope with the fast-changing urban environments. Throughout human history, highest rates of vulnerability in a population were reached under changing environments (such as the transition from foraging to sedentary life, the formation of medieval cities, or the early industrialization), when the evolved coping capacities did not fit to the environmental challenges any more, which nowadays is the case in urban environments permanently (Nonini 2014). Short term adaptations as studied only recently with the field of epigenetics reacting to environmental conditions suggest that fast and meaningful reactions occur affecting the activity of genes. As these activation patterns seem to inherit to the next

generation, the influence of environmental factors might be even much more effective than it has been assumed until recently.

This is especially evident if considering meaningful behavior of mothers significantly affecting their offspring. First studies e.g. suggest an epigenetic influence on the relationship between urban upbringing and social stress processing fixed by neural regulation in the brain (Lederbogen et al. 2011).

Besides others, these first results suggest that the environmental influence on mothers and their children is even higher than expected compared to the classical risk factors models. This is a clear demand to care for mother and child health in urban environments, suggesting to invest much of our global health capacities into mother and child population subgroups.

Focusing on urban maternal and child health adds on the complexities of living in an urban environment. A variety of factors could affect health of mothers and children such as social determinants of health, health systems, environment, community, social networks, etc. Often maternal and child urban studies focus on vulnerable populations including migrants, poor, disabled, single mothers, and those with mental health conditions. Regardless of whether maternal and child health is viewed for an entire urban population or specific subgroups are targeted, it is an important investment for governments and other key stakeholders in communities, because maternal & child mortality is an indication of a country's health systems failure or success (UNICEF 2016).

For many years, academics, governments, and non-governmental organizations have investigated different programs, policies, and interventions to improve maternal and child health. As a result, much progress has been made in most developed countries compared to under-developed countries. The U.S. Agency of International Development (USAID) notes that since 2008 their 24-country partnership with the WHO has saved the lives of 4.6 million children and 200,000 women (USAID 2016). Polio has been eradicated from India through a number of surveillance and vaccination efforts (Obregon et al. 2009). The United Nations' Millennium Development Goal led to a reduction in under-five mortality from 12.7 million to 6 million between 1990 and 2015 and the maternal mortality rate has fallen by 44 per cent (WHO 2015b). These are just some examples out of many that have contributed to making the lives of mothers and children better. Commitment of governments to ensure sustained progress in reducing under-five mortality and the maternal mortality rates and bridging the existing access to health care disparities is but one the crucial methods of sustaining healthy communities.

The heart of this progress is data, information, and knowledge. Without these three pillars it would be impossible to track, monitor, and evaluate any progress in maternal and child health. It would also be difficult to understand where and how to intervene and how to formulate effective policies and encourage effective practices. Advancing maternal and child health requires data, yet data collection is expensive and often done in a haphazard manner. Data collection is typically done to answer a targeted question without regard for how new disciplines could utilize the data in the future. Finally, data collection is moot unless those data are ultimately turned into information and knowledge. Data should be and bring about concrete change.

For urban maternal and child health, the most optimal scenario would be that organizations would collect data in an informed, interdisciplinary manner and be able to demonstrate the conversion into information and knowledge, which leads to improved outcomes. Certainly, reality is often different from the best-case scenario. The following case study describes an attempt to assess the maternal and child data in South Africa.

7.3 Maternal and Child Health in South Africa

7.3.1 *Setting*

Considerable investments have been made in maternal and child health data management in South Africa. South Africa has governmental, academic, and community infrastructure facilities that are active in maternal and child health suggesting that this country would be able to source and monitor data on child and maternal health. Despite advancements in maternal and child health, South Africa still has significant numbers of under-five mortality or mother-child HIV transmission (Groenewald et al. 2014; Cock et al. 2000) so the interest to improve data capturing and management persists.

Disparities in access to health have been in existence pre- and post-apartheid in this country, which unfortunately impact directly on the quality of health data that exist, and on the dissemination and translation to practice. For example, national data on child and maternal health do not include data from private sectors, making it impossible to accurately report on the status of the country with regard to this (Weimann et al. 2016). According to a study by Oni and Mayosi (2016), gaps in data management on the subject exist, at province and even at country level, underreporting on both child and maternal mortality rates.

In Limpopo, a rural province in SA, public hospitals do not properly report maternal mortality, because there are no standardised tools to accurately document maternal mortality. Additionally, some pregnant patients are admitted in different wards (not maternity wards) for other ailments, and when they die in those wards, they are not recorded as maternal mortality cases. In those tertiary hospitals where mortality recording tools are in place, there is a paucity of information that is recorded, depending on the experience of the person who is recording the incidence of maternal mortality.

There is an urgent need to focus on *urban* health in South Africa as four of the top 20 fastest growing cities in Africa are located in South Africa such as Cape Town (African Development Bank Group 2014). At the heart of this growth, migration to this city has been increasing in large proportions, in a quest to seek employment opportunities.

Therefore, our health data analysis reflects the current conditions within a specific urban setting and does not allow a conclusion concerning other African settings. We rather emphasize the value of health relevant data and identify existing data and their structure, as well as recognizing data gaps.

Finally, this in-depth analysis of maternal and child urban health data was part of a larger study which was focused on Cape Town. The aim of the study was a health gap analysis as a contribution to understand the health situation and to explore, to which health issues attention is paid to, what neglected diseases occur, or what neglected health issues are missing in the focus of researchers (Mumm et al. 2017). Thus, such a health gap analysis allows an overview over existing information and data and represents a mirror of the capacity of the health system. Among the major results the gap analysis revealed a clear gap in the field of maternal mental health in the city of Cape Town, a much-needed health service as a clear sign of unfavourable living conditions for mothers and their children. As well the intercultural approach allows a view on a regional setting with a different perspective as approached by the local authorities and health workers.

7.3.2 *Methods and Aims*

Two approaches were used to assess the maternal and child urban health data in South Africa: a literature review and the identification, cataloguing, and statistical analyses of available datasets. Identification and cataloguing of datasets help to understand what data are available and the characteristics of that data. The project was primarily focused on secondary datasets that exist and are known publicly. This also speaks to the transparency of data in the country. Many other urban health datasets exist but one objective of the project was to demonstrate what can be explored with the available data and used by a larger audience that seeks to understand, study, and improve the situation. The literature review aims to understand how data has been converted into information and knowledge. A major objective of studying these two columns of information was to see if the situation analysis based on each of the information columns delivers the same picture or a different picture of the urban maternal and child health situation in Cape Town.

7.3.3 *Literature Review*

In order to summarize the available mother-child health datasets in South Africa a narrative review of the literature was conducted in May 2015. Child health growth indicators were also catalogued from the literature review. PubMed, Google Scholar, National Center for Biotechnology Information (NCBI) were used to search online for relevant literature in the fields of anthropology and health including the sub-disciplines of public health and global health. Further reviews were done on the homepage of journals that were applicable to the topic.

Because structured search terms were used, additional literature in “other” fields beyond the ones listed above were also searched. Search terms were reviewed and agreed upon by the research team. These include: *children health, neonatal health,*

growth, obesity, overweight, infant mortality, weight-for-height, height-for-age, weight-for-age, BMI-for-age, stunting, wasting, infant development, maternal health, maternal, pregnancy, urban health, mother-child health, health care system, smoking during pregnancy, and foetal alcohol syndrome. Boolean operators were used in the online searches to ensure that the results were applicable, for example “urban health + children health”. Geographic search terms were also used including Cape Town, Western Cape, South Africa, Sub-Saharan Africa, and Africa. Although these terms include some broader (Africa) and narrower (Cape Town) geographic areas they were used to ensure that all applicable literature was reviewed. Titles, abstracts, and full papers were extracted and read according to Cochrane guidelines. All applicable literature was catalogued and, if raw data were mentioned and publicly available, attempts were made to gain access to the datasets. The following information was extracted for each publication to the database; title, year published, author(s), indicators, aggregation level, data source, sample size, location, availability, and contact details of author(s). Specific child growth data were extracted including; age and ethnicity of participants, growth measurements, and references to other studies.

7.3.4 Datasets

Based on the literature review several potential data sources were identified that were either suitable for a primary or secondary data analysis on mother and child health. Primary data analysis was done on accessible raw data provided by contacted persons. Due to a low response rate and the focus on analysing information gaps (secondary data analysis) solely raw data of the Western Cape Mortality Report (Groenewald et al. 2014) were analysed which include number of death per age, cause of death and geographic region. This dataset was used to calculate infant and under five mortality rates and mortality rates of women in childbearing ages. Information to calculate maternal mortality was missing due to missing data on causes of death.

Availability of secondary data was far higher and covers all the intended areas of interest from South Africa to the Western Cape region to Cape Town and even city districts within Cape Town. General information such as life expectation, sanitary, housing, age distribution were available from census data (Statistics South Africa 2011) provided by the South African Government. Access to raw data was not possible on all levels.

Although most of the datasets refer to mother-child health, information was diverse in density of details, studied population, content, and indicators used to describe mother-child health. In general, published articles or information either included information on maternal health (e.g. mortality rates, HIV and tuberculosis prevalence) or on child health (e.g. mortality and morbidity rates, growth, and vaccination). No studies were found that assessed the health of mother-child dyads in South Africa, independent on level of aggregation. However, this type of information

is necessary to describe the risk factors and the vulnerability of mothers and children and to provide sufficient interventions to improve mother-child health. In addition, although mortality and morbidity were surveyed, they were not matched with data on living conditions, access to health care and other factors that might explain the observed prevalence for diseases and mortality rates. Without this combined information, intervention programs may not reach their potential as they may not be tailored for the needs of the community.

Furthermore, availability of datasets strongly depends on the level of aggregation. For example, the smaller the studied geographic aggregation, the less detailed information may be available. For Cape Town, its eight health districts were the smallest level on which at least some information could be accessed. Information for smaller communities with their special cultural and socioeconomic conditions within the city was not available. An overview of the available secondary data, in relation to aggregation level, is presented in Table 7.2.

Besides data availability and accessibility, the review also allowed for comments on data quality. As in other countries, published information from South Africa often does not include information on study design or data quality assurance making it difficult to be critically reviewed. For example, the maternal mortality rate in Cape Town is the highest in high-socioeconomic districts whereas it is the lowest in low-socioeconomic districts characterized by informal settlements, no clear drinking water and less access to health care. Without understanding the methodology for how the data was collected and analysed, or perhaps potential biases, the meaning of this finding might be misconstrued. A simple reason could be that high-socioeconomic districts have greater resources for reporting birth vital statistics than low-socioeconomic districts.

The crucial aspect for all countries is the ability to record accurate data for maternal and child health outcomes, from which interventions can be drawn. In most African countries, there is poverty of reliable data on the subject, as a result, in most cases data on both maternal and child health outcomes is undocumented or incompletely documented (Mumm et al. 2017). The fact that there is no suppository bank linking both public and private sector, makes it impossible for countries to accurately report the status of child and maternal health which is always marred by underreporting on maternal mortality.

7.4 Reflections

In order to understand what information is available concerning maternal and child health and how it can be used, an exercise was planned and conducted that focused on Cape Town and on a broader view on South Africa. However, any city could have been chosen with similar or more disparate results. South Africa was chosen because it was supposed to represent, most likely, the best case scenario of available data on the African continent (see above). However, the ever-changing impact of urbanization due to economic, political, and cultural changes needs to be constantly considered in the urban health subject.

Table 7.2 Available secondary data on mother and child health in South Africa (SA), in the province Western Cape (WC), in the city of Cape Town (CT), and in city health districts (CTHD) by aggregation level

Field of information	SA	WC	CT	CT HD
Demographic information				
Area	x	x	x	x
Population	x	x	x	x
Population density	x	x	x	x
Number & size of households	x	x	x	x
Life expectancy	x	x	x	x
Number & cause of deaths	x	x	x	x
Age distribution and ethnicities	x	x	x	x
Male-female ratio		x		x
Total fertility rate	x	x		
Age of mother at birth	x	x	x	
Mortality rates				
Infant mortality rate	x	x	x	x
Under-5 mortality rate	x	x	x	x
Maternal mortality rate	x	x	x	x
Socioeconomic information				
Average income	x			x
Education	x	x		x
Housing & sanitation	x			x
Food security	x			
Unemployment rate	x	x		x
(Maternal) Health care				
Availability (density) of health facilities	x	x	x	x
Access to health care	x			
Utilization of health care	x			
Prevalence of communicable & non-communicable diseases	x	x		(x)
Immunization of children	x	x		
Level of & access to perinatal care	x	(x)	(x)	
HIV prevalence – adults & children	x	x	x	
HIV prevalence – pregnant women & mothers	x			
Number of antiretroviral therapy – adults & mothers	x			
Nutritional status of children	x	x		
Health risks of adults – alcohol & tobacco	x	x		

Sources see Mumm et al. (2017)

x data fully available on aggregation level, (x) data incompletely available

Datasets and available literature were reviewed to understand the situation of mother-child health in South Africa. Particular attention was paid to what datasets were referred to, if they were available, and analyses were conducted on some of these available datasets. Based on the planning, execution, and reflection of the project, several lessons learned are listed below.

There was a plethora of data on urban mothers and children in South Africa and specifically in Cape Town. However, the data were often uncoordinated, not differentiated between situation analysis, and it was unclear if these data would be useful for meaningful development of strategies and implementation of health improvement programs. Across the different datasets that were available, there was often a mismatch in the data structure and aggregation levels. Differing definitions of terms prevented comparison across datasets and sometimes data was collected at only the national level and sometimes at more discrete geographic units. While national data can provide insights for stakeholders on what needs to be improved, finer level data are needed to understand where and how to start with targeted interventions.

Data availability impacts its usefulness and transparency. Although there are issues related to propriety around sharing data, the study team received no responses back from inquiries made about obtaining primary datasets that were cited in the literature review. Governments might require that datasets collected using public funds be available, at least in a limited manner, for use by the public. Use of data by the public, not just academics, is important for meaningful change. During the literature review it was clear that data, information, and knowledge on urban health for mothers and children are publicly available, but not easy to locate or in a number of unrelated sources such as journals, websites, or in grey publications. However, recently there has been a specialized focus on urban health journals, on maternal and child health, as well as on the health issues of Africa. Although the interest of the study was the intersection of all three areas, these specifically focused resources make information access easier. It was interesting to note that there was a lack of visibility of interdisciplinary research on urban health or the study of maternal and child health from a comprehensive perspective. It is possible that data are not being using in the most powerful way. Given that some data were not available at levels smaller than national, it would be difficult to use those to facilitate change in a smaller unit such as a city, community or district.

Since we followed the WHO definition of health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (WHO 1948), the search for data, information and knowledge on mother and child health in South Africa and specifically in Cape Town included a comprehensive approach. Although in many cases the aims of data collections were not clearly documented, we found the majority of approaches on physical health, assuming that this field received higher priorities compared to mental health. As the focus on mother and child health requires a comprehensive approach, a fruitful interaction of scientists from diverse disciplines, as it was the case in this project, is needed. The team of researchers met this challenge of developing a better culture of communication between humanities and Life Sciences/Medicine, or between different scientific cultures, including seeking for an integrative and balanced significance of both quantitative and qualitative approaches. Such skills in health approach interactions need to be actively developed, are often time-consuming, or suffer from a lack of suitable funding options. But this is the most promising approach of dealing with the highly complex and dynamic processes interacting in the health situation of people in urban environments.

In closing, the lessons learned were somewhat expected. All countries, regardless of economic status, have improvements that are needed in data collection, analysis, and interpretation. Globally, there is a need in better understanding and improving health in an evidence-based manner. Perhaps the lessons learned would have been different if the study had been conducted by in-country researchers only. However, given that data, information, and knowledge production are important around the world, the lessons learned can be applied in many different scenarios and are important for stakeholders to consider in planning and decision making.

Challenges

- Across the different datasets that were available, there was often a mismatch in the data structure and aggregation levels. Differing definitions of terms prevented comparison across datasets and sometimes data was collected at only the national level and sometimes at more discrete geographic units.
- While national data can provide insights for stakeholders on what needs to be improved, finer level data are needed to understand where and how to start with targeted interventions.

Lessons Learned

- As the focus on mother and child health requires a comprehensive approach, a fruitful interaction of scientists from diverse disciplines, as it was the case in this project, is needed.
- The team of researchers met this challenge of developing a better culture of communication between humanities and Life Sciences/Medicine, or between different scientific cultures, including seeking for an integrative and balanced significance of both quantitative and qualitative approaches.
- Such skills in health approach interactions need to be actively developed, are often time-consuming, or suffer from a lack of suitable funding options. But this is the most promising approach of dealing with the highly complex and dynamic processes interacting in the health situation of people in urban environments.

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