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Developing a Conceptual Framework of Urban Health Observatories toward Integrating Research and Evidence into Urban Policy for Health and Health Equity

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ABSTRACT *Detailed information on health linked to geographic, sociodemographic, and environmental data are required by city governments to monitor health and the determinants of health. These data are critical for guiding local interventions, resource allocation, and planning decisions, yet they are too often non-existent or scattered. This study aimed to develop a conceptual framework of Urban Health Observatories (UHOs) as an institutional mechanism which can help synthesize evidence and incorporate it into urban policy-making for health and health equity. A survey of a select group of existent UHOs was conducted using an instrument based on an a priori conceptual framework of key structural and functional characteristics of UHOs. A purposive sample of seven UHOs was surveyed, including four governmental, two non-governmental, and one university-based observatory, each from a different country. Descriptive and framework analysis methods were used to analyze the data and to refine the conceptual framework in light of the empirical data. The UHOs were often a product of unique historical circumstances. They were relatively autonomous and capable of developing their own locally sensitive agenda. They often had strong networks for accessing data and were able to synthesize them at the urban level as well as disaggregate them into smaller units. Some UHOs were identified as not only assessing but also responding to local needs. The findings from this study were integrated into a conceptual framework which illustrates how UHOs can play a vital role in monitoring trends in health determinants, outcomes, and equity; optimizing an intersectoral urban information system; incorporating research on health into urban policies and systems; and providing technical guidance on research and evidence-based policy making. In order to be most effective, UHOs should be an integral part of the urban governance system, where multiple sectors of government, the civil society, and businesses can participate in taking the right actions to promote health equity.*

KEYWORDS *Urban health observatory, Health equity, Urban health metrics, Health information, Governance*

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INTRODUCTION

Background and Context for Urban Health Observatories

Health in the twenty-first century is being shaped by multiple forces. Demographic changes, globalization, climate change, inequities within cities, and the movement toward decentralization of decision-making to the local level have differential effects on urban dwellers.[1–4] In 2008, for the first time in human history, the majority of the world's population was living in urban centers; by 2030, about 60 % of the population will be living in urban settings, rising to about 75 % by 2050.[5]

In general, cities offer more opportunities for better health, though many of today's sprawling cities face a triple burden of disease: explosive outbreaks of infectious diseases related to overcrowding and other facilitators, a heavy burden of chronic disease related to unhealthy urban lifestyles and environmental conditions, and injuries from traffic crashes, violence, and crime.[1,6,7] Rapid, unplanned urbanization, which often aggravates poverty, lead to this scenario instead of to better health. Urban dwellers also constantly face new threats to their health, mental and physical well-being, and quality of life.[8] Globally, the pressure of several exposures, including climate change and economic and political disruptions, are expected to accelerate urban growth due to migration, amplifying the problems of inequitable access to health and the large, growing gap in health outcomes.[9]

In order to effectively deal with these challenges, cities need quality intelligence on population health status in association with geographic, sociodemographic, and environmental information. Sustainable mechanisms for monitoring health and health equity at the local level are essential for guiding local interventions, resource allocation, and planning decisions.[10,11] The integration and coherence of evidence-based actions within existing systems in both health and non-health sectors (e.g., urban planning, development, transport, trade, and food provision) can greatly increase the impact and sustainability of policies and programs.

The reality, however, is that the capacity for characterizing intra-urban health is not well developed, globally. Neighborhood-level analysis suffers not only from limited data availability, accuracy, and completeness but also from the lack of an institutional mechanism for collating and analyzing health-relevant data at that level to generate useful intelligence for policy-making. This mechanism for centrally assembling, analyzing, and translating comprehensive community data is essential in order to improve urban health and reduce disparities.[11] Even in cities with significant data repositories, converting raw data into meaningful and actionable data requires an integrated, multisectoral health monitoring system with a strong foundation in the "urban health model".[10–12]

Urban Health Observatories

The concept of a public health observatory, and specifically those in urban settings (i.e., urban health observatory—UHO), has been developed to address the obstacles presented by the complex network of health determinants in urban settings, and the often dispersed and uncoordinated nature of data at the local level.[13,14] They exist in different forms and institutional arrangements, most commonly in government, academia, and non-government.[15] In general, they are expected to act as a focal point for urban monitoring by assembling, analyzing, and producing information on health outcomes and their broad range of determinants; and mobilizing a network of actors/stakeholders to take action on the wider determinants of health through better-informed policies. Their focus is on generating "information and knowledge

for evidence-based health policy and decision-making".[13–16] They work to monitor health trends, identify gaps in health information, provide guidance on appropriate methods, assemble data from different sources, and integrate population-based data (e.g., vital statistics, censuses, and social–demographic surveys) and institution-based data from both within and outside the health sector.

This study focused on the potential of urban health observatories to serve as a model institution for filling the gap in local health intelligence. It aimed to describe characteristic features of a select group of existent UHOs in different countries and to develop a conceptual framework of a UHO.

METHODS

Sample of Urban Health Observatories

Given the absence of a global network or directory of UHOs, a purposive sample of UHOs was selected for the study. Three observatories were chosen by the WHO Centre for Health Development based on their strong track record of generating policy-relevant research for their local urban jurisdictions and their leadership roles in the professional societies of urban health. Additional organizations, including some that did not specifically identify themselves as an "urban health observatory", were searched through online searches and personal contacts, and screened by applying criteria that included the following: has a clear institutional structure, generates quality intelligence on health and health determinants that informs urban research and policy, uses an approach that is coherent with the framework of the determinants of health in urban settings,[11] brings together health and non-health sectors, and represents low- or middle-income countries. As a result, four were selected and agreed to enroll in the study. The observatories are described in further detail in subsequent parts of this paper.

An A Priori Conceptual Framework

A preliminary conceptual framework was developed based on a review of gray and white literature, and information about existing UHOs obtained through secondary sources. The literature review was conducted mainly using online resources and focused on identifying relevant existing frameworks, such as the one on the determinants of health in urban settings (i.e., the Urban Health Framework)[11] and extracting characteristic features of a UHO. Information on existing UHOs, including their mission, objectives, activities, and products, was obtained from their websites. These information formed the basis to develop a preliminary conceptual model of a UHO with three broad, inter-related domains[17,18,19] (Fig. 1).

Questionnaire Survey

A self-administered survey was conducted with the UHOs to collect more detailed information. A structured questionnaire with both closed and open-ended questions was developed based on the preliminary conceptual model. The questionnaire was sent via e-mail to the contact person at each of the seven observatories. Additional information to clarify ambiguous responses and gather missing data was obtained through direct communication. Data collection was carried out from November 2011 to May 2012. The research protocol was approved by the WHO Research Ethics Review Committee (#RPC544).

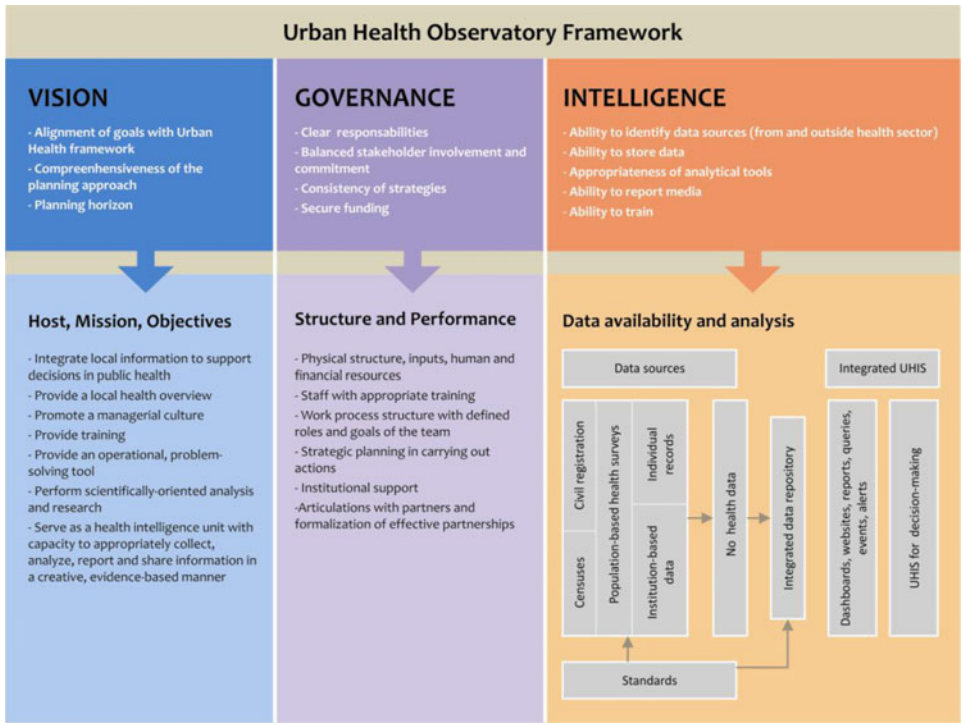

FIGURE 1. A preliminary framework of an Urban Health Observatory.

Data Analysis

The analysis used basic descriptive analysis as well as framework analysis[20,21,22] to synthesize information across the seven observatories and to refine the conceptual framework in light of the empirical data collected through the survey.

RESULTS

History of Establishment

The seven organizations included in the study, henceforth referred to as Urban Health Observatories (UHOs), were (in chronological order of establishment) as follows: London Health Observatory (LHO), in London, England (established in 2001); Observatório de Saúde Urbana de Belo Horizonte (OSUBH), Belo Horizonte, Brazil (2002); Observatorio del Derecho a la Salud (ODSP), Lima, Peru (2002); Nairobi Urban Health and Demographic Surveillance System (NUHDSS) associated with the African Population and Health Research Center, Nairobi, Kenya (2002); Observatori de la Salut Pública associated with the Agència de Salut Pública de Barcelona (ASPB), Barcelona, Spain (2004); Bangladesh Urban Health Network (BUHN): Eminence, Dhaka, Bangladesh (2007); and Observatorio de Salud Urbana–Guatemala (OSUG), Guatemala City, Guatemala (2008). Two were from low-income, one from lower-middle income, two from upper-middle income, and two from high-income countries.[23] They represented the WHO Regions of Africa, the Americas, Europe, and Southeast Asia; none were from the Eastern Mediterranean or the Western Pacific regions.

The UHOs varied in terms of their host institution, historical aspects, roles, operational frameworks, and key partners (Table 1). Four were governmental organizations, two were non-governmental organizations, and one was nested within a university. As such, the single or combined motivations for implementation were diverse, varying from government interest (local government, $n=1$; regional government, $n=2$; federal government, $n=1$) or stakeholders' interests ($n=3$) to researchers' interests ($n=3$).

Regarding the motivation for implementation, all UHOs reported public policies or special agendas, either at the local or global level, but their origins were distinct. The LHO and the OSUBH reported strong ties to the so-called new public health agenda developed in many countries after the Lalonde Report in 1974.[24] The LHO was considered a key part of the newly created London Health Commission as a pan-London strategy for health in the 1990s. Conversely, the OSUBH, which mirrored itself on the LHO model, lacked a political strategy for its creation and received much more support from public health technical personnel than substantial political support from the local City Health Department.

The ODSP in Lima and the ASPB in Barcelona, on the other hand, emerged from a change in the political circumstances in both countries: in Barcelona, by a coalition of leftist political parties after the democratic elections in 1979; and in Peru, with a transitional government after the fall of the non-democratic government in 2002. As a result, ODSP has a strong emphasis on the population's right to health in addition to urban health.

Both NUHDSS in Nairobi and BUHN in Dhaka were driven by a call for concerted efforts to understand and address the deteriorating living conditions of urban slums in their respective countries; hence, they are highly motivated by the Millennium Development Goals agenda. Nevertheless, while the former was established by research interests, the latter was created by stakeholders' interest. Neither had explicit political support, but NUHDSS has had strong international financial support, while BUHN is supported by its members and other NGOs.

The OSUG in Guatemala, created in 2008 and formalized in 2009, deserves attention due to the strong influence the urban health agenda had on its foundation. It was supported by government and NGOs' (national and international) interests, but under the technical assistance of expert consultants in urban health from the Pan American Health Organization (PAHO).

The approaches of OSUBH, NUHDSS, BUHN, and OSUG are relatively well adapted to the framework of urban health proposed in the "Report to the WHO Commission on Social Determinants of Health from the Knowledge Network on Urban Settings".[11]

Noteworthy is the LHO trajectory. Over decades, the LHO developed a successful network of observatories working at national, regional, and local levels, resulting in the creation of the Association of Public Health Observatories across the UK and Ireland. However, due to recent reforms, the Association has now been disbanded and health observatories are in transition to a newly configured public health system. The new system will be characterized by strong financial austerity, which may jeopardize the future performance of the English observatories.

Mission and Objectives

Common to most of the UHOs is their role in producing and disseminating regional and local health intelligence in order to inform policy and practice. The reported missions were ample and ranged from turning routine data into health intelligence for evidence-based decision-making, to developing health knowledge for empower-

TABLE 1 Study UHOs, their host institutions, key partners, and mission

Observatory name city, country (year of establishment)	Host institution	Key partners	Mission
London Health Observatory (LHO) London, England (2001)	• National Health Service (NHS)	• Central Government Ministries • Local government: the Greater London Authority • National researchers, agencies, and universities • International partners: WHO	• To be a population health intelligence organization • To turn routine data into health intelligence on health and health care to inform evidence-based decision-making • To provide a health knowledge signposting service and run training and capacity-building for health practitioners
Observatório de Saúde Urbana de Belo Horizonte (OSUBH) Belo Horizonte, Brazil (2002)	• Federal University of Minas Gerais *Universidade Federal de Minas Gerais (UFMG)*	• National Health Ministry • Local government: Belo Horizonte Municipality • National researchers, agencies, and universities • International partners: universities, WHO, International Society for Urban Health (ISUH)	• To build knowledge and workforce capacity in population health research • To conduct urban-themed studies that can drive planning for improving urban health, especially in urban areas associated with intra-urban inequalities, through public policies
Observatorio del Derecho a la Salud (ODSP) Lima, Peru (2002)	• Economical and Social Research Consortium *Consorcio de Investigación Económica y Social (CIES)*	• Central government ministries • Universities • Civil society—ForoSalud • International partners	• To strengthen human rights and public health communities in their relationship with the academic community • To produce and disseminate useful knowledge about the requirements for health, the right to health and economic and social policies
Nairobi Urban Health and Demographic Surveillance	• African Population and Health Research Center (APHRC)	• Central government ministries • Local government	• To be a global center of excellence, consistently delivering sound scientific evidence for policy

TABLE 1 (CONTINUED)

Observatory name city, country (year of establishment)	Host institution	Key partners	Mission
System (NUHDSS) Nairobi, Kenya (2002)		• Universities • NGOs • International partners	and action on population, health and education in Africa
Observatori de la Salut Pública (OSP/ASPB) Barcelona, Spain (2004)	• Public Health Agency of Barcelona *Agència de Salut Pública de Barcelona (ASPB)*	• Regional and state: Spanish Federation of Municipalities and Provinces • Local government: municipalities of Catalonia, Consorci Sanitari de Barcelona, The Provincial Council of Barcelona • International partners: WHO	• To develop public health activities with a high degree of interaction with service activities • To facilitate the integration of preventive care • To use health information system as a key element to support the planning of health services in the city
Bangladesh Urban Health Network (BUHN) Dhaka, Bangladesh (2007)	• Bangladesh Urban Health Network (BUHN): Eminence	• NGOs • Civil society	• To be a civil society network that advances the generation, exchange, and application of high-quality urban health knowledge to attain health equity in urban settings nationwide
Observatorio de Salud Urbana (OSUG) Guatemala City, Guatemala (2008)	• Guatemala Municipality *Municipalidad de Guatemala*	• Central government ministries • Local government: Guatemala City • Universities • NGOs: Proyecto Génesis • International partners: PAHO/WHO, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)	• To be a multidisciplinary and multisectoral group with the objective of providing quality information for decision-making in the field of urban health • To promote analysis of the public policies which act as determinants of health in the municipality and propose intersectoral and inter-institutional health interventions

ment and capacity-building. Two of the observatories claimed to act as health policy advocates.

Table 2 shows the similarity of the objectives in terms of surveillance, health information organization for the development of social and health policies, and dissemination of information through mass media outlets and scientific forums.

Governance

Regarding governance, most of the UHOs reported some mechanisms or plans for sustainability, capacity building, ownership, accountability, and networking. In general, the UHOs reported aptitudes in planning, decision-making, and stakeholder management. Also, they showed political commitment and utilized participatory processes involving local stakeholders to facilitate the collection of accurate and transparent information on locally relevant indicators for planning, policy-making, management, accountability, or donor reports.

More specifically, for example, the LHO, in London, focused on its strong links with national and European observatories while also emphasizing their independence and the importance of their ability to ensure unbiased and evidence-based research on health inequalities. They reported complex accountability mechanisms, but with overview of an effective advisory board.

All but one observatory reported performing systematic strategic planning. Some undergo yearly planning while others do not have a predetermined planning period. The Belo Horizonte observatory underwent its first strategic planning in 2012. All reported developing strategies relating to ethical concerns, such as conflicts of interest and confidentiality, along with strategies to influence public policies and resource allocation.

Resources

UHOs from low- and middle-income countries reported more resources when compared to the others, perhaps reflecting the need for greater initial investments in resource-poor settings. In terms of human resources, the composition of staff varied. Some, like ASPB, in Barcelona, and OSUBH, in Belo Horizonte, have several students involved whereas the LHO, in London, have a large professional staff. Four of the UHOs reported having communication personnel.

The sources of funding also varied. Three UHOs receive governmental funds on a regular basis (i.e., LHO, ASPB, and OSDP). Most of them receive funds from specific projects. Some UHOs receive mixed funding from the national government and non-governmental agencies. The NUHDSS, in Nairobi, was financed exclusively by international agencies. The BUHN, in Bangladesh, is an exception, receiving contributions from its individual members in addition to funds received from other NGOs.

Intelligence and Integration

All the UHOs, but the BUHN, in Bangladesh, use both primary and secondary data for their inputs. The production of primary population-based health data occurs through the use of various methods including cross-sectional and longitudinal designs, surveillance, and health services and system monitoring. Three UHOs perform primary data collection: OSUBH, Belo Horizonte; OSP/ASPB, Barcelona; and OSUG, Guatemala. Three UHOs reported that they maintain a data repository. Regarding the levels of data disaggregation utilizing primary and secondary data, only three UHOs (LHO, London; OSUBH, Belo Horizonte; and OSP/ASPB, Barcelona) use intra-urban indicators based on census tract data. In some cases, the indicators were disaggregated into multiple levels stemming from the census tract.

TABLE 2 UHOs' objectives

Observatory	Objectives
London Health Observatory (LHO) London, England	• Become London's premier source of health intelligence and health knowledge • Ensure that outputs are scientifically robust and represent best evidential practice • Provide understandable information, data, and interpretation that are used by decision-makers, politicians, and the public to influence health and reduce health inequalities • Provide a responsive approach to stakeholder inquiries
Observatório de Saúde Urbana de Belo Horizonte (OSUBH) Belo Horizonte, Brazil	• Produce research related to the urban setting • Contribute to the training of health academics and professionals • Systematically analyze health events and their determinants • Produce methods of measuring the attributes of the urban context • Establish a data warehouse for the systematic analysis of urban health data • Publish scientific articles and disseminate information which is accessible to the media • Present knowledge produced to partner institutions • Seek sustainability and legitimacy of the OSUBH
Observatorio del Derecho a la Salud (ODSP) Lima, Peru	• Promote the surveillance capacity of social policies and health programs from a gender perspective • Comply with international human rights commitments in health with emphasis on sexual and reproductive health
Nairobi Urban Health and Demographic Surveillance System (NUHDSS/APHRC) Nairobi, Kenya	• Increased generation and synthesis of scientific knowledge on population, health, and education in Africa • Strengthen individual and institutional research capacity in sub-Saharan Africa for better generation and use of research evidence • Greater engagement with policymakers, practitioners, and other stakeholders for better utilization of research evidence in local, national, and regional policy formulation and action • Enhanced operations and prudent management of finances, human resources, programs, and other services
Observatori de la Salut Pública (OSP/ASPB) Barcelona, Spain	• To analyze and monitor the health and its determinants of the population of Barcelona • To do the surveillance of infectious diseases in Barcelona • To evaluate new public health interventions to be implemented in the city
Bangladesh Urban Health Network (BUHN) Dhaka, Bangladesh	• Act as the policy advocate to enhance the status of Bangladesh urban heath • Facilitate the exchange of perspectives, research methods, and data on the study of diseases in urban areas • Evaluate and help develop programs that reduce urban health hazards and promote well-being of people living in urban areas • Provide an informal and open association for review and discussion of issues of common interest with focus on urban health
Observatorio de Salud Urbana–Guatemala (OSUG) Guatemala City, Guatemala	• Permanently monitor the urban health conditions with reference to the social determinants of health • Implement operational areas in order to mainstream urban health concerns and characteristics resulting in a foundation for targeting priority actions in planning, prevention, and resolutions • Systematically analyze public policies in the field of urban health

With regards to the dissemination and accessibility of the health intelligence produced, the more accessible ones were those published in peer-reviewed journals as well as online. While the UHOs with strong academic connections published frequently in peer-reviewed journals, those in government focused more on publishing regular reports and publications for local audiences.

The value of health intelligence produced by the UHOs is enhanced when it can actually influence action by the government and community. Many of the UHOs create impact through providing the evidence base to guide policies and programs, across sectors, especially in addressing the wider determinants of health and equity. For example, the LHO developed citywide indicators for monitoring the social determinants of health according to deciles of deprivation. This provided an important tool to raise community awareness and demand as well as government response on the local level to reduce health inequity. The OSUBH uses a mixed-method approach involving data on social determinants of health and a quality of urban life index, along with primary data on neighborhood perception and systematic social observation. This provides detailed intra-urban information for guiding local action not necessarily in the formal health system alone but also in the health-related systems capable of impacting the health of city residents.[25,26]

The regular health reports based on routine health surveys and infectious diseases surveillance by the UHOs have been used for health planning at local and regional levels. The NUHDSS has provided data and a research platform for monitoring and evaluating the impact of several interventions on health outcomes of slum dwellers, which helps policy-makers identify intervention options for improving the conditions of the urban poor.

ODSP, in Peru, and BUHN, in Bangladesh, are strongly engage in advocacy. The ODSP engages in managing and technically supporting a civil society organization which defends the population's right to health, while the BUHN supports an advocacy platform to ensure the participation of civil society organizations, health workers, activists, and the media on urban health issues.

Refining the Conceptual Framework of a UHO

Refining the preliminary conceptual framework under the assumption of an empiric and more parsimonious model for a UHO involved both logical and intuitive thinking. It involved making judgments about meaning, the relevance and importance of issues, and implicit connections between concepts. It also involved making sure the framework would be useful for guiding the establishment and sustainability of UHOs.[17]

The revised framework is presented in Fig. 2. The labels and contents of the three domains and sub-domains were modified based on the inputs received from the UHOs surveyed. One of the more obvious changes in the framework is its circular logic representing a more holistic concept, in which the domains of the UHOs are interconnected in a dynamic process.

Table 3 shows the UHOs rearranged through the lens of the adjusted framework. As observed, LHO (London), OSUBH (Belo Horizonte), OSP/ASPB (Barcelona), and OSUG (Guatemala City) fulfilled most of the items in each domain.

DISCUSSION

The UHOs in this study were often a product of the particular historical circumstances of their creation. They resulted from a combination of a powerful

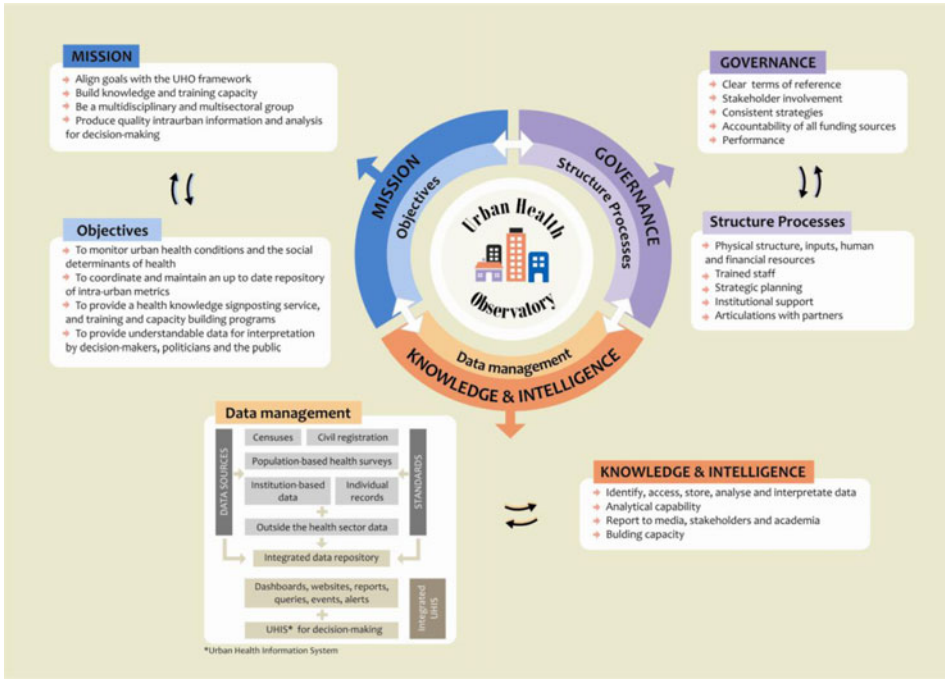

FIGURE 2. Re-defined framework proposed for UHOs.

local health agenda and a political momentum that facilitated the circumstances for creation and for sustainability. The UHOs established in high-income countries were designed and managed in a high-demand environment facilitated by financial and institutional support from the local government. For the rest, one was nested in an academic environment (OSUBH in Belo Horizonte), another was created by demand from civil society (BUHN in Dhaka), and for the others, external funding was essential to the implementation phase.

In general, the UHOs tend to be autonomous and therefore able to develop their own locally sensitive agenda. Although not necessarily repositories for large amounts of data, the majority of UHOs have strong networks for accessing data from multiple sources. In terms of the size of their directly employed staff, UHO teams tend to be small, though highly qualified. However, their networks allow them to extend across a wide area, creating more than the sum of their parts in terms of the information they disseminate, and the influence they have on policy. Partnerships, including with government representatives, staff of local organizations, and members of the public, are important to create realistic expectations and work plans which are responsive to the needs of all involved. This local collaboration is important for strengthening the mechanisms of government.

The support of political leaders is vital to the success of any UHO. We found that in UHOs primarily coordinated by government entities, political support tends to be strong. However, when a UHO has political and financial dependency of such entities, it is vulnerable when political changes occur. In contrast, while a UHO hosted by an academic institution appears to have less support from the government and potentially reduced influences on policy, it might have more political autonomy and be stimulated to diversify its funding base. Ideally speaking, the UHO should have a combination of political and financial support from several sources, national

TABLE 3 UHOs' classification according to the revised framework domains

	Domains	LHO London England	OSUBH Belo Horizonte Brazil	ODSP Lima Peru	NUHDSS Nairobi Kenya	OSP/ASPB Barcelona Spain	BUHN Dhaka Bangladesh	OSUG Guatemala City Guatemala
Mission	Alignment of goals with the UHO framework	✓	✓		✓	✓	✓	✓
	Build knowledge and training capacity in urban-themed studies	✓	✓		✓	✓		✓
	Multidisciplinary and multisectoral	✓	✓			✓	✓	✓
	Produce intra-urban data for decision-making	✓	✓	✓		✓		✓
Governance	Clear responsibilities	✓	✓	✓	✓	✓	✓	✓
	Stakeholder involvement	✓	✓	✓	✓		✓	✓
	Consistent strategies	✓	✓	✓	✓	✓	✓	✓
	Multiple funding sources	✓	✓		✓	✓		✓
Intelligence	Ability to identify data sources	✓	✓	✓	✓	✓		✓
	Repository of data	✓	✓			✓		✓
	Utilization of appropriate analytical tools	✓	✓		✓	✓		✓
Integrating Information and evidence	Ability to influence policy, planning and decision-making	✓	✓	✓	✓	✓	✓	✓
	Ability to influence health or community action	✓	✓	✓	✓	✓	✓	✓
	Ability to research, monitor, and evaluate	✓	✓		✓	✓		✓
	Capacity for media outreach	✓	✓			✓	✓	✓
	Ability to provide urban health capacity building	✓	✓		✓	✓		✓

and international, in order to guarantee financial sustainability, institutional support, and influence on policy. The selected UHOs have been working with urban and health indicators highly connected to local concerns and to their local decision-makers, thus helping to attract the interest and support of government officials and other stakeholders.

Implications for Practice, Policy, and Research

Given the contextual complexities related to the implementation and maintenance of an UHO, we illustrated the context in which the UHO framework would be applied, considering the mechanisms involved with sustainability, as well as the ability to integrate information and evidence for action to improve urban health equity. In this final illustration, we emphasize that sustainability is mediated by the UHOs' ability to strengthen and implement activities and intra-urban health information for the transformation of information and evidence into action (Fig. 3).

The formation of a UHO is a diverse and complex process, which, like most processes, tends to undergo continuous adaptations to the particular historical and political contexts. Despite the flexibility of this process, legitimacy and sustainability are the cornerstones of any successful UHO. It is important to note that democratic, popular, and/or representative governments tend to embrace the mission and objectives of UHOs.

UHO legitimacy begins with the partnerships developed and the intelligence gathered by the UHOs in their production of knowledge. As knowledge for political action is produced, as partnerships with diverse social agents (principally public officials but also key civil society members) are established, and as the data and subsequent interventions are recognized as appropriate, the legitimacy of the

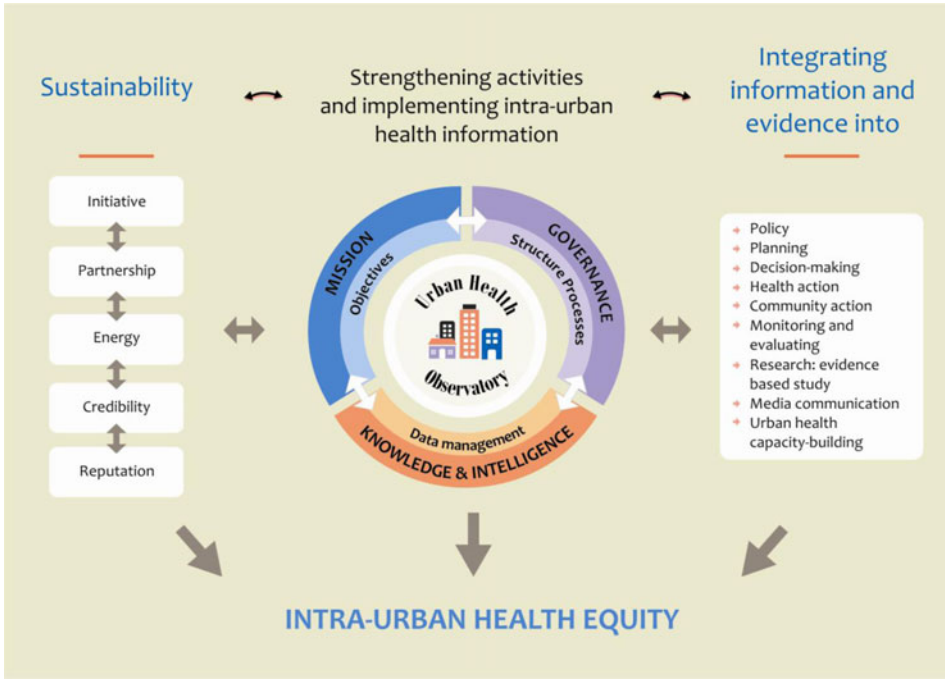

FIGURE 3. The UHO framework and contextual dynamics.

knowledge produced by the UHOs increases, as does partner adherence to the conceptual model and actions of the observatory.

Legitimacy and solid partnerships are the key to sustaining financial and human resources of UHOs. These resources in turn maintain the quality of the intelligence that advances the vision of urban health as dependent on multiple complex determinants, catalyzes society to act in the struggle for enhanced quality of life and reduced inequalities, and leads to the development of healthy and fair public policies. Ultimately these results contribute to the legitimacy and sustainability of not only existing UHOs but future observatories using the proposed framework.

CONCLUSION

Before drawing final conclusions, limitations ought to be acknowledged. The framework was developed to outline the broad properties of UHOs that may be helpful in guiding new establishment, realignment/reorganization, or sustenance of UHOs. However, it is not suggested that the framework is "one size fits all". There is a long-standing debate over defining observatories strictly according to their functions and structures, as they are often a product of the particular historical circumstances of their creation.[24] A diverse yet limited group of organizations were included in the study to obtain empirical data with which to calibrate the a priori framework. As inputs are gathered from more UHOs in the future, further modifications to the framework may be required.

Notwithstanding, this study represents a nascent attempt to understand the roles, functions, and good practices of selected UHOs worldwide, and to translate them into a conceptual framework that may help to support the development of new initiatives; support or expand existing initiatives upon a triple partnership of government, academia, and civil society in order to guarantee sustainability; stimulate networking and capacity building in urban health; provide an approach to managing an array of urban health programs and policies; identify priorities; and solidify commitments to action.

Urban health observatories can provide an essential antidote to the social and public health problems in cities by developing relevant indicators, assembling and analyzing data, and generating information which can offer sound evidence to inform the actions of citizens and decision makers.[18] They can play a vital role in monitoring trends in health determinants, outcomes, and equity; optimizing an intersectoral urban information system; incorporating research on health into urban policies and systems; and providing technical guidance on research and evidence-based policy making. In order to maximize effectiveness and sustainability, however, UHOs should be an integral part of a healthy urban governance system where multiple sectors of government, the civil society, and businesses can participate in taking the right actions to promote health equity.

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