Developing Urban Resilience using Public Health Preparedness: Research Design

Preparedness and Resilience to Address Urban Vulnerabilities (PRUV)

Work Package 5

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Introduction

Urban populations have historically had higher morbidity and mortality rates than in rural areas. These spiked dramatically after the Industrial Revolution, which led to the first health of city-dwellers movement that stimulated the adoption of new public health measures to improve the built environment and sanitation in the European countries and the United States. Together with additional factors such as increasing prosperity, hygiene and especially medical advances, the old health disadvantages of urban areas were reversed; many urban population are now healthier than their rural counterparts [1].

Since the 1970s there has been a fertility decline in all regions of the world and populations around the world are rapidly ageing. The number of people aged 60 years and above will shortly be close to two billion. The low-middle income countries experiencing the most dramatic increase in the proportion of older people which will rise to approximately 80 percent [2]. With people in cities ageing, cities sprawling and becoming poorer, cities and people need to transform in order to maintain and improve health and wellbeing. The emerging health risks are increasing recently.

A new set of public health challenges threatening to reverse previous progress has emerged, which are mostly associated with people’s migration to urban and formed slum areas. Urban populations are exposed to multiple threats to public health deriving from the particularities of such areas: poor living conditions that exacerbate the spread of infectious disease; a prevalence of non-communicable diseases exacerbated by lifestyle and environmental factors (i.e.: smoking, lack of exercise, and high cholesterol intake); accidents on busy roads and in workplaces; insecurity of person and property; as well as poor housing, water and food insecurity, and poor hygiene and sanitation. Insufficient and inadequate access to safe and good quality food and waste disposal are further important determinants of urban health [3]. Those who live in slum areas on inadequate diets also have a reduced resistance to disease because they live in the constant presence of pathogenic micro-organisms [4]. Urban social conditions can both support or undermine public health. Drug abuse, social pressure, high level of social stressors such as social isolation and violence are problematic characteristics of the urban social environment that lead to health damaging behaviour [5, 6]. In urban areas, adolescents commit the largest proportion of violent acts and are most likely to be victims of violence [7]. Similarly, reproductive health among adolescents is a relatively neglected target of public health interventions in urban settings [8]. A further issue critical to health in urban safety is food safety and security, particularly among children from poorer families [9].
A review of the various health determinants that contribute to ill-health shows that since many of these factors are not within the purview of current health practice, they must be addressed if the health and well-being of people in urban areas are to be improved. A series of other problems that were previously overlooked need to be tackled, such as the need for developing public health preparedness and community resilience [10]. This new effort requires more commitment of politicians and community or individual involvement in planning and delivering public health preparedness, better ways of promoting health rather than just treating ill-health with a new emphasis on wellness [11]. Prevention is better than curative action. This ultimately will result in more effective measures to reduce the burden of ill-health in many urban areas.

The *Sendai Framework for Disaster Risk Reduction 2015-2030* recognises that health is a key driver of sustainable community and national development. It recognizes the strong connection between health and disasters and promotes the concept of health resilience throughout. Several of the seven global targets stated in the Sendai Framework are directly related to health in terms of reducing disaster mortality, the number of affected people, disaster damage to critical infrastructure, and disruption of basic services such as health facilities. The Sendai Framework also maintains close coordination with other United Nations landmark agreements relevant to health such as the Sustainable Development Goals [12]. Public health is recognised as a key contributor to human resilience. Increasingly, local public health agencies play an important role in building human resilience. Nonetheless, there has been too great an emphasis on addressing immediate public health needs.

The overall objective of the work package is to model the effectiveness of inter-sectoral public health preparedness interventions for improving the resilience of household, community, and local government to humanitarian crises in urban settings.

Related study questions are as follows:

- What inter-sectoral public health approaches to preparedness and resilience bring together local, municipal and national authorities as well as the private sector and local communities?

- How can the effectiveness of public health preparedness interventions, including those involving the private sector, be modelled?

Against the backdrop of these objectives, this document traces the economic, social and environmental determinants of urban public health. It then proceeds to detail a framework for measuring public health preparedness and resilience and answering the study questions.
Economic, Social and Environmental Determinants of Urban Public Health

Interlinking economic, social and environmental determinants at structural and intermediate levels influence urban living conditions and health. They do so in a rapidly urbanising world. In 2014, 54 percent of the population lived in urban areas and by 2050, 66 per cent of the world’s population is projected to be urban with nearly 90 per cent of the increase concentrated in Asia and Africa [2]. In 2012, the world had 1.6 billion persons aged 12-24, of which 721 million were adolescents aged 12-17 and 850 million were youth aged 18-24. By 2030 sixty percent of the urban population is likely to be under the age of 18 years [13].

From an economic and social perspective, urban areas have become a source of creativity and technology and an engine for economic growth whereby the 750 largest cities worldwide account for 57% of today’s GDP, and this share is projected to rise further [14, 15]. The urban economy has spurred not just economic transformation but also widespread and deep political and cultural change due to the high levels of inequality generated [16]. Thus, while cities provide myriad examples of economic and social progress, there are also many attendant social problems, including social exclusion through unemployment and poverty, poor governance and the associated increased risk of violence. It is understood that without employment and its associated income there is little possibility for households to invest and improve their conditions. Economic growth has not benefited all urban residents equally, and those left behind are burdened by poverty and exposed to a range of health hazards [5].

Such health hazards are also exacerbated by factors deriving from the broader built and natural environment. The management of this human-natural interface has a significant effect on the health of urban dwellers. Both natural and man-made environments can protect urban dwellers from natural disasters. They are assets for protecting humans in the urban setting. Thus, the conservation of the natural environment is as important as building urban infrastructure because it may protect urban dwellers from disasters of various kinds. By integrating both conservation and man-made infrastructures, physical vulnerability can be reduced. Through sustainable consumption and waste disposal behaviours, urban dwellers can boost their health resources over the long term. Whether through lack of awareness or adequate infrastructure, it can be difficult for urban dwellers to consume and dispose of waste in an ecologically friendly manner. Particularly in informal settlements, household waste tends to be disposed of directly on the land and water surface, which in turn degrades the environment and threatens livelihood conditions. To boost health outcomes, city planners should not only provide for adequate health care facilities, but also promote a healthy
environment, through measures that ensure clean water, adequate sanitation and nutrition, and safe transport.

**Public Health Preparedness and Resilience in Urban Settings**

As cities continue to develop and struggle with many challenges, urban resilience has become an important concept. Although the concept has been defined in different ways by different epistemic communities, public health is considered a strong component within the framework for urban resilience adopted by the 100 Resilient Cities Network. Within the PRUV project resilience is understood as:

“a measure of the ability of households, communities and societies to both address their vulnerabilities by improving their capacities to absorb and adapt to existing and anticipated shocks and stresses while strengthening their capacities to transform/overcome to a level where these stresses are no longer relevant. Resilience is to be considered a concept that is “co-created” by all actors in the research process, both researchers and participants.”

Resilience can be measured at the level of the individual, community, city, region or at a national or international scale. The questions is not only what is resilience but how can we built it [17, 18]. Mental, social, and physical characteristics all play an important role in maintaining high individual resilience [19]. Resilience beyond the individual level is termed “collective resilience.” As detailed in Figure 1, protective factors that contribute to the development of resilience among children, adolescents and young adults include active relationships with their peers, with networks and state structures that allow for the capitalisation of dormant and existing capacity.

![Figure 1: Conceptual General Model: Personal-Environment Dynamic](image-url)
Such an approach can serve to prevent adolescent pregnancy and ameliorate the disadvantages of adolescent pregnancy. To date, international studies have established that adolescent pregnancy brings many disadvantages to the girl’s health, mental and psychological wellbeing, economic and career opportunities, poverty and future life prospects [8]. Teens who become parents are less likely to be knowledgeable regarding child development, have inappropriate expectations for their children, demonstrate less empathy compared with older mothers [20], are more likely to engage in parenting behaviours that are potentially abusive or neglectful [21], and higher rates of child maltreatment [22]. However, young mothers who benefit from appropriate services, even in the context of adversity, will thrive and demonstrate competence as parents and be resilient [23]. The resilient adolescent mother, if equipped with cognitive and behavioural strategies and positive social influences is more likely to remain abstinent and thus prevent a repeat pregnancy [24]. Such strategies in a range of fields from food safety to waste disposal can bring about positive change, boosting protective factors to ensure that a community can transform itself over time in the face of various challenges. This is how community resilience is understood [25].

However, higher societal levels cannot be neglected in the promotion of public health in urban settings. Public health policy in the form of laws, regulations, and guidelines, has a profound effect on health status. A public health emergency preparedness system is conceptualised whereby command and control is clearly designated and workloads pre-defined.
The development of policies and plans that support individual and community health is considered one of the ten Essential Public Health Services [26]. Policy has a considerable impact on daily lives and public health indicators and many public health programmes now being implemented focus on policy change [27]. As detailed in figures 3 and 4, public health legal preparedness relies on legal and policy development that ensure that the public health system is prepared for a disaster.

![Diagram](image1)

**Figure 3: Adapted by the authors from PAHO (2000) and Tekeli-Yeşil (2006)**

Various health professionals, including public health and medical professionals should be familiar with public health legal issues relevant to disaster mitigation, preparedness, response, and recovery efforts. Recognizing these legal issues allows health professionals to plan for and protect themselves, their employers, their patients, and the community.

![Diagram](image2)

**Figure 4: Adapted by the author from Béné (2013)**
They should also be able to apply knowledge of legal concepts in a disaster [28, 29]. The competencies can be applied to a wide range of health professionals who are expected to perform at different levels according to experience, professional role, level of education, or job function. Competencies strongly reflect lessons learned following the health system response to specific disaster. It must be understood that preparedness is a process, and that these competencies must be reviewed continually and refined over time.

Using the framework developed by C Béné [30] public health preparedness and resilience is conceptualised in Figure 5. At an individual level, resilience is captured through coping strategies (using morbidity, nutritional status, education and employment as examples of indicators). At the household level, resilience is conceptualised in terms of changes in income (which can be represented by expenditure) and assets induced by the impact of the shock (e.g. losses) and any subsequent ex-post strategies adopted to ensure the recovery including coping strategies (if any). Scaling up the resilience measurement to the community level would be achieved by considering the social conditions and/or investments made in infrastructure at the community level. Also relevant at this level is risk communication and social changes to improve public health.

Finally, at the system (or eco-system) level, the ecological condition (measured in changes in relevant ecosystem services’ indicators) is taken into consideration. It is induced by the household’s and/or the community’s impact on the resources/ecosystem as a result of their coping strategies and/or adaptation/ transformation strategies, and the ex-ante or ex-post costs and/or investments made at the system level in relation to infrastructure, risk communication and public health legal and policy preparedness.

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**Figure 1: Public health preparedness and resilience intervention model (adapted from Béné 2013)**

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Surveillance

Data collection frequency

Resilience at system level

- Policy changes on prevention/mitigation
- Intersectoral collaboration on RH and nutrition
- Risk communication at population based
- Health system strengthening (i.e. UHC)
- Infrastructure changes at system level

Resilience at community level

- Social changes to improve public health
- Risk communication at community level
- Availability of health facility at community level
- Environmental and sanitation improvement
- Food security and safety measures

Resilience at household level

- Health insurance enrollment
- Income/Assets changes
- Food security and safety at HH
- Morbidity related to child neglect
- Reproductive health status related to sexual violence
- Nutritional status

Notes: UHC Universal health coverage
HH Household

Modified from Béné (2016)
The framework will be applied to the baseline data collected at the household level in each of the test-bed cities. Analysis of this data will be complemented by the use of secondary data obtained from health institutions, the relevant statistical offices, the population itself, as well as the environment. The results of the analysis will be presented in tables and charts as well as in narrative.

Output of the Work Package

The outputs of this work package will be a compilation or package of a core set of strategies to achieve and sustain substantial reductions in a specific risk factor or outcome relating to urban public health, i.e.: child abuse, sexual violence and increase food safety. Such a package will help communities and government prioritize prevention activities based on the best available evidence.

The proposed package has three components. The first component is the strategy or the preventive direction or actions to achieve the goal of preventing risk, i.e.: child abuse and neglect and sexual violence towards girls and adolescents. The second component is the approach, which includes the specific ways to advance the strategy. This can be accomplished through policies, programs, and practices. The third component is the evidence for each of the approaches in preventing humanitarian crisis, i.e.: prevention of child abuse, neglect and sexual violence or its associated risk factors for food safety. The following stages will be followed in order to complete these outputs.

Stage I: Law and policy review of public health preparedness and resilience in urban settings

A fundamental challenge for national, provincial and local public health agencies is how to use the law to prepare for and respond to public health emergencies associated with urbanization. This research stage will involve an empirical study designed to assess and evaluate how the law shapes the public health system’s preparedness activities and its response to a wide range of public health threats in urban settings. Despite the critical importance of law to public health, there is almost no systematic examination of how law shapes the public health system or how practitioners involved in public health preparedness understand the legal requirements, interpret their constraints, and apply the law in planning for public health emergencies at different governance levels. From a policy perspective, it is important to identify and understand the factors responsible for how any gaps in practitioners’ knowledge about legal requirements affect the public health system’s response capabilities.
Stage II: Health risk assessment in urban areas

A standard epidemiology of risk assessment of diseases will be applied in urban settings, i.e. risks of child abuse, neglect and sexual violence or its associated risk factors for food safety. Epidemiology is a branch of public health that evaluates relationships between exposures and adverse outcomes within specific populations, including urban populations. One of the critical areas of health risk assessment in urban areas is the assessment and evaluation of potential causal associations between exposures of interest and identified adverse outcomes [31]. We rely on a variety of tools to assess this relationship, and epidemiology has very useful applications in the risk assessment process. For example, it will involve a case-control study and risks that will be presented on Odds Ratios. The integrative use of epidemiology in the risk assessment process not only assists in identifying and evaluating hazards, but it can also be used to better characterize situations and conditions for reducing, eliminating or mitigating the burden of disease through controlling hazardous exposures. Epidemiology (in conjunction with risk assessment) can play an integral role in the formulation of health policy and regulation. A subsequent review will address factors that can reduce risks.

Stage III: Modelling inter-sectoral collaboration through local participation

This stage will involve the modelling of inter-sectoral collaboration for public health preparedness in reducing risk factors for urban population. In addition to the individual level, it will also allow for improved capacity and capability of local governments and the private sector in this regard. It will furthermore facilitate improved learning processes through shared knowledge and experiences of different stakeholders using more effective models of risk communication.

Public health preparedness will be strengthened through the strengthening of health systems, by meeting the needs of vulnerable populations, and by promoting organizational competence, social connectedness, and psychological health. Community resilience encourages actions that builds preparedness, promote strong day-to-day systems, and address the underlying social determinants of health.
References


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