Chapter 13
The Public Health System Resilience Addendum: A Tool to Help Governments Manage Biological Hazards Better and Prepare for an Uncertain Future

Sanjaya Bhatia

Abstract This article explains how the Disaster Resilience Scorecard, and its Public Health Addendum is an easy to use tool for governments in managing the COVID-19 crisis and ensuring effective recovery and build back better. The underpinning concept is that pandemic management will be enhanced if cities are resilient. In this model, cities need to complete the Disaster Resilience Scorecard for cities and the public health addendum, and then develop and implement action plans. This multisectoral approach could be short-cut in the COVID-19 pandemic by rapidly completing the public health system Scorecard to develop, guide, and implement an action plan for sustainably managing response and recovery.

Keywords Multisectoral approach · Pandemic · Preparedness · COVID-19 · Management

13.1 Background

The “Public Health System Resilience Addendum” of the Disaster Resilience Scorecard for Cities aims to help local governments identify areas that require strengthening in relation to public health issues that are not adequately emphasized in the original version of the Disaster Resilience Scorecard for Cities (Fig. 13.1). This Addendum was designed by UNDRR, with the support of the World Health Organization (WHO) and other partners. The Addendum is better used in conjunction with the WHO’s Health Emergency and Disaster Risk Management (Health EDRM) Framework.¹

¹View the official website of WHO for getting the detailed information on Health EDRM framework: https://www.who.int/hac/techguidance/preparedness/factsheets/en/.

S. Bhatia (✉)
Global Education and Training Institute (GETI), Incheon, South Korea
e-mail: bhatia1@un.org

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**13.1.1 Making Cities Resilient Campaign 2010–2020**

The Making Cities Resilient Campaign (MCR), launched in 2010, was very successful in raising awareness of disaster risk reduction (DRR) and resilience among cities and local governments globally. The work of the Campaign began in 2010, midway through the implementation of the Hyogo Framework for Action (2005–2015). Since 2015, it has been key for delivering Target E of the Sendai Framework for Disaster Risk Reduction 2015–2030 (Sendai Framework),\(^3\) guided by the Ten Essentials for Making Cities Resilient (the Ten Essentials).\(^4\) More than 4350 cities signed up to the Campaign, declaring a determination to build resilience.

Review research conducted during the Campaign indicates that cities that have joined the MCR campaign have made significant progress in reducing disaster risk than cities that have not gone through a similar process of disaster risk awareness.

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\(^2\) Visit UNDRR website: [https://www.unisdr.org/campaign/resilientcities/toolkit/article/public-health-system-resilience-scorecard.](https://www.unisdr.org/campaign/resilientcities/toolkit/article/public-health-system-resilience-scorecard)

\(^3\) Visit: [https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030.](https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030)

\(^4\) Visit the UNDRR website: [https://www.unisdr.org/campaign/resilientcities/toolkit/article/the-ten-essentials-for-making-cities-resilient.](https://www.unisdr.org/campaign/resilientcities/toolkit/article/the-ten-essentials-for-making-cities-resilient)
13.1.2 Changing Risk in a Changing World

Over time the nature of risk has changed. With the increasing complexity of the human, economic and political systems (including in the international financial system, communications, trade, and supply chains, and urbanization) and natural systems (marine, land, and air), risk has become increasingly systemic, which means risk is reflected in all sectors, in all walks of life and governance. It is impossible not to adopt a holistic approach to risk reduction.

This means while risk may start out one way, because of its dynamic nature, it may often combine with or cascade into another risk. An example is how Think of climate change is now contributing to environmental degradation and biodiversity loss, causing losses in crop yields and food production. Another example is where an extreme event creates an unanticipated technological risk, causing the partial or full disabling of a national power grid with cascading impacts on business, critical infrastructure, and civil security, and disruption of basic services. The nuclear disaster at Fukushima is an example where the tsunami caused a power outage, which caused the nuclear meltdown, which in turn caused evacuations and contamination.

We can no longer afford a hazard-by-hazard risk reduction approach. This is particularly important at the city level. Risk cannot be departmentalized or made the responsibility of just one public service provider or responder. Local planning bodies with representation must be involved that assume an all-of-service provider approach. Moreover, cities must plan not just to reduce risk but to invest in resilience-building: allowing systems, services, and people to respond to the crisis, cope with shocks and stresses and rebound.

13.2 The Tools

13.2.1 Disaster Resilience Scorecard for Cities

The Making Cities Resilient Campaign introduced a number of tools for cities and local governments. The key tool is the Disaster Resilience Scorecard for Cities (“the Scorecard”) which is freely downloadable at the UNDRR website.⁵

The Sendai Framework for DRR 2015–2030 identifies the role of the local governments in reducing disaster risks, including the risks from biological hazards and health emergencies, such as the current pandemic. The Making Cities Resilient Campaign has simplified the message from the Sendai Framework by creating a Ten Essentials, breaking down the message from the Sendai framework into ten checklist points, which, when followed by local governments, can help them achieve the objectives of the Sendai Framework. These ten points are divided into issues

⁵Visit: https://www.unisdr.org/campaign/resilientcities/toolkit/article/disaster-resilience-scorecard-for-cities.
of governance, planning, and response. The ten essentials are relatively holistic and treat the local government as a “system of systems” (technological, social, economic), encouraging interconnectedness among the different sectors. However, public health system issues do not emerge clearly from this structure.

13.2.2 Public Health Addendum

A limitation of the Scorecard is that public health issues are not adequately emphasized. While the more obvious health factors such as hospital services, capacities, and structural and non-structural safety are covered in the Scorecard (under Essential 8), other disaster-related public health issues have not been well addressed. The Public Health Addendum was developed by partners of the Campaign, and UNDRR, with the support of the World Health Organization (WHO) to mitigate this gap. The Addendum should be used in conjunction with the WHO’s Health Emergency and Disaster Risk Management (Health EDRM) Framework.

The Public Health Addendum is available free in English, Arabic, and Spanish. The term “public health issues” is used to cover the generalized impacts of disasters on the health systems of local governments. These may include:

- Events (including, disease outbreaks drought, earthquake, flood, tornado, cyclone, famine, wild-fires, and other disasters);
- Immediate consequences of a disaster (including mass casualties and psychosocial impacts);
- Secondary consequences of disasters (including malnutrition, disruption to livelihoods and vaccination programs, psychological impacts and more; all these issues have been witnessed in the COVID-19 emergency);
- Disruptions in health care services for persons with chronic health issues (for example, access to medications for chronic conditions such as HIV, diabetes, and cancer treatment);
- Consideration of the vulnerable populations (for example, the extremely poor, infants, people with disabilities, senior citizens, women).

A broader description of the health system includes people, institutions, and resources who are in the health and other sectors. The responsibility to handle a health emergency is not that of the health department alone, nor that of the civil defense by itself. It is the responsibility of all departments, as the impact is on all. The City Scorecard and the Addendum promote a system of the systems approach to resilience.
13.3 Structure of the Public Health System Resilience Assessment

13.3.1 The Structure

The Public Health Addendum uses the same “Ten Essentials” structure as the Scorecard—in the context of health emergencies and focuses on the wider issues of management and recovery. It is not a medical or epidemiological tool and addresses the “non-medical” issues of a medical emergency including—hospitals, quarantine facilities; nursing homes, health clinics, doctors’ offices; mental health facilities; laboratory and testing facilities; public sector health departments; water and sanitation; food distribution mechanisms; pharmaceutical and medical supply distribution; community information and alert systems; technical skills, staff, and equipment required; and other aspects of a fully functioning public health system. In this manner the tool covers both the hardware and the software (human resources) required to handle and recover from a health emergency. The Public Health Scorecard links hospitals, communities, schools, community centers, non-profit organizations, law enforcement, faith institutions, and elected officials. Some examples of what the Scorecard covers include:

1. Organization & Governance
   - Are public health and medical professionals involved in disaster planning and management?
   - Are other professionals (e.g., sanitation, water, energy, comms) involved in public health planning?

2. Risk understanding
   - Inclusion of a pandemic scenario in risk planning
   - Inclusion of pandemics (and pre-existing chronic health stresses—malaria, malnutrition) as a complexity factor, alongside “disasters as usual”—floods, earthquakes, fire, etc.

3. Financial architecture
   - Adequacy and protection of funding
   - Resilience “dividends”—other benefits that arise from resilience spending

4. Land use and building codes
   - Code and zoning compliance of key facilities

6“Ten Essentials for Making Cities Resilient” Scorecard integrates the public health with the governance (i.e., Essential 1), disaster scenarios (i.e., Essential 2), finances (i.e., Essential 3), land use/building codes (i.e., Essential 4), management of ecosystem services (i.e., Essential 5), institutional capacity (i.e., Essential 6), societal capacity (i.e., Essential 7), infrastructure resilience (i.e., Essential 8), disaster response (i.e., Essential 9), recovery/building back better (i.e., Essential 10).
5. Ecosystem services
   - Protection of ecosystem services with health benefits—natural water filtration, tree cover, recreation space

6. Capacity
   - Availability of public health skills—medical and other
   - Availability and sharing of required data with (that is, to and from) other stakeholders

7. Social capacity
   - Community engagement processes and effectiveness
   - Community trust of information provided
   - Community mental health and mental stress management

8. Infrastructure
   - Resilience of key health infrastructures
   - Resilience of other relevant infrastructures—water, power, communications, sanitation, trash collection
   - Surge capacity
   - Continuity of care facilities for those already sick

9. Disaster response
   - Early warning systems
   - Integration with emergency management
   - Education, rehearsals, drills, public health supplies

10. Recovery planning
   - Offsetting long run impacts on health
   - Learning and improving

   In total, there are 23 questions/indicators, each with a score of 0–5, where 5 is best practice (see Fig. 13.2 as an example).

### 13.3.2 Required Data

Data required to complete the Addendum will include:

- Public health system capacity, stakeholders, planning and procedural documentation;
- Emergency management planning and procedural documentation;
- Public health infrastructure (see Essential 8);
- Data on healthcare outcomes of previous disasters, if available;
- Demographic data, including for vulnerable populations;
Community and professional feedback on system capacity and effectiveness.

13.3.3 Methodology to Use the Addendum

The user needs to understand that resilience is a long-term objective. It cannot be achieved in a short time. Depending on the objectives, the resilience functions may play out over a long time, e.g., strengthening of health infrastructure and establishing surge capacities of doctors and nurses may take years, while emergency planning and simulations for a pandemic may be conducted on an annual basis. We need to keep this perspective while using a tool such as the Health Scorecard—actions proposed in an action plan need to be considered on a timeline as short, medium, and long term for the actions to be realistic.

The user also needs to understand that the Health Scorecard Addendum is not about the health sector alone. As the current pandemic demonstrates, all aspects of socio-economic development are impacted by the pandemic. The consultations must include other relevant sectors and stakeholders to use the Scorecard effectively. Without a multi-stakeholder approach, the resulting action plan will be left lacking ownership and not be implemented. Apart from sectors and stakeholders within the local government, the national government will have a key role in providing data and support. In the current situation, national governments are providing guidance, financial support, surge capacity, and data, which helps the local governments in the response.

Another important consideration is that hazards do not act alone, and the impact of a hazard may become amplified due to underlying stresses, e.g., a community already impacted with poverty will likely be more impacted by a pandemic, as their livelihoods opportunities are reduced, as has been seen in the case of migrant labor.
Chronic economic, societal, or environmental stresses can worsen the impact of earthquakes, floods, and pandemics, and the hazards can worsen chronic stresses. This relationship between chronic stresses and hazards will continue in the recovery stage and delay recovery.

Economic stress (poverty) leads to a higher risk of contracting diseases such as COVID-19 through population density, poor sanitation, and underlying ill-health, and the pandemic can cause enforced closures on local businesses, so causing social and economic stress through lack of facilities and unemployment.

### 13.3.4 The Workshop

The Scorecard is to be used in a workshop-based approach intended to be used to:

- Build consensus and working relationships between the different sectors and departments in the government, as well as with other stakeholders who may be external to the government;
- Share results from a detailed study with the sectors and stakeholders;
- Explore specific essentials for further detailed assessment if required, and to develop a draft action plan of activities the government should undertake to reduce the gaps as identified by the use of the Scorecard.

The workshop methodology includes a number of steps, including:

1. **Determine the objectives:** All should be clear what the objectives of the exercise are—to develop an action plan and strategy to reinforce and strengthen the public health systems in the government. This can also be an opportunity to provide an orientation, and resources, on terminology, the methodology to be adopted, etc. to ensure all participants in the exercise and the workshops are on the same page and level of understanding and competency.

2. **Identify the stakeholders:** The list of stakeholders is not the usual health department personnel alone, as economic and planning, finance, public transport, utilities, etc. all play a role and are impacted by the biological hazards, including pandemic. External stakeholders such as civil society organizations and their networks, private sector service providers, business councils and chambers of commerce, etc. need to be involved to ensure the plan and strategy developed is relevant, practical, and effective. The COVID-19 situation demonstrates the role of the transport sector, supply chains, commerce, and economic and financial planning.

3. **Carry out initial research:** To determine and answer questions such as—what are pre-existing resources that could be used, what data is required, what are the sources of data, etc. This step would require a study of the Scorecard, to determine who should be invited and contacted, what data is required, and what are the potential source of the required data.
4. Conduct the workshop: The Scorecard exercise includes going through each question, discussing the options for the answer, and arriving at the most suitable score via consensus. Each session can be designed around this methodology. The workshop can be conducted in a number of short sessions virtually, in place of face to face. Each session could be 2–3 hours long, perhaps covering one or two essentials at a time.

5. The first step is the scoring. Once the scores are agreed upon, the participants can decide on whether they want to develop an action plan for all the questions and gaps or only for the questions which scored below a certain criterion, e.g., the score of 3 or below. Such a prioritization ensures the weakest areas are strengthened first.

6. The action plan must have actions to address the gap identified through the scoring, the time frame, and the roles and responsibilities— who will lead, who will support. Normally the plan should be valid for a period of 3–5 years.

7. Implement: Once the action plan is developed and finalized, it should be endorsed by an appropriate level of government to ensure its legal status. This could be the Mayor’s office or the city council. Such endorsement guarantees the strategy and action plan will become part of the documents considered when the development plan of the government is budgeted and funded. Endorsement ensures continuity even with a change in political leadership.

13.4 Conclusion

The benefits of completing the Scorecard extend far beyond the development of a plan to manage biological hazards and to report. The conversations and dialogue the process enables, and the silos it can break, are more important than the scores. Often, informal relationships are developed between the departments, which can greatly improve coordination during emergencies. The Scorecard encourages inter-sectoral discussions, which means departments that may not regularly exchange information are empowered to discuss planning and implementation issues with each other. This adds to the resilience of the city, especially if we remember that resilience is an issue of governance. When completed in a collaborative and consultative mechanism, local governments can:

- Understand how resilient their public health systems are
- Create and increase awareness and identify the remaining challenges
- Enable dialogue, interactions, and breaking of silos between key city stakeholders, bringing together those who may otherwise not collaborate
- Enable discussions to decide the priorities for investment and action promote and enable the development of a resilience strategy or an action plan that integrates public health issues with other issues of resilience
- Promote the development of projects that enhance the resilience of the public health systems of the local government and contribute to the overall resilience.
This tool can be used by local governments, cities as well as national governments, as the indicators are sufficiently generic for all levels of administration. The use of this tool can help governments prepare for biological hazards and health emergencies, including pandemics in the future. Being prepared is better than getting caught unaware, as happened during this pandemic.

**Key Resources**

A Handbook for Local Government Leaders [2017 Edition], UNDRR. https://www.unisdr.org/campaign/resilientcities/toolkit/article/a-handbook-for-local-government-leaders-2017-edition

Disaster Risk Reduction Terminology, UNDRR. http://www.preventionweb.net/english/professional/terminology/

Health Emergency and Disaster Risk Management Framework, WHO. https://www.who.int/hac/techguidance/preparedness/health-emergency-and-disaster-risk-management-framework-eng.pdf?ua=1

Making Cities Resilient Campaign Website, UNDRR. https://www.unisdr.org/campaign/resilientcities/

Sendai Framework for Disaster Risk Reduction 2015–2030, UN. http://www.preventionweb.net/drr-framework/sendai-framework

The Global Assessment Report & Global Risk Atlas, UNDRR. http://www.preventionweb.net/gar/

The Ten Essentials for Making Cities Resilience, UNDRR. https://www.unisdr.org/campaign/resilientcities/toolkit/article/the-ten-essentials-for-making-cities-resilient

Understanding Disaster Risk—based upon GARs 2009, 2011, 2013, 2015, UNISDR—including risk models, viewers, and data, UNDRR. http://www.preventionweb.net/risk

**Sanjaya Bhatia** is the Head of the UNDRR (United Nations Office for Disaster Risk Reduction) Global Education and Training Institute (GETI) and the Office for Northeast Asia (ONEA) in Incheon, Republic of Korea. He is responsible for the training of over 8000 government officials globally. His areas of focus are disaster risk reduction, disaster recovery, safe schools and hospitals, and disaster risk management for local governments. He holds a degree in law and a master’s degree in Public Administration from New York University. He has authored a number of publications. He is a certified trainer for the Incident Command System (Emergency Management) and functioned as a trainer and resource person for the Government of India and the United Nations. He has worked with the Government of India (Indian Administrative Service), the World Bank, and the United Nations in the field of disaster risk reduction and climate change adaptation for over 30 years.