Strategies to support the COVID-19 response in LMICs

A virtual seminar series
Capacity Building for Management of Health Emergencies in Low- and Middle-Income Countries

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Overview

• Context
• Costs of Capacity Building for Health Emergencies & Costs of Inaction
• Capacity to Fulfill International Health Regulations
• Capacity Building for Emergency Operations Centers
• Future Challenges for Health Emergency and Disaster Risk Management
Context
Global Health Origins: The Centrality of Epidemics

Quarantine of ships coming to port

• Protect local populations from cholera and plague
  • First introduced in Dubrovnik (1377) on Croatia’s Dalmatian Coast
  • Lazaretto, first plague hospital, opened in 1423 on island of Santa Maria di Nazareth (Venice)

Female quarantine during the cholera epidemic of 1865-1866.

History of Epidemics
Global Health Origins: Early Attempts at International Cooperation

International Sanitary Conferences

1. Paris (1851)
2. Paris (1859)
3. Constantinople (1866) – Miasma theory adopted
4. Vienna (1874)
5. Washington (1881) – Yellow fever vector
6. Rome (1885) – Koch’s “discovery” of *Vibrio cholerae*

7. Venice (1892) – First International Sanitary Convention

8. Dresden (1893)
9. Paris (1894)
10. Venice (1897)

    Washington (1902) (Americas only – founding of PAHO)

11-14. Paris (1903, 1911-12, 1926, 1938)

1948: WHO Founded
1951: International Sanitary Regulations
2005: Current IHR Revision
Global Health Origins: Early Attempts at International Action

• International Sanitary Conference in 1866 (during 5\textsuperscript{th} global cholera pandemic)
  • Argued over whether to cordon off India because of Hindu pilgrimages (e.g. Puri – Jagannatha) and Muslim pilgrimages to Mecca
  • Pilgrimages were “the most powerful of all the causes which conduce to the development and propagation of cholera epidemics.”

• “The squalid pilgrim army of Jagannath with its rags and hair and skin freighted with vermin and impregnated with infection, may in any year \textit{slay thousands of the most talented and beautiful of our age in Vienna, London, or Washington.”} (WW Hunter, Indian Civil Service, History of Orissa - 1872)
Defining Capacity Development

Capacity development is the process by which individuals, groups, organizations, and societies increase their abilities to:

• **Perform core functions**, solve problems, and define and achieve objectives

• Understand and deal with their development needs in a broad context and in a **sustainable manner**

*Source: Organisation for Economic Co-operation and Development (OECD).*
Evolution of Capacity Building Approaches in Developing Countries

The Diagnosis – Developing Countries:

- Need Money
- Should model themselves after Developed Countries
- Should partner with Developed Countries
- Should own, design, direct, implement and sustain their own processes

The Practice:

- Development Aid provides funding
- Technical Assistance experts operate projects in other countries
- Technical Cooperation on training and knowledge sharing
- Capacity Development & Utilization by strengthening local capabilities

Shortages in Human Resources for Health Is Greatest in LMICs

Estimates of health worker needs-based shortages, by WHO region, 2013

Needs-based shortages (in millions)*
- South-East Asia Region (6.9)
- Eastern Mediterranean Region (1.7)
- African Region (4.2)
- Region of the Americas (0.8)
- Western Pacific Region (3.7)
- European Region (0.1)

* Needs-based shortage is estimated as the difference between need and supply by country for those with current supply below the SDG threshold.

Source: WHO
Common Health Workforce Issues in LMICs

• **Distribution:** Overstaffing in cities, under-placement in rural areas
• **Skill mix:** Reliance on limited numbers of highly skilled workers, inadequately trained and supported
• **Low pay and incentives, especially in the public sector**
• **Poor supportive supervision and promotion opportunities**
• **Difficult recruitment, low staff retention, and high migration**
• **Weak accountability and performance management**
• **Low motivation**
• **Poor data and HR information systems**
Community Health Workers: First Responders & The Backbone of Primary Health Care

Source: Perry HB, Zullinger R (2012). How effective are community health workers?
Common Challenges for Combatting COVID-19 in LMICs

• **Weak surveillance and response systems.** Countries may have difficulty in early detection and response to new cases, or setting up Incident Management Systems.

• **Significant at-risk populations.** Many people working in informal sector, depend on daily earnings. Remote populations with poor access to services are vulnerable.

• **Multi-generational housing in crowded conditions.** Increased transmission and severity of infection among those most at risk.

• **Limited health care capacity.** Healthcare worker shortages are common, and insufficient protective equipment puts them at risk. Wuhan required 2.6 ICU beds per 10,000 adults. Some LMICs have 1 ICU bed per 1,000,000 adults.

• **Other health conditions.** Consequence of overwhelmed health system is loss of services for pre-existing diseases and other preventable conditions, as well as difficulty managing pregnancy and childbirth.

• **Low trust in public institutions.** Willingness to comply with government orders or use public services.
Past Lessons: What turned around the Ebola epidemic in Liberia?

Credit to United Nations Mission Ebola Emergency Response, initiated October 1, 2014, for ETU beds, patient isolation, and safe burial

Critical role for “building and staffing Ebola treatment units”
Which Parts of the Health System Stopped the Ebola Epidemic?

Liberia Ebola Reproduction Numbers and Interventions

What turned around the Ebola epidemic in Liberia?

• Engaged communities – own & participate rather than deny & resist
• Strong national and local leadership
  • Re-organization of Incident Management System
  • >90% of workforce was local
• Behavior change – Which behaviors mattered most?
  • Isolating sick cases at home and at clinics
  • General hygiene (hand washing and no touching)
  • Safer care for ill at home (and hygiene after they leave home)
  • Identifying cases and deaths (community dependent)
• Safe burial
  • Burial teams & safe funerals
Need for Community Engagement in Epidemic Surveillance & Response

Riot during Ebola lockdown in West Point, Monrovia, Liberia

Ebola public health worker in community

Picture Credits: John Moore, Getty Images (Left); Pascal Guyot, AFP (Right).
Communities and Public Health Surveillance: What to Do

- Engage communities in design of surveillance system, at beginning and throughout outbreaks.
- Include community members in committees and other activities to plan, prepare, and implement critical response efforts.
- Listen to and respect the opinions of people living in affected communities.
- Identify those who are excluded from communities – often they are most at risk.
- Focus on what can be done.
- Understand issues of trust in community & learn from them – communities provide trusted messages and resources.
- Build technical capacities, and support community institutions.
Costs of Capacity Building for Health Emergencies & Costs of Inaction
Common Goods for Health: Beyond Clinics and Health Insurance

Population-based functions or interventions to improve human life and promote economic progress that *only* collective arrangements can finance because they are public goods or have large social externalities:

<table>
<thead>
<tr>
<th>1. Policy and coordination</th>
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</thead>
<tbody>
<tr>
<td>2. Taxes and subsidies</td>
</tr>
<tr>
<td>3. Regulation and legislation</td>
</tr>
<tr>
<td>4. Information, analysis and research</td>
</tr>
<tr>
<td>5. Communications and persuasion</td>
</tr>
<tr>
<td>6. Population services</td>
</tr>
</tbody>
</table>

We Pay Enormous Costs for Health Emergencies and Disasters

• >$500 Billion per year globally
  • Direct costs from large disasters (~$170 Billion)
  • Indirect social costs of large disasters (> $170 Billion)
  • Smaller disasters (> $150 Billion)
  • Pandemic diseases
    • $30 Billion per year (World Bank 2013)
    • $60 Billion per year (National Research Council 2016)
    • $500 Billion (0.6% of global income) per year (Fan et al. 2018)
  • Other epidemics - ??

## Costs of Major Epidemics Since 2000

<table>
<thead>
<tr>
<th>Country</th>
<th>Disease</th>
<th>Epidemic Year</th>
<th>Direct Economic Cost</th>
<th>Indirect Economic Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taiwan</td>
<td>Dengue</td>
<td>2002, 2014</td>
<td>US$ 2.5 Million</td>
<td>US$ 6.4 Million</td>
</tr>
<tr>
<td>Tanzania</td>
<td>Rift Valley Fever</td>
<td>2006-7</td>
<td>US$ 10.3 Million</td>
<td>NA</td>
</tr>
<tr>
<td>Colombia</td>
<td>Dengue</td>
<td>2010-12</td>
<td>US$ 260 Million</td>
<td>US$ 70 Million</td>
</tr>
<tr>
<td>USA (Louisiana)</td>
<td>West Nile Virus</td>
<td>2002</td>
<td>US$ 13.6 Million</td>
<td>US$ 6.6 Million</td>
</tr>
<tr>
<td>Guinea, Liberia, Sierra Leone</td>
<td>Ebola</td>
<td>2014-16</td>
<td>US$ 15.7 Billion</td>
<td>US$ 37.2 Billion</td>
</tr>
<tr>
<td>China (Beijing)</td>
<td>SARS (SARS-CoV)</td>
<td>2002-3</td>
<td>US$ 4.8 Million</td>
<td>US$ 1.4 Billion</td>
</tr>
<tr>
<td>Australia and New Zealand</td>
<td>H1N1 (Swine) flu</td>
<td>2009</td>
<td>AUS$ 65 Million</td>
<td>NA</td>
</tr>
<tr>
<td>England</td>
<td>H1N1 (Swine) flu</td>
<td>2009-11</td>
<td>GBP 45.3 Million</td>
<td>NA</td>
</tr>
<tr>
<td>Thailand</td>
<td>H5N1 (Avian) flu</td>
<td>2004</td>
<td>US$ 132.5 Million</td>
<td>US$ 631 Million</td>
</tr>
<tr>
<td>South Korea</td>
<td>MERS-CoV</td>
<td>2015</td>
<td>NA</td>
<td>US$ 10 Billion</td>
</tr>
</tbody>
</table>
Cost of Recent Pandemics and Epidemics

Estimated Cost of West African Ebola Outbreak

The cost of Ebola in West Africa

- **50% DROP IN TOURISM**
  Drop in tourist arrivals in Sierra Leone from 2013 to 2014. The rest of West Africa also saw a 7.7% drop in arrivals in 2014.

- **51% NO LONGER IN WORK**
  % of Liberian wage earners that reported no longer working in their latest job 9 months into the epidemic.

- **4.8–9.4% DECLINE IN REVENUES**
  Decline in government revenues in 2015 in the 3 countries (incl. direct & indirect taxes, VAT).

- **20% DROP IN GDP**
  Drop in Sierra Leone’s GDP in 2015, wiping out 5 years of development. The GDP per capita dropped by an average $125 per person in the 3 impacted countries.

Social Costs of 2014 Ebola Outbreak

- $36.8 Billion for cost of lives lost to Ebola, the impact of health worker deaths on health systems capacity, and the consequences of non-Ebola diseases that were neglected during the outbreak
- $370 Million for cost of social factors
  - ~17,300 children lost one or both parents as result of the outbreak
  - Education for school-age children was disrupted for ~33 weeks
  - Increased food insecurity, which will subsequently impact growth and development, particularly in young children

Of note, the effects of these social costs may not be fully realized until many years later.

Types of Costs Due to Pandemics and Other Disasters

Areas where multi-sectoral action is needed

Source: Adapted from Deloitte. 2016. The economic cost of the social impact of natural disasters.
Common Goods for Health EDRM are Affordable to Governments

### Additional Costs to Finance Health EDRM Common Goods

<table>
<thead>
<tr>
<th></th>
<th>Total (billion)</th>
<th>Per capita average</th>
<th>Low-income country average (per capita)</th>
<th>Lower middle-income country average (per capita)</th>
<th>Upper middle-income country average (per capita)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td><strong>26.05</strong></td>
<td>4.69</td>
<td>8.49</td>
<td>5.46</td>
<td>2.76</td>
</tr>
<tr>
<td><strong>Capital</strong></td>
<td>12.29</td>
<td>2.21</td>
<td>4.33</td>
<td>2.47</td>
<td>1.35</td>
</tr>
<tr>
<td><strong>Recurrent</strong></td>
<td>13.76</td>
<td>2.48</td>
<td>4.16</td>
<td>2.99</td>
<td>1.41</td>
</tr>
</tbody>
</table>

**Notes:** CGH function estimates include capital costs and one year of recurrent costs in USD 2014. Based on sample of 67 countries. Population-weighted averages used.
Why Governments Should Invest in Common Goods for Health Emergency and Disaster Risk Management (EDRM)

The economic and social value of Health EDRM is large and the costs are tiny compared to the costs of not acting.

Government financing & action are needed - markets and civil society cannot play critical Health EDRM roles.

The institutional options for implementing Health EDRM systems are feasible.

Investment strengthens national security, individual and community health and wellbeing.
Capacity to Fulfill International Health Regulations

Strengthening health security by implementing the International Health Regulations (2005)
IHR (2005): What is it?

• An agreement between 196 countries – including all WHO Member States – to work together for global health security

• Countries agreed to build their capacities to **detect, assess and report public health events**. WHO plays the coordinating role and together with its partners, helps countries to build capacity.

• Includes specific measures at ports, airports and ground crossings to limit the spread of health risks to neighboring countries and to prevent unwarranted travel and trade restrictions so that traffic and trade disruption is kept to a minimum

Source: [https://www.who.int/ihr/about/en/](https://www.who.int/ihr/about/en/)
Technical Areas of Work

1. Global Outbreak Alert and Response Network (GOARN)
2. Public Health Logistics (LOG)
3. Risk Assessment (RAS)
4. Strategic Health Operations Centre (SHOC)
5. Support to National Surveillance (SNS)
6. Laboratory Strengthening and Biorisk Management (LBS)

Source: https://www.who.int/ihr/gcr-work-areas/en/
Technical Areas of Work (cont.)

7. Risk Communications (RC)
8. Learning Solutions and Training Support (LST)
9. International Travel and Health & Mass Gatherings
10. Ports, Airports and Ground Crossings (PAG)
11. Monitoring and Assessment of National Capacities (MAC)
12. Support to National Legislation (LEG)

Source: https://www.who.int/ihr/gcr-work-areas/en/
### IHR (2005) Core Capacities and Indicators by Capability Level

<table>
<thead>
<tr>
<th>Core Capacity</th>
<th>Component</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – National legislation, policy, and financing</td>
<td>National legislation and policy</td>
<td>Legislation, laws, regulations, administrative requirements, policies, or other government instruments in place are sufficient for implementation of IHR.</td>
</tr>
<tr>
<td></td>
<td>Financing</td>
<td>Funding is available and accessible for NFP functions and IHR core capacity strengthening.</td>
</tr>
<tr>
<td>2 – Coordination and NFP communications</td>
<td>IHR coordination, communication and advocacy</td>
<td>A functional mechanism is established for the coordination of relevant sectors in the implementation of IHR.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IHR NFP functions and operations are in place as defined by the IHR (2005).</td>
</tr>
</tbody>
</table>

Source: Checklist and Indicators for Monitoring Progress in the Development of IHR Core Capacities in States Parties.
<table>
<thead>
<tr>
<th>Core Capacity</th>
<th>Component</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3 – Surveillance</strong></td>
<td>Indicator-based surveillance</td>
<td>Indicator-based surveillance includes an early warning function for the early detection of a public health event.</td>
</tr>
<tr>
<td></td>
<td>Event-based surveillance</td>
<td>Event-based surveillance is established and functioning.</td>
</tr>
<tr>
<td><strong>4 – Response</strong></td>
<td>Rapid response capacity</td>
<td>Public health emergency response mechanisms are established and functioning.</td>
</tr>
<tr>
<td></td>
<td>Case management</td>
<td>Case management procedures are implemented for IHR relevant hazards.</td>
</tr>
<tr>
<td></td>
<td>Infection control</td>
<td>Infection prevention and control (PIC) is established and functioning at national and hospital levels.</td>
</tr>
<tr>
<td></td>
<td>Disinfection, decontamination and vector control</td>
<td>A programme for disinfection, decontamination and vector control is established and functioning.</td>
</tr>
<tr>
<td><strong>5 – Preparedness</strong></td>
<td>Public health emergency preparedness and response</td>
<td>Multihazard National Public Health Emergency Preparedness and Response Plan is developed and implemented.</td>
</tr>
<tr>
<td></td>
<td>Risk and resource management for IHR preparedness</td>
<td>Priority public health risks and resources are mapped and utilized.</td>
</tr>
</tbody>
</table>

*Source: Checklist and Indicators for Monitoring Progress in the Development of IHR Core Capacities in States Parties.*
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<tr>
<th>Core Capacity</th>
<th>Component</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 – Risk communication</td>
<td>Policy and procedures for public communications</td>
<td>Mechanisms for effective risk communication during a public health emergency are established and functioning.</td>
</tr>
<tr>
<td>7 – Human resources</td>
<td>Human resource capacity</td>
<td>Human resources are available to implement IHR core capacity requirements.</td>
</tr>
<tr>
<td>8 – Laboratory</td>
<td>Policy and coordination of laboratory services</td>
<td>Coordinating mechanism for laboratory services is established.</td>
</tr>
<tr>
<td></td>
<td>Laboratory diagnostics and confirmation capacity</td>
<td>Laboratory services are available to test for priority health threats.</td>
</tr>
<tr>
<td></td>
<td>Laboratory biosafety and laboratory biosecurity</td>
<td>Laboratory biosafety and laboratory biosecurity (biorisk management) practices are in place and implemented.</td>
</tr>
<tr>
<td></td>
<td>Laboratory-based surveillance</td>
<td>Laboratory data management and reporting is established.</td>
</tr>
</tbody>
</table>

*Source: Checklist and Indicators for Monitoring Progress in the Development of IHR Core Capacities in States Parties.*
IHR Implementation

A long-term process that calls for countries to:
1. Develop and strengthen specific national public health capacities
2. Identify priority areas for action
3. Develop national IHR implementation plans
4. Maintain these capacities and continue to build and strengthen as needed over time

“National Action Planning for Health Security (NAPHS) is a country owned, multi-year, planning process that can accelerate the implementation of IHR core capacities, and is based on a One Health for all-hazards, whole-of-government approach. It captures national priorities for health security, brings sectors together, identifies partners and allocates resources for health security capacity development.”

Source: https://www.who.int/ihr/procedures/health-security-national-action-plan/en/
Joint External Evaluations (JEE)

The Joint External Evaluation (JEE), a voluntary, externally-validated assessment of each country's ability to find, stop and prevent health threats, was developed to track preparedness around the world. Many countries still need to complete the JEE.

Global Health Security Index (GHSI)

The GHSI assesses countries’ preparedness to fight pandemics and epidemics across 6 major categories: prevention of emergence or release of pathogens, detection and reporting, rapid response, health system capacity, compliance with international norms and standards, and risk environment and vulnerability to biological threats.

Source: https://www.ghsindex.org/
Capacity Building for Emergency Operations Centers (EOC)
EOC: Capacity

• The EOC uses the National Incident Management System to better manage and coordinate emergency responses.

• An Incident Management System (IMS) is an internationally recognized model for responding to emergencies. Having an IMS in place reduces harm and saves lives.

Developing an Incident Management System to Support Ebola Response — Liberia, July–August 2014

Satish K. Pillai, MD1, Tölbert Nyenswah, LLB2, Edward Rouse, MPA3, M. Allison Arwady, MD4, Joseph D. Forrester, MD4, Jennifer C. Hunter, DrPH5-6, Almea Matanock, MD4, Patrick Ayscue, DVM4, Benjamin Monroe, MPH6, Ilana J. Schafer, DVM7, Luis Poblano, AS3, John Neatherin, MPH8-9, Joel M. Montgomery, PhD8-9, Kevin M. De Cock, MD10 (Author affiliations at end of text)
IMS Structure in Liberia

Morbidity and Mortality Weekly Report

1. If the costs of preparedness are so affordable ($4 per capita in LMICs), why are funds not allocated, even in low income countries?

2. How do we fill the knowledge gap about the effectiveness of integrated disease surveillance and response systems (and EDRM)? Will this solve the barrier to action?
   - Limited cost-effectiveness analysis due to difficulty quantifying intangibles (e.g., loss of life, effects on health, effects on community) and the variable impacts of disasters, and methods to assess low-probability and high-risk events

3. How do we “remember” that emergency preparedness and response begins with and depends on community involvement and their capabilities?
   - Need to overcome lack of trust in public institutions, disconnect between community priorities and EDRM priorities; communication barriers between local communities and those coordinating emergency preparedness and response (e.g. ignorance of existing community-level forums); knowledge, skills, social capital vary across communities
Thank you!