Policy Brief - Health System Resilience Metrics and Indicators

Ms. Catherine O'Donoghue MSc., Dr. Padraic Fleming, Dr. Arianna Almirall-Sanchez and Professor Steve Thomas
The Centre for Health Policy and Management, School of Medicine, Trinity College Dublin

Context

Health system resilience has never been more important than with the COVID-19 pandemic. There is need to identify feasible measures of resilience, potential strategies to build resilience and weaknesses of health systems experiencing shocks.

What We Did

A mixed-methods systematic review was undertaken to identify how health system resilience has been measured across a range of shocks over the past two decades. The aim of the review was to categorise how health system resilience has been assessed and reported, to inform future preparedness, research, evaluation and to identify strategies to build resilience.

Frameworks

The metrics were classified according to four WHO Health System Functions of- **Governance, Resources, Finance and Service Delivery.**

The metrics were also categorised according to the four-stage shock cycle framework: **1. Preparedness, 2. Onset and Alert, 3. Impact and Management and 4. Learning and Legacy**

Health System Resilience

Health System Resilience was defined as the ability to prepare for, manage (absorb, adapt and transform) and learn from shocks to improve health system performance

Shocks examined included COVID-19 (46%), economic crises (26%), natural and man-made disasters (18%), previous pandemics (H1N1 2009/10 and SARS 2003) (9%) and conflict (1%).
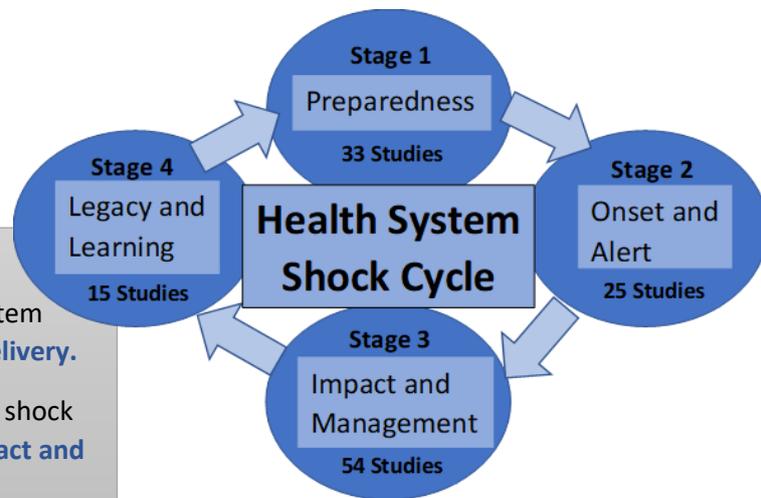
Shock Cycle Stage- Findings

3,175 articles were screened and 68 studies were included in final analysis of high-income countries. Most studies reported metrics related to the management stage (79%), while the fewest number of studies reported metrics related to the recovery and learning stage (22%).

Stage 1: Preparedness Many COVID-19 studies used composite measures of health system preparedness, based on pre-COVID-19 data, which were then correlated with COVID-19 outcomes such as confirmed case numbers or total death. Counterintuitively, in some studies, countries with greater preparedness scores had worse COVID-19 outcomes. Preparedness plans, surveillance data, patient activity data, early warning systems, communication strategies, availability of staff, infrastructure and surge capacity were also important metrics.

Stage 2: Shock Onset and Alert The key focus for pandemics tended to be on the impact on Resources and Service Delivery. Measures included increasing staff and infrastructure, testing, as well as protecting and training staff. -Innovative mechanisms for delivering care and strengthening forecasting and reporting mechanisms were also a key focus. Metrics relating to Governance included mitigation, containment and re-distribution of functions and staff responsibilities. For non-pandemic studies decision-making and information availability and flow were key Governance metrics.

Stage 3: Impact and Management Pandemic studies tended to focus on activity data, infrastructure and the implications for non-pandemic related conditions and elective surgeries. In terms of the workforce, impact metrics highlighted shortcomings in terms of staff shortages, knowledge, PPE, closed decision-making processes, supply chains as well as physical and mental well-being of staff.

For Stage 4: Legacy, Recovery and Learning Economic studies highlighted problems associated with the sustainability of health insurance funds and workforce supply. Disaster studies focused on the integration of care and information flows between ambulance services, regional and national, hospitals, and the management of back-up generators and disrupted care during an event.

Common Metrics by WHO Health System Function

Resources
- Staff headcount - doctors and nurses (normal and surge capacity), hospital and ICU beds per 100,000 pop. or per 1,000 pop or compared regionally or with national averages, EU average, OECD average.
- Staff wellbeing: absenteeism, anxiety, demotivation, PPE distribution.

Service Delivery
- By far the most common metrics and indicators were the impact of crises on normal services.
- Impact on activity of normal services: Emergency care provision, number of people attending, procedures, diagnostics, tests.
- Impact on quality: Time taken, delay/waits, outcomes, unmet need

Governance
- Data on timeliness, operation and accuracy of information systems

Finance
- Health expenditure as proportion of GDP,
- Public health expenditure (total and %),
- Private health expenditure (total and %),
- Insurance cover of population,
- Out of pocket payments (total and %),
- Financial stability of system,
- Salary costs and changes (health professionals),
- Spending on Pharmaceuticals.

Reflections
- COVID-19 highlighted the importance of health system resilience and produced a massive flow of new articles on the topic.
- The review notes the problems with measuring preparedness as a strategy even when indicators exist and the fact that few studies have really assessed the legacy or enduring impact of shocks.
- Policy makers attempting to deal with a shock will either consciously or inadvertently create a legacy for their health system for many years. Dealing with this more explicitly will help build future health system resilience and performance.

Metrics and Recommended Strategies

Workforce – Enhanced Surge Capacity
Students incorporated early, retired healthcare workers returned, part-time staff to full-time staff, recruitment drives, elective procedures delayed

Improve Workforce Wellbeing
Childminding, training supports, 'Support lines' set up for healthcare workers, flexibility, psychological support

Physical Infrastructure - COVID-19 Surge Capacity
Surgical operating rooms converted to ICU units, anaesthesia machines converted into ventilators, ventilators used for more than one patient, ambulatory clinic spaces converted to inpatient wards

Better Governance
Improved transparency, medical workforce involvement in decision making, coordinated action, effective collaboration across sectors, high communication

Funding Strategies
Additional funding (mental health, telehealth, for disadvantaged groups)

Conclusions
- Heath system resilience is much broader than metrics related to COVID-19 or even pandemics and covers a range of different types of shocks, each with their own features and peculiarities.
- It is hoped the metrics and indicators can be useful for future research, as well as to policy and decision makers, practitioners, and health service managers, to be able to better understand and assess Health System Resilience and identify strategies to increase resilience.