

REPORT

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Factors impacting on the preparedness ability of a country

- A narrative report to the Norwegian Agency for Development Cooperation (NORAD)

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(NORAD)

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Acronyms

Acronym	Explanation
GHSA	Global Health Security Agenda
GHSI	Global Health Security Index
GPMB	Global Preparedness Monitoring Board
HICs	High Income Countries
IHME	Institute for Health Metrics and Evaluation
IHME	The Institute for Health Metrics and Evaluation
IHR	International Health Regulations (2005)
IHRMEF	International Health Regulations Monitoring and Evaluation frameworks
IOAC	The Independent Oversight and Advisory Committee for the WHO Health Emergencies Programme
IPPPR	The Independent Panel for Pandemic Preparedness and Response
JEE	Joint External Evaluation Report
LICs	Low Income Countries
LLMICs	Low-Lower Middle-Income Countries
NAPHS	National Action Plan for Health Security
NPHIs	National Public Health Institutes
SPAR	State Parties Annual Reporting
SPH	Strategic Partnership for Health Security

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Introduction

The Global Health Preparedness Programme (GHPP) is a programme at NIPH funded by the Norwegian Ministry of Foreign Affairs and NORAD 2015-2021 to strengthen global health preparedness through collaboration at the global level and in four partner countries. It has three strategic objectives: 1) to support assessment, prioritization and implementation of actions to meet specific IHR core capacities in the partner countries, 2) to contribute to global efforts to enhance capacity and procedures for assessment, prioritization and action to assist all countries to meet their obligations under IHR, and 3) to strengthen institutional capacity of National Public Health Institutes (NIPHS) in partner countries in efforts to prevent, detect and respond to public health events of national and international concern. As the GHPP is coming to a close, and in the midst of the largest pandemic in more than a century, we want to put the GHPP in context by presenting a broader view of pandemic preparedness and health security beyond the IHR core capacities.

In this report, we aim at

1. Describing some essential experiences from the current COVID-19 pandemic
2. Exploring various sets of factors impacting national epidemic preparedness and how to review them,
3. Discussing a more comprehensive model with key factors that need to be taken into account to build, assess and improve a robust and resilient national health security system.

To achieve the aims we used qualitative scientific methodology of reviewing literature, recommendations, and reports to address the following topics: International Health Regulations, epidemic preparedness, building capacities, resilience, and COVID-19. We explored documents from international organisations like the WHO, World Bank, International Monetary Fund, GPMB, IANPHI, and the United Nations, and from scientific institutes like University of Oxford, Johns Hopkins University, National Institute of Health and US CDC.

COVID-19 has caused an unprecedented global crisis in recent times, with millions of lives lost, exhausted health systems, economic volatility, and social disruption. It has also disproportionately affected the most vulnerable. As of June 2021, there are over 170 million confirmed cases and close to four million COVID-19 deaths globally. The International Health Regulations (2005) were adopted by the WHO to strengthen global health security in public health emergencies by strengthening national capacities of epidemic preparedness. Despite the significance of the IHR monitoring and evaluation tools to guide countries in developing their national plans for health security, these tools did not sufficiently cover countries' abilities to handle the COVID-19 pandemic. The ongoing pandemic has exposed the vulnerability of the current global health system and has shown how the global community is ill prepared.

We have seen from the pandemics of 2010 and 2019 and the large outbreaks of Ebola in recent years that new zoonoses pose a significant threat to humanity. It is very likely that future pandemics will also start in this way. Global warming, deforestation, and more intensive farming and fishing all increase the likelihood of these emerging pathogens, including antimicrobial resistance ^(1, 2). Furthermore, they also push vulnerable populations into an increased reliance on new bushmeats, increasing the risk even further ⁽³⁾.

Pandemics come with a heavy toll of economic, and social hardships and above all, they hit the most disadvantaged groups in the population hardest. The International Health Regulations (2005) (IHR) monitoring and evaluation frameworks are important to develop the technical preparedness capacities of prevention, detection, and response. However, these frameworks do not fully capture weaknesses in governance, decision making, and country-specific vulnerabilities. Comparing the impact of the COVID-19 pandemic between countries should not only be visualised by COVID-19 mortality and morbidity, but also include various vulnerabilities beyond just health issues and systems. Despite the successful development of an effective vaccine against SARS-CoV-2, the pandemic is raging on, partially because of economic inequalities and logistic challenges.

The COVID-19 pandemic has challenged our traditional way of building preparedness, whilst several global initiatives and frameworks are being developed, the way towards resilient societies is yet to be fully explained. Resilience is a dynamic process; it originates from the individual level and grows to the national level. To properly underpin a resilient health security system, it's critical to tackle individual vulnerabilities of education, healthcare, sustainable income and social equality and scale it up to handle the broader vulnerabilities of a country specific context. COVID-19 has shown that values of public trust and abiding by national guidance, engaged communities, scientific decision making, and strong leadership are essential to effectively mitigate health emergencies. These values depend to a certain degree on state governance prior, during and after emergency. Despite the devastating ramifications of the COVID-19 pandemic, it has made the world more focused than ever on building a resilient health security system.

The report is divided into four main sections. In section I, we give an overview of the ongoing COVID-19 pandemic, discuss how the pandemic has impacted the world and present some of the main reviews and assessments carried out so far. In section II, the IHR (2005) and its core elements are discussed in addition to other global initiatives. Section III presents how the world has responded to the COVID-19 pandemic according to the IHR (2005). In the last section, we discuss new perspectives, and ways to strengthen state preparedness.

Section I: The impact of COVID-19 pandemic

Key Points

- 1- More than 170 million people worldwide have been reported infected with COVID-19, there have been more than 3 million of deaths and the pandemic has meant an estimated USD 28 trillion in economic loss.
- 2- The methods used to estimate, and report costs of the pandemic is limited and does probably not capture the entire picture of social and economic ramifications of the outbreak.
- 3- The COVID-19 pandemic has exploited existing social and economic disparities and has infringed on the basic human rights to health, education, freedom, and free movement.

The global crisis of COVID-19

One of the inherent challenges of global health security is to clearly assess the needs and to evaluate the direct & indirect consequences of a pandemic. Prior to the ongoing pandemic, outbreaks tended to be assessed uniformly using a modelled or observational approach ⁽⁴⁾. In the modelled approach, an economic equation is most often used to predict the need for physical resources like stockpiling of personal protective equipment and other medical equipment, and often overlooks the need for e.g. a skilled workforce to cope with a surge of demand. While, in the observational approach, the impact of outbreak is mainly expressed by developing a new set of skills or adoption of new technology for instance the mRNA vaccine technology for COVID-19, it fails to take into account the overall picture of disruption caused by the outbreak.

The pandemic's disproportionate impact on marginalised groups and disadvantaged populations (including women and children) has shed light on widespread pre-existing social and territorial inequalities between and within countries. The virus has exploited their liabilities, lack of resources, demographic composition, and geographic vulnerability ⁽⁵⁾. The novel coronavirus SARS-CoV-2 emerged from Wuhan, China late in in 2019. Thailand, the first country affected outside of China, reported its first confirmed case on the 13th of January 2020. A Public Health Emergency of International Concern (PHEIC) was declared on 30th of January. At that time, COVID-19 cases had been reported from 18 countries, and consequently COVID-19 was labelled a global pandemic on 11th of March 2020. Table 1 shows the officially reported numbers of COVID-19 cases, deaths, and vaccinated people in a few selected countries as of 14th of May 2021. The real number of cases and deaths are probably higher.

Table 1: Total reported COVID-19 related cases, mortality and the number vaccinated (WHO,14 May 2021)

	China	USA	UK	India	Brazil	South Africa
Reported cases¹	117,548	32,929,178	4,630,044	29,935,221	17,883,750	1,823,319
Reported death	5,395	588,596	127,976	388,135	500,800	58,702
Vaccine coverage²	43 %	53%	63%	16%	29%	4%

The pandemic has amplified the economic and racial disparities seen within Low- and Lower Middle-Income Countries (LLMICs). In these countries the prevalence of informal economy and self-employment is higher than it is in HICs and labour protection & human rights might be compromised⁽⁶⁾. It has already curbed a decade of economic growth and is expected have effects for the coming five years. The IMF has estimated that the COVID-19 pandemic has contributed to a decline in 90% of household's income, and to reverse 10 years of income development. With factors such as high debt economies, downgraded growth rates, new variants, and disruption of vaccine procurement and distribution, the global economy is projected to sustain its volatility and uncertainty and to push millions into poverty⁽⁷⁾. In their recent study, the IMF has estimated the global poverty- individual income of below 1.9 USD a day- to reach 738 million, and to be concentrated in Southern Asia and Sub Saharan countries.

From an economic perspective, COVID-19 has forced central banks worldwide to deploy various fiscal and liquidity support measures to counter the economic impact of the pandemic. This included massive doses of liquidity- mounted to more than US\$ 20 trillion, halting public spending, tax relief and social support packages⁽⁸⁾. Other measures to support business and employment through a loosening of monetary policy and emergency credit support for businesses have also been implemented⁽⁹⁾. Another chronic repercussion of COVID-19 is income inequality, the Gini Index is expected to rise 0.7 percentage point meaning a wider gap between upper and lower social percentiles⁽¹⁰⁾. Speaking of the social impact of the COVID-19 pandemic, UNICEF has warned that 110 million girls are at risk of child marriage, unwanted pregnancies plus an increased gender-based violence as a direct consequences of economic insecurity and interrupted education caused by the pandemic⁽¹¹⁾.

The Institute for Health Metrics and Evaluation (IHME) at the University of Washington has developed a model to evaluate the pandemic impact as measured by total mortality. It estimates the excess mortality during the pandemic compared to the pre-pandemic trends of expected health outcomes for all-cause mortality. In addition to the reported COVID-19 mortality rates, the IHME model has taken into account:

¹ Total confirmed COVID-19 cases per 100,000 population as per 22. June.2021

² The vaccination coverage as per 20. June.2021, and at the time all countries adopted a vaccination policy of vulnerable group and others as per our world in data <https://ourworldindata.org/covid-vaccinations>.

1. The increase in mortality due to delayed care & mental health disorders.
2. Reduction in mortality due to limited mobility & social distancing.
3. Reduction in mortality caused by other medical conditions e.g., infectious disease or non-communicable diseases.

They have estimated at least 30% higher mortality than the reported numbers COVID-19 globally as shown in figure 1 ⁽¹²⁾.

In light of COVID-19, the WHO Regional Office for Europe has presented a guiding document: *Strengthening population health surveillance: a tool for selecting indicators to signal and monitor the wider effects of the COVID-19 pandemic (2021)*. The aim of the document is to provide a tool for Member States to select suitable indicators for signalling and keeping track of the wider effects of the COVID-19 pandemic and for incorporation into their national monitoring schemes. ⁽¹³⁾. In addition to measuring the morbidity and mortality as direct effects of the pandemic, it is important to include surveillance of other health outcomes that are impacted indirectly by COVID-19 pandemic:

1. The effect of fear; of infection, or to spread the infection, or to lose a loved one from being infected.
2. Disrupted healthcare services; limited quality, accessibility, and resources for non-COVID-19 patients.
3. Direct effects of COVID-19 containment measures in the form of psychological stress, loneliness and interpersonal violence which hits the most vulnerable groups of elderly, women, and children particularly hard.
4. Indirect effects of COVID-19 containment measures through increased NCDs, alcoholism and drug abuse.
5. An effect of COVID-19 on the social determinants of health; increased poverty, social inequalities, and loss of education.

Another looming repercussion of the COVID-19 pandemic is the impact of the pandemic on the global fight against antimicrobial resistance (AMR). In the absence of an optimal strategy to combat COVID-19 infections, and with absence of resources for mass testing, physicians especially in LLMICs are often left with no other choice than prescribing antibiotics. There is mounting evidence indicating overutilization of antibiotics in treating COVID-19 patients even with absence of a secondary infection ^(14, 15). The consequent effect of antibiotic's overutilization on the evolvement of resistant bacteria is yet to be deliberated.

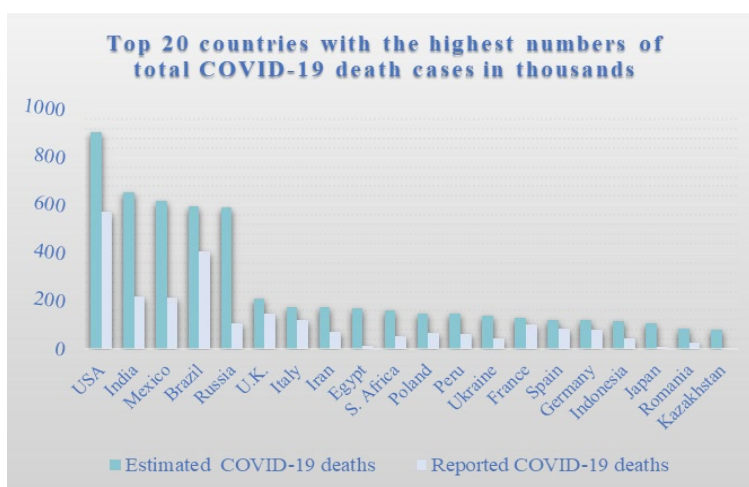


Figure 1: Estimated death toll of Covid-19 vs the reported cases (IHME, 2021)

The extent of disruption caused by outbreaks is often summed up in calculated figures of burden of disease. However, the impact of these emergencies exceeds those of health and health systems. Likewise, when it comes to assessing the health outcomes of an outbreak, they extend beyond the scale of mortality and morbidity caused by the outbreak. Thus, comparing the impact of the COVID-19 pandemic between countries should not only be visualised by COVID-19 mortality and morbidity, but also include factors of various vulnerabilities beyond mere health issues and systems.

The impact of pandemics on human rights issues

Everyone has the right to life, liberation, and security of person (article 3, UDHR).

Article 3 of the Universal Declaration of Human Rights (UDHR) has described the fundamental norms of human rights that everyone should respect and protect. Outbreaks of zoonotic diseases such as Bubonic Plague, Cholera, HIV, Ebola, and SARS-CoV-2 have continued to challenge these fundamental rights throughout history. The unprecedented challenge of the COVID-19 pandemic has shown the convergence between health and human rights in three dimensions: 1) Right to health, and limited accessibility of health services, 2) Right to free movement, closed societies and restricted-tracked movement, and 3) Right to liberty, political polarization and emergency power to overshadow the democratic process ⁽⁸⁾. Social and economic equality are important factors for delivering attainable health services. The resilient community is expected to guarantee equal rights to social security, food, water, housing, and education in the time of public health emergency ⁽⁹⁾. During the COVID-19 pandemic, several societies have relied on their digital infrastructure to minimise the COVID-19 led disruption in the shape of digital health services, digital workplace, and remote education. This reliance on new technologies has increased the vulnerabilities of modern societies to unconventional challenges like cyberattacks, phishing campaigns, fake medicines, and fake medical devices, conspiracy theories and the Infodemics of false or misleading information. These could lead to public confusion, risky behaviour, mistrust in health authorities and undermine the public health response ⁽¹⁶⁾.

In response to the COVID-19 crisis, the European Council has circulated a legal guidance call for respecting democracy, rule of law and protecting human rights during the pandemic ⁽¹⁰⁾. It states that the European national response to the pandemic should convey the European Human Rights Convention in shielding the democratic principles, freedom of expression, freedom of choice, prohibiting discrimination and gender-based violence.

Section II: Building national capacities of preparedness

Key Points

1. The global collaboration has been driven by epidemics.
2. The International Health Regulations (2005) (IHR) stand as the global blueprint to develop national capacities of global health security in addition to synchronising the global collaboration.
3. Several initiatives like the GHSA, were developed to assist countries in developing their national capabilities of the IHR.

The International Health Regulations

Outbreaks occur more frequently than ever with the increasing challenges of deforestation, urbanization, civil unrest, and climate change. The WHO gets reported approx. 7,000 outbreaks a month which have the potential to ignite a pandemic as severe as COVID-19⁽¹⁷⁾. The International Health Regulations, IHR (2005) aim to *prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risks, and which avoid unnecessary interference with international traffic and trade*. The IHR outlines the obligations and interaction channels between the WHO and member states, plus it mandates state parties to assess, report, maintain and develop their national epidemic capacities. The origin of the IHR is deeply rooted back to the nineteenth century, when infectious diseases evolved together with growing global trade. Figure 2 shows the chronological development of global epidemic preparedness frameworks till the ongoing pandemic⁽¹⁸⁾.

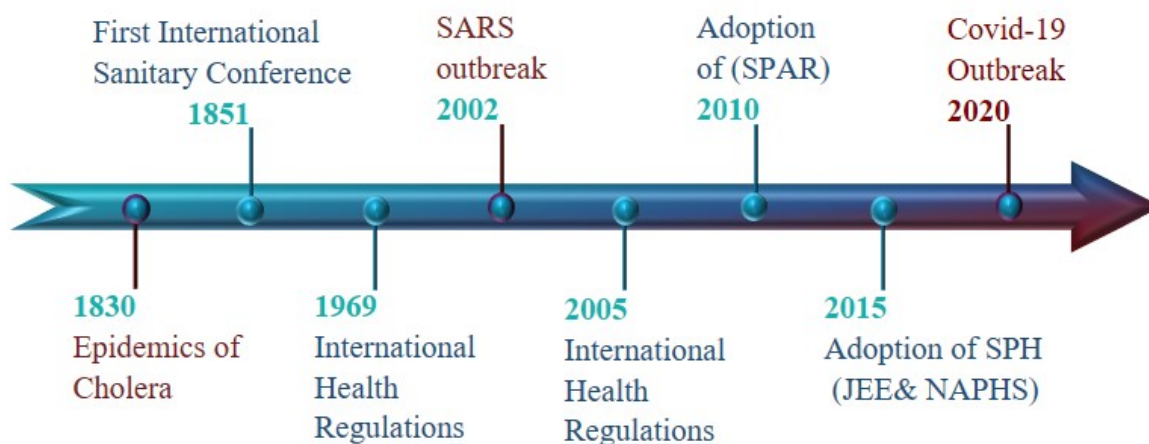


Figure 2: The chronological development of epidemic preparedness frameworks (WHO,2021)

The IHR Monitoring and Evaluation Framework (IHRMEF)

The IHR (2005) mandates member states to assess and develop their national technical capacities of preparedness- to prevent, detect, and respond to any public health threat. It ultimately leads to developing their costed National Action Plan for Public Health Security (NAPHS). NAPHSs are a country specific, multi-year, planning process to accelerate implementation of the IHR technical capacities in alliance with One Health & whole-of-government concepts ⁽¹⁹⁾.

Member states are encouraged to benchmark their national capacities for preparedness using the IHRMEF, and develop their NAPHS, then share their outcomes with potential donors using the portal of Strategic Partnership for IHR and Health security (SPH). Despite the pivotal role of the SPH in networking and pooling resources for preparedness development, it has some ambiguities when it comes to identifying national/subnational vulnerabilities and in prioritising interventions. It designates the process of priority setting to the member states without offering any implementation guidance. The IHR Monitoring and Evaluation Frameworks include:

- 1- Quantifying assessment tools:
 - a) State Party's Annual Reporting (SPAR), an annual self-reporting scheme for benchmarking 13 technical capacities of preparedness. SPAR is often criticised for self-over-estimation and not including the capacities of antimicrobial stewardship & immunization coverage ⁽²⁰⁾.
 - b) Joint External Evaluation (JEE), a voluntary, independent, transparent and multisectoral assessment examining 19 technical capacities of preparedness. JEE aims at establishing a baseline measurement on scale from one to five for a country's capacity and capabilities to prevent, detect and respond to public health threats. The JEE should be followed by a development plan to improve national capacities of IHR. During the ongoing pandemic, the JEE tool has been criticised for limited predictability ⁽²³⁾.
- 2- Self-learning and development tools:
 - a) Action Review (AR), a voluntary plenary qualitative analysis to identify what works, what does not and how to improve outcomes. It comes in two forms:
 - 1- After Action review, where State Parties assess performance after a real outbreak is over, and or
 - 2- Intra-action review, a newly adopted framework during the pandemic.
 - b) Simulation Exercise (SimEx), hands on exercise for public health emergency, aims at extracting best practice and shortfalls of emergency management.

Global Health Security Agenda

As an IHR (2005) implementation vehicle, the Global Health security Agenda (GHSA) was launched in 2014 as a collaborative, multisectoral initiative aimed at strengthening global health security. The GHSA offers a collaborative framework initiated by the United States and in collaboration with 64 other countries, governmental and non-governmental international organisations like WHO, FAO, OIE and WB. The core of the GHSA is to provide technical assistance and to sharing the know-how of strengthening public health preparedness between participant countries. The GHSA offers eleven specific collaborative work packages: antimicrobial resistance, zoonotic diseases, biosecurity and biosafety, immunization, National laboratory system, real time surveillance, reporting, workforce

development, emergency centres, multisectoral rapid response and personal development ⁽²¹⁾. The JEE was initially developed by GHSA as a pilot tool to assess 3 basic capacities of epidemic preparedness – to prevent, detect and respond – based on the IHR. A newer action package of the GHSA is the Sustainable Financing for Preparedness Action Package which is exploring financial mechanisms to stimulate the improvements of national health security.

Other assessment tools

Infectious Disease Vulnerability Index (IDVI) ⁽²²⁾

Following the deadly outbreaks of Zika virus and Ebola, the RAND corporation, a non-profit and non-political research organization has developed the IDVI. Where a ‘disease belt’ was identified in the Sahel region of Africa by ranking countries based on their infectious disease vulnerability score. The economic model used in the IDVI was based on national domains of economy, political stability, demography, healthcare, public health capacities, and disease dynamics. The IDVI has concluded that Low Income Countries (LIC) of sub-Saharan and Sahel regions are more susceptible to outbreaks and more likely to suffer most from their devastating impacts in comparison to High Income Countries (HIC).

Global Health Security Index ⁽²³⁾

The Global Health Security Index is a project of the Nuclear Threat Initiative and the Johns Hopkins Center for Health Security and was developed with The Economist Intelligence Unit ⁽²³⁾. It consists of 140 questions across six main categories: prevention, detection and reporting, rapid response, health system, compliance with international norms and risk environment. According to the GHSI, high income countries such as the United States and United Kingdom and others are the global champions of developing their national emergency preparedness.

In a summary, the Global Health Security Index and Infectious Disease Vulnerability Index have explored the link between the ability of a country to manage outbreaks and country’s domains of; economic, political, and health system factors. These assessment models have ranked HICs like the United Kingdom and the United States of America as the most resilient and capable communities to face outbreak, while the LICs are most vulnerable societies, a hypothesis that has been critically challenged by COVID-19.

Section III: The robustness of the current systems

Key Points

1. The current scope of the IHR is limited to confined technical capacities of preparedness and does not necessarily capture all needed competences to mitigate epidemics.
2. LMIC's are often portrayed as underdeveloped in terms of preparedness capacities, mostly due to lack of financial resources. The current pandemic has also revealed major weaknesses in HICs.
3. The COVID-19 pandemic has triggered unprecedented global determination to strengthen global health security and investments in global health resilience.

Capacity of the IHR

The WHO defines resilience as ***the ability to prepare for, manage (absorb, adapt, and transform) and learn from shocks***, this ability is based on a robust health system. While the Ebola outbreak in West Africa in 2014-2016 had highlighted the need for better health systems to harness preparedness, COVID-19 has demonstrated the need for preparedness to have a holistic multisectoral approach ⁽²⁴⁾. SARS-CoV-2 has not caused only the devastating pandemic, but it has also influenced geopolitical tensions, Infodemics have emerged and the most overwhelming impacts were seen in marginalised populations. These complexities have verified the societal resilience in general and epidemic preparedness specifically in a deeper context than availability of financial resources or developing technical capacities of the IHR. Health security does not depend merely on technical capacities expressed by the IHR. Health security also includes multisectoral values of an engaged community, public trust, evidence-based decision-making, and a resilient health system in addition to the technical capacities of the IHR ⁽²⁴⁾.

The IHRMEF; JEE, SPAR, AR and SimEx, serve as the global blueprint for developing health security resilience. The JEE offers a transparent tool to assess national level of preparedness towards biological, chemical, and nuclear threats. The JEE ultimately guides countries to manage identified gaps in their emergency preparedness through developing country based NAPHS. It assesses three thematic areas of the IHR: prevention, detection, and response to any public health emergency either natural or manmade. These capacities are measured using the WHO benchmark scheme ranges from 1 (no capacity) to 5 (sustainable capacity) of 32 indicators covering 19 technical areas.

The JEE has been quite successful in identifying strengths and shortcomings in national application of the IHR. It also guides prioritising of investments, and to providing partnerships in developing needed capacities.

However, the JEE has been criticized for:

1. being too restricted to preparedness technical capacities,
2. having a relatively long period of 5 years between suggested repetitions, and
3. being costly and human resource demanding.

As of June 2021, more than 108 countries have conducted their JEE reports distributed and shown across the WHO regions in figure 3³. This distribution of JEE scores across regions shows the correlation between availability of financial resources and building technical preparedness capacities.

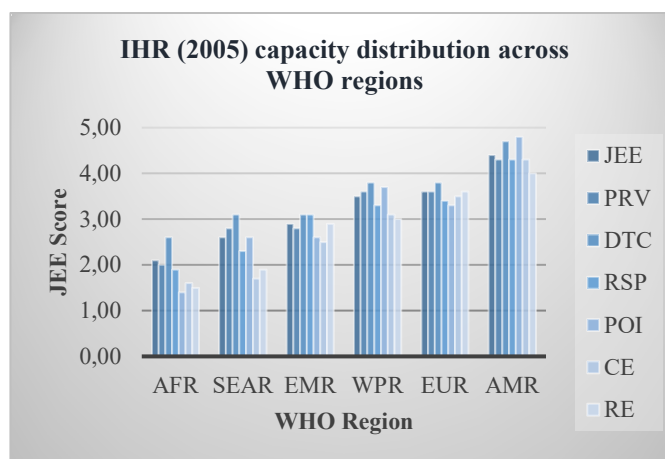


Figure 3: JEE technical capacities distribution across WHO regions (WHO,2020)

Shortcomings in assessing country health security

As figure 4 shows, one of the fundamental cores of the IHR (2005) to build specific capacities to prevent, detect and respond to outbreaks on the national level. These capacities were designed to control outbreaks locally and to protect the world from a public health emergency of international concern (PHEIC). Several attempts were conducted to assess the accuracy of IHRMEF, and especially the JEE, in measuring national epidemic preparedness. While one approach has been to correlate the variation between countries in their preparedness level to their economic and development disparities, others have suggested an adjuvant system to the JEE as e.g., the Epidemic Preparedness Index (EPI) to capture a wider scope of preparedness. Within the EPI, Oppenheim et al (2019) have suggested a framework of public health, economic, and infrastructures equivalent to the JEE in measuring national capacities (25)

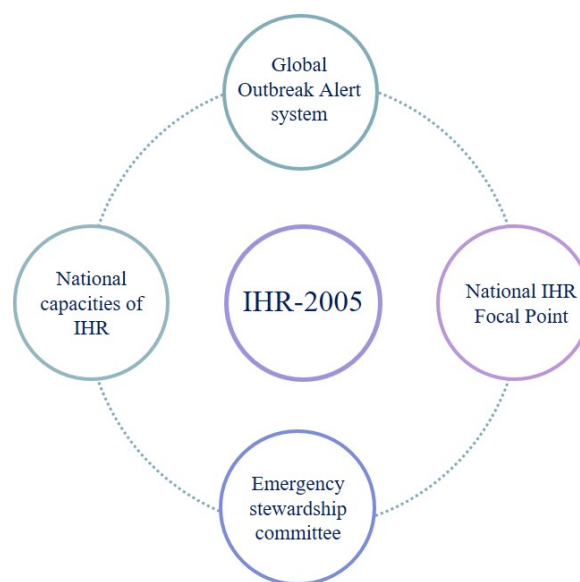


Figure 4: IHR (2005) main fundamentals (WHO, 2021)

³ JEE is organised on 5 categories of Prevention (PRV), Detection (DTC), Response (RSP), Point of Entry (PoI), Chemical Events (CE) and Radiation Emergency (RE) The data is distributed by the WHO regions of African Region (AFR), South East Asia Region (SEAR), Eastern Mediterranean Region (EMR), Western Pacific (WPR), European region (EUR) and Region of the Americas (AMR). Source: <https://extranet.who.int/sph/jee>.

In 2018 and prior to the COVID-19 Pandemic, the Global Preparedness Monitoring Board (GPMB) was established to identify shortcomings of the global health security and to ensure a better preparedness. The GPMB in their 2019 annual report *A World at Risk*, identified global gaps in strengthening preparedness in term of: political determination, sustainable financing, global coordination and investing in a better health system ⁽²⁶⁾.

These gaps were aligned with various published NAPHS, shed light on systematic gaps in coordination between national and subnational levels and a lack of multisectoral collaboration leading to operational silos ⁽²⁷⁾. Similarly, Georgetown University in their report to the GPMB has underscored the importance of exploring concealed trigger points including accountability, equity, transparency, and participation in preparedness stewardship ⁽²²⁾.

The COVID-19 pandemic has challenged the traditional way of thinking around building national capacities for epidemic preparedness, and how to assess it. Two of the tools of the IHRMEF; the JEE and the SPAR have been criticised for their limited predictability, inability, misalignment ⁽²⁸⁾. While predictability mirrors the ability of the IHRMEF to indicate how efficient the Member State to detect outbreak, the inability reflects the efficiency to manage the ongoing pandemic ⁽²⁹⁾, and it has been recommended to align them better to each other. In addition, some countries tend to obtain a political or financial gain by underestimating their public health capacities ⁽³⁰⁾.

Assessments and reviews of the preparedness and response to the COVID-19 pandemic

The world has initiated several measures to learn from the historic distress caused by COVID-19, as shown in figure 5:

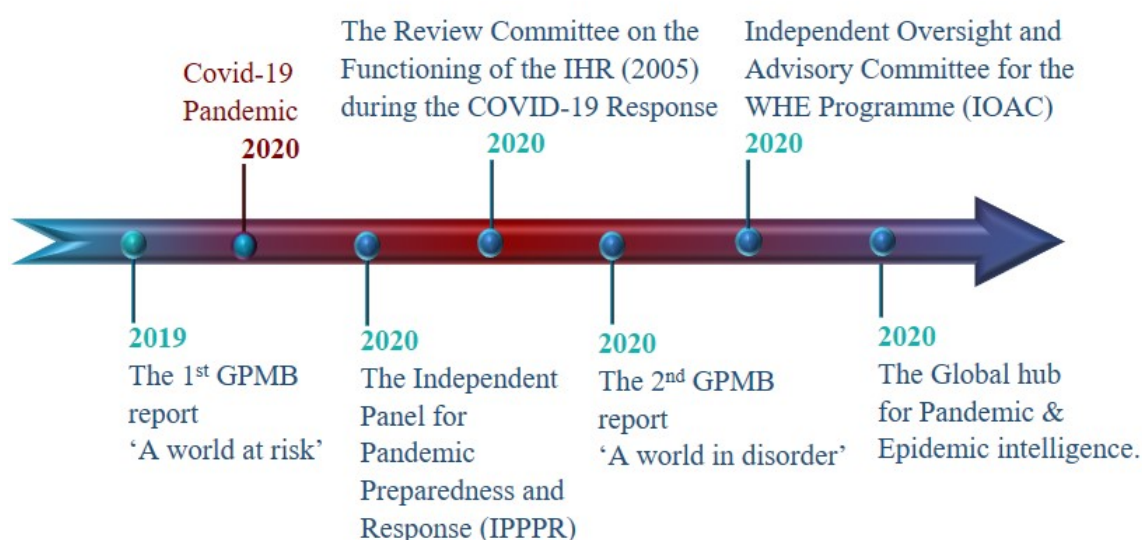


Figure 5: The evolvement of epidemic preparedness initiatives caused by the pandemic

The Independent Panel for Pandemic Preparedness and Response (IPPPR) was recently established by the WHO and its member states to evaluate the global pandemic response. The IPPPR has called for making COVID-19 the last pandemic via a roadmap of 8 recommendations⁽³¹⁾. These recommendations include developing resilient health system is a necessity besides developing national capacities of health securities. The IPPPR committee has accredited successful countries in managing COVID-19 pandemic by being proactive, agile, and expeditious to tackle the emergency, reallocate resources, reorient their services and integrate their communities.

The Review Committee on the Functioning of the International Health Regulations (2005) during the COVID-19 Response is an impartial, independent committee established by the 73rd WHA, to assess functionality and applicability of the IHR (2005) during the pandemic. The committee has proposed 40 recommendations to strengthening epidemic preparedness, some of which are country focused and others are global/ WHO related. The committee has called for a new inclusive and more accurate framework to measure, assess and develop national capacities of epidemic preparedness. In addition, they recommend developing an IHR compliance scheme comparable to the Universal Period Review⁴ to ensure compliance of member states to the IHR regulations.⁽³²⁾

The Independent Oversight and Advisory Committee for the WHO Health Emergencies Programme (IOAC) is an open-ended committee. Its role, since 2016, has been to oversee the World Health Emergency program. In their ninth report to the 74th WHA, the IOAC has acknowledged the significance of World Health Emergency programme in leading and coordinating the global crisis management, however it has called for more comprehensive-multisectoral building capacity program to effectively handle the devastating sociocultural and gender-based violence consequences of the public health emergency⁽³³⁾.

The GPMB in their 2nd report *A world in Disorder* has named engaged citizenship, responsible leadership, agile systems, and sustainable investment as essential components to progress in strengthening preparedness capacities⁽⁸⁾.

In addition to the reports described above, the seventy fourth World Health Assembly deliberated on the urgency for a better preparedness globally by acknowledging the following:

Adoption of a resolution of Strengthening WHO Preparedness for and Response to Health Emergencies. The WHA urged Member States to 1. Strengthening their national capacities of epidemic preparedness in alliance to the IHR (2005). 2. Building the capacities of public health preparedness by adopting an all hazards, multisectoral and One Health approach. 3. Investing in more efficient surveillance systems⁽³⁴⁾.

⁴ UPR is a peer review mechanism to ensure country's accountabilities towards International Human Rights Law.

The global BioHub for pathogen storage, sharing and analysis. The COVID-19 pandemic has underscored the importance of real time analysing and sharing biological samples of concerning pathogens, thus the WHO and Switzerland have agreed to establish a global BioHub to foster the global coordination in dealing with biological threats. In addition, it is expected to enable Member States to share biological materials with and via the BioHub under pre-agreed conditions, including biosafety, biosecurity, and other applicable regulations ⁽³⁵⁾

The global hub for pandemic and epidemic intelligence. As a part of the WHO's health Emergencies Programme, the WHO and Germany have launched a global platform for pandemic prevention, bringing together various governmental, academic, private, and international institutions. It will serve as a multisectoral data analysis platform to develop digital tools and predictive models for emergency surveillance, risk analysis, and to monitor disease control measures. This initiative is expected to foster global collaboration and to scale up the innovation of global early warning capacities and diminish the effect of infodemics⁵.

A Pandemic preparedness treaty. Twenty-five heads of states and the WHO have followed up on the recommendation of the IPPPR to endorse an international pandemic treaty to be included in the constitution of the WHO. It is expected to be similar to the WHO Framework Convention on Tobacco control, and to complement the IHR (2005) and other existing global health regulations. In addition, it aims to foster a comprehensive, multi-sectoral approach to strengthen national, regional, and global capacities and resilience to future pandemics⁶

Health Security from a country perspective

Shifting more of the attention of epidemic preparedness from a global perspective – macro level – to a national and subnational level – micro level – and emphasising community engagement is a way forward for improving preparedness. Most countries are overwhelmed with unattained needs: strengthening the health system, sustainable UHC financing, and building capacities of national public health institutes, and others. Both the IPPPR and the GPMB have stressed the importance of National Public Health Institutes (NPHI) in generating the scientific knowhow to orchestrate the national emergency response. In the WHO consultative symposium, unmet needs of building NPHI capacities and implementation framework for health security were raised. NPHIs should play a crucial role in delivering a robust prompt response in tackling contextualised need. The implementation framework would move the IHRMEF from the assessment stage to an actionable level.

After conducting an assessment of the IHR core capacities using the JEE, countries are recommended to develop a costed National Action plan for Health Security (NAPHS). The NAPHS framework is a flexible, three-step approach to help countries plan and implement priority actions to attain health security. The current framework of NAPHS is built on the three stages of inception, development, and

⁵ <https://www.who.int/news/item/05-05-2021-who-germany-launch-new-global-hub-for-pandemic-and-epidemic-intelligence>

⁶ <https://www.who.int/news/item/30-03-2021-global-leaders-unite-in-urgent-call-for-international-pandemic-treaty>

implementation. Within the implementation process, many countries who have published their NAPHS have focused their action plan on the national level, without referring to the societal level, which consequently creates a gap within the implementation process ⁽¹⁹⁾. Therefore, the NAPHS should include both national and societal objectives with short- and long-term attainable deliverables.

The Norwegian Research Council has supported a Global Health and Vaccination Research Programme (GLOBVAC). The final research conference was organised by the Norwegian institute of public health (FHI) and the University of Oslo in April 2021 (GLOBVAC 2021) ⁷. In a keynote address, Sir Jeremy Farrar, director of the Wellcome Trust, argued for scaling up the scope of preparedness beyond just measuring technical capacities. In the post-COVID-19 era, preparedness should be more country specific taking into consideration various domains of demographic, social, economic, and political determinants. At the same conference, the Global Health Preparedness Program at the FHI organised a symposium: *Strengthening Global Health Preparedness and the International Health Regulations [IHR (2005)] – What evidence exists for successful strategies?* Some of the main perspectives were:

From the African perspective, Dr Ahmed O. Ouma⁸ had ranked the need for a skilful workforce as their main priority besides a unified regional surveillance and preparedness system that allows African countries to collectively pool resources, detect outbreaks and effectively take control.

From the European perspective, Prof. Mika Salminen⁹ had argued for more proactive steps; 1) Expanding health system capacity to meet the surge of demand during an outbreak. 2) Investing in new innovative solutions such as mRNA vaccines. 3) Develop more robust surveillance systems between countries, especially at point of entry, so we don't need to closedown boarder and disrupt the flow of essential medical supplies including PPE.

From the WHO perspective, Mr. Ludy Suryantoro¹⁰ prioritised political leadership and effective governance as most valuable steps to strengthen national preparedness capacities. COVID-19 has shown multisectoral coordination and shared responsibilities are fundamental to engaging communities in case of a public health emergency.

⁷ <https://globvac2021.com/>

⁸ Dr Ahmed O. Ouma is the deputy director of the Africa Centres of Disease Control and Prevention (ACDC)

⁹ Prof. Mika Salminen is the director of Health Security department at the Finnish institute for health and welfare, Finland.

¹⁰ Mr. Ludy Suryantoro is a unit head at the WHO HQ, Switzerland.

Section IV: Possible ways to move forward

Key Points

1. Resilience is a dynamic process and doesn't merely depend on financial resources.
2. Each country has a unique context of vulnerabilities which may prevent tangible developments, especially in health security.
3. Community engagement, scientific decision making, and a whole of society approach, are important factors in addition to the IHR technical capacities in mitigating outbreaks.

The previous section presented how IHR contributes in building national competences of epidemic preparedness. The IHR represent a global blueprint to develop epidemic preparedness, despite the limited ability of the IHRMEF to measure countries' ability to navigate through a pandemic. The COVID-19 pandemic has also put into question the validity of available epidemic preparedness assessment models, IHRMEF, GHSI, IDVI, and EPI. It is now evident to us that these assessments or reporting tools have failed to measure, reflect, and guide countries during the pandemic.

In this final section we aim to disentangle the complexity of epidemic preparedness building blocks by presenting different theories and initiatives. To efficiently measure and improve the countries' total preparedness level, we argue for a wider perspective than the ones we have on hand. We also call for a definite and explicit definition of resilience to facilitate further adoption and implementation by countries. The next paragraphs will present various perspectives of developing a resilient health security system.

Concept of a resilient health system

To frame resilience in an applicable context, the Stockholm Resilience Centre has structured seven core elements to achieve resilience shown in figure 6⁽³⁶⁾. These elements were further elaborated by the WHO regional office for Europe in presenting 13 elements of a resilient healthcare system. In their model, financial resources have a major impact on purchasing flexibility, financing the health system, and reallocating extra resources, to deliver a resilient health system⁽³⁷⁾. Financial resources exert certain strengths in the resilience equation, but clearly it is not the vital determinant especially within resource constrained settings.

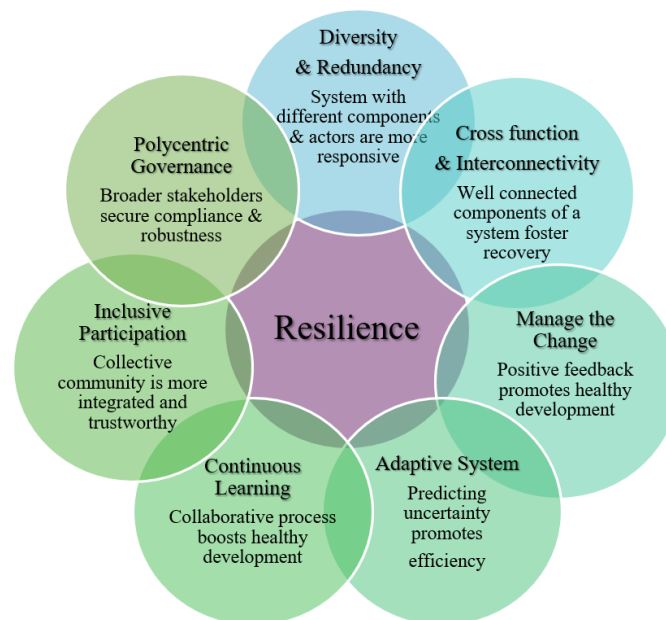


Figure 6: Seven Elements of achieving resilience (Biggs et al, 2015)

Resilient health system based on the COVID-19 experience

The IPPPR has presented a fundamental framework for achieving resilience by reviewing the COVID-19 responses in 28 nations worldwide. It has concluded that *a resilient health system is [the one] able to effectively adapt in response to dynamic situations and reduce vulnerability across and beyond the system* ⁽³⁸⁾. The framework argues for resilience as a dynamic process before, during and after an emergency, and the determinants to achieve this dynamicity are: competent and motivated health workforce, health service delivery, public health function, medical products and technologies, governance & financing in addition to community engagement. While a resilient health system is able to meet the surge of demand for healthcare service during an emergency, resilient systems are expected to protect their skilful healthcare workforce. Adaptive health systems in term of supplies and service delivery is another essential core to mitigate an emergency. In addition, a responsive government can efficiently engage taskforce from all governmental sectors, adopt needed legislations and policies, reallocate resources and take exceptional measures when needed.



Figure 7: Determinants of health system resilience (IPPPR, 2021)

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The IPPPR concludes that resilient countries structured their activities in managing the COVID-19 pandemic based on the following key elements: Whole of government approach; Active community engagement; Public trust; Open communication; Motivated and competent healthcare workers; Responsive primary healthcare; and Multisectoral coordination.

The background review article commissioned by the IPPPR unfortunately doesn't discuss the vulnerabilities of the countries and did not offer a strategic approach to deliver resilience in case of emergency. It confirms that developing a resilient health security system needs to be country based rather than having a global template.

Health System for Health Security

The WHO and Leeds university have jointly proposed a new complimentary health security framework called **Health System for Health Security** (HSforHS).

Currently there are few details about the proposed framework other than its aims:

1. Integration of IHR core capacities into different components of health systems.
2. Benchmarking these capacities and providing guidance for development ⁽³⁹⁾.

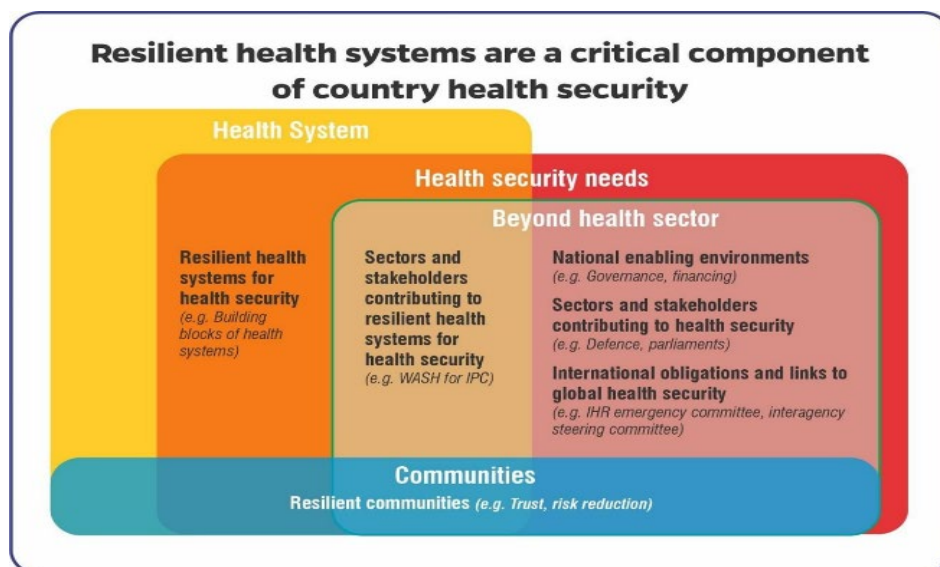


Figure 8: The proposed framework of HSforHS (WHO,2021)

According to Leeds University, the existing health security system is ill-prepared:

- 1- Health security is limited to infectious diseases management and ignores the other pressing issues of NCDs and AMR.
- 2- Health security is usually confined to building capacities of surveillance.
- 3- All contemporary frameworks indicate health emergency as a cross border emergency rather than considering their own ability to generate an outbreak as we see through COVID-19 variants.
- 4- Investment in health security is often siloed, most of programs are unilateral or vertical.

New perspective

As a part of the Global Health Preparedness Programme, NIPH has developed a research proposal to identify a broad spectrum of factors impacting on a country's preparedness called:

Expanded Country Approach for Resilient Health Security Systems – E-CARES

The E-CARES project aims at enabling an efficient governance of emergency preparedness and response in resource-constrained settings. Post-pandemic recovery and future global health preparedness will fail without identifying the real vulnerabilities at the country level, and how to tackle these bottlenecks in an inclusive multisectoral way. The knowledge is needed to better utilise LLMICs resources and strengthen the resilience of their health security systems. Several international reports have praised countries who were agile enough to implement swift restrictive public health measures (24, 40). Societal values of public trust, abidance, and literacy were named as crucial to effectively engage communities in health emergencies (8, 31, 38). However, the knowledge is required to underpin these values especially within resource constrained societies. In a scientific discourse on vulnerabilities and systematic setbacks of a country's preparedness, E-CARES seeks to expand this scope beyond measuring the technical capabilities to explore the country specific context of Political,

Economic, Sociocultural, Technological, Environmental, Legal, and Global collaboration (PESTEL-G) governance (figure 9).

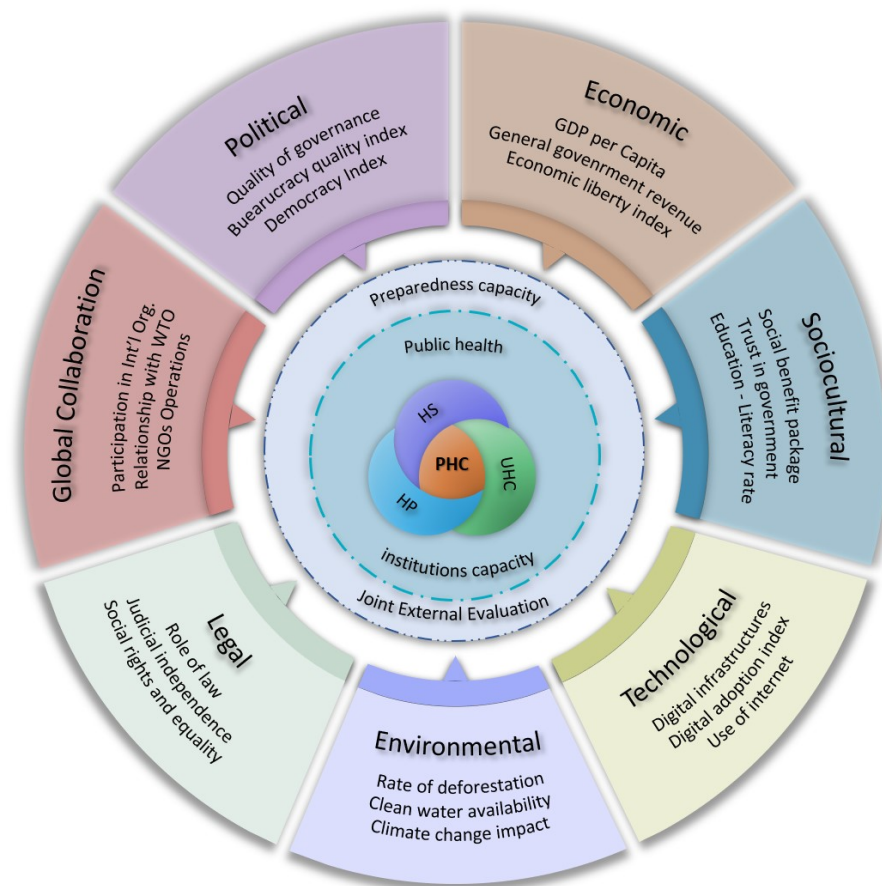


Figure 9: The hypothesised framework of E-CARES for epidemic preparedness

The role of NPHIs in pandemic preparedness and response is rapidly evolving, not least during the current pandemic where they are playing a decisive role in many countries. During a health emergency like a pandemic, the need for scientific knowledge is huge, and NPHIs can be a key provider of such knowledge.

Three of the main principles of E-CARES could be used to contribute in strengthening country preparedness:

- 1- Advancing epidemic preparedness must be a dynamic model grounded on country-specific vulnerability rather than being a template to fill in.
- 2- Having a national institute of public health serves as a dynamic hub to underpin, sustain, and fine tune that dynamic model.
- 3- Reinforcement of Primary Health Care (PHC) is the nucleus of a dynamic resilient health system. While in emergency, PHC serves as the first responder to detect, respond, and prevent an emergency, it bridges the trust between authorities and community, it charges up the community engagement.

Conclusion

Key Points

1. COVID-19 has exposed preparedness as a dynamic process beyond the scope of the technical capacities of the IHR (2005).
2. In the post COVID-19 era, developing resilient health security systems is a necessity to avoid recurrence of pandemics.
3. The global health security arena has 3 major components needed to be addressed in order to deliver resilience: on the global, national, and the local or individual levels.
4. The social determinants of health are of upmost importance to effectively empower community engagement on the individual level.
5. On the national level, determinants of corruption, equality, infrastructure, and others play a dominant role, whereas on the global level, global stakeholders of international and regional organisations are of importance.
6. The current scope of the IHR is limited to certain technical capabilities on the national and global level, while it does not contain any capabilities for the individual level- see figure10.
7. To efficiently develop a resilient health security system, identifying the contextualised vulnerabilities especially those on the sub-national and individual level is vital in order to deliver tangible societal resilience.

The COVID-19 pandemic has caught the world by surprise and no country was well prepared. Developing technical skills of epidemic preparedness is fine, but clearly insufficient to handling a public health emergency like a pandemic of this scale. In addition, the current way of ranking national preparedness levels has failed to effectively anticipate and mitigate the impact of COVID-19. Having a well-structured and developed health system does not automatically imply the system is sufficiently agile to mitigate a pandemic. The way to achieve a resilient health security system is challenging and demands a need for making difficult decisions and calls for a profound understanding of the country specific context and vulnerabilities for effective outbreak management. The essence of the IHR is to apply **proportionate interventions** in a time of emergency and to minimise global disruption. This can only be achieved by contextualising countries' vulnerabilities and thereafter tackling them with cost-effective interventions. Despite the significance of the IHR monitoring and evaluation tools to guide country-specific road maps to develop a national plan for health security, these tools do not capture other essential factors as engaged population, scientific decision making and trust in public services. The pandemic has exposed liabilities of the current scheme of global health security in terms of legitimacy, inclusivity, and sustainability. Regarding **legitimacy**, despite the IHR being legally binding, its national implementation relies solely on countries' willingness, and there are no reinforcement or motivational mechanisms to encourage implementation. Regarding **inclusivity**, the

current schemes of monitoring the IHR capacities have failed to reflect the real-life competences needed to mitigate health emergencies like pandemics. Factors like the capacity of public health institutions, and public engagement are already out of the scope of IHR application. Regarding **sustainability**, investing in public health is a long-term investment which is usually underestimated or overtaken by other pressing priorities for countries, especially those with constrained resources.

During the current pandemic, nonpharmaceutical measures of social distancing, adoption of personal hygiene measures, and implementing preventive interventions and measures, have played pivotal role to curb community spread of SARS-CoV-2. Still, there is much research and analysis to be conducted to be able to better understand why some countries were so much more vulnerable and harder hit than others, and to identify the most important factors of a robust and resilient health security system. In a resilient global health security system, the resilience can be categorised on 3 levels: global, national, and subnational levels, where each of these levels have different variables or drivers as shown in figure 10.

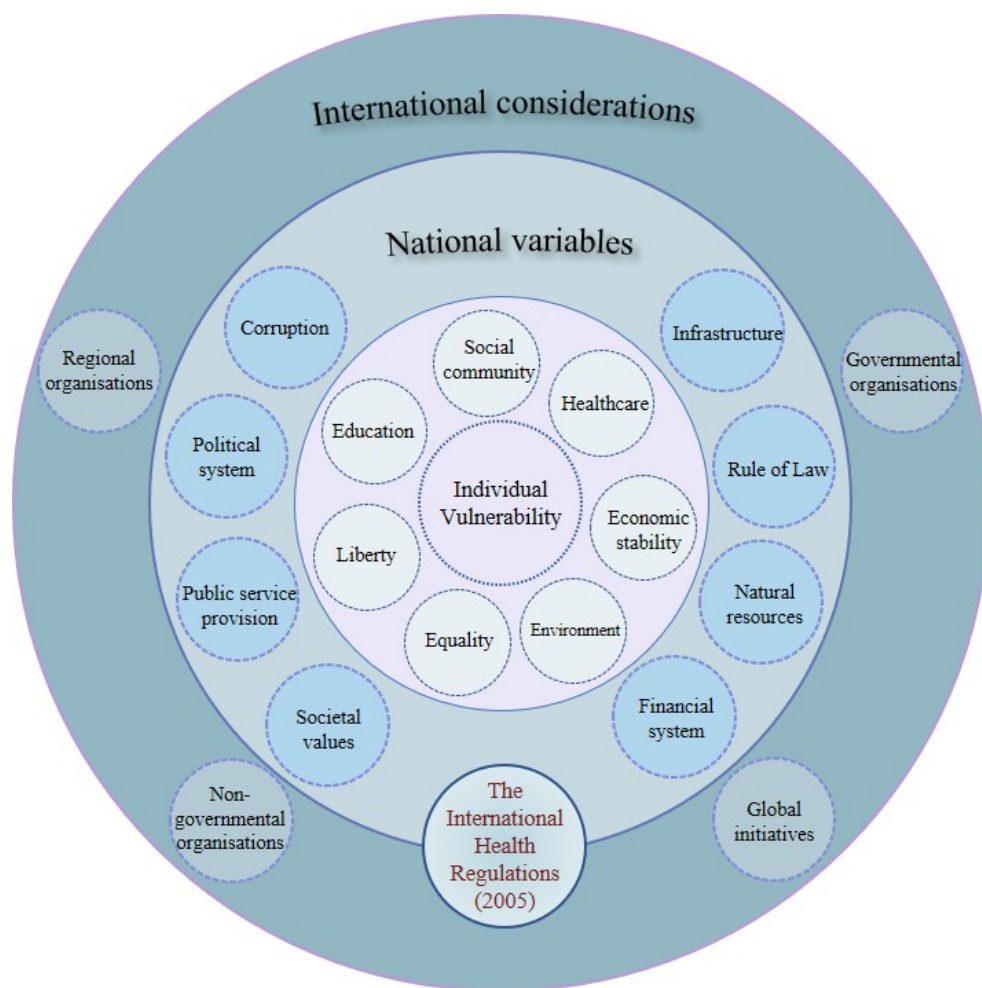


Figure 10: The complexity of developing resilient health security system

On the ***subnational level or microlevel***, the individual represents the core of society. Individual values of social & economic equality, education, literacy, and healthcare accessibility can be keys to shape public trust and consequently lead to better abidance to the authorities in case of emergency.

On the ***national level***, the national priorities are different and so are the vulnerabilities. Factors like availability of national resources, clean water and sanitisation, digital infrastructure, having a national public health institute, skilled workforce, political stability play more significant role in shaping the national political choice and consequently the national strategy in emergencies.

On the ***global level or macro level***, much of the debate on strengthening health security takes place. Global and regional organisations, governments and international non-governmental institutions are important stakeholders on the global level, although the building blocks for resilient global health security are to be found at the national and sub-national level. The main challenge is how to create a political motive to prioritise investment in global health as a common good to best benefit nations and societies.

There are very many factors impacting on the preparedness ability of a country. The core capacities of the IHR are important, but they are only a part of the picture. A comprehensive all of government and all of society approach is needed in order to develop a more robust and resilient health security system in countries.

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