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Addressing the challenges of implementing evidence-based prioritisation in global health

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ABSTRACT

Global health requires evidence-based approaches to improve health and decrease inequalities. In a roundtable discussion between health practitioners, funders, academics and policy-makers, we recognised key areas for improvement to deliver better-informed, sustainable and equitable global health practices. These focus on considering information-sharing mechanisms and developing evidence-based frameworks that take an adaptive function-based approach, grounded in the ability to perform and respond to prioritised needs. Increasing social engagement as well as sector and participant diversity in whole-of-society decision-making, and collaborating with and optimising on hyperlocal and global regional entities, will improve prioritisation of global health capabilities. Since the skills required to navigate drivers of pandemics, and the challenges in prioritising, capacity building and response do not sit squarely in the health sector, it is essential to integrate expertise from a broad range of fields to maximise on available knowledge during decision-making and system development. Here, we review the current assessment tools and provide seven discussion points for how improvements to implementation of evidence-based prioritisation can improve global health.

SUMMARY BOX

⇒ Global health requires evidence-based approaches to improve health and decrease inequalities, yet while countries use numerous assessment tools repeatedly, COVID-19 failures have come on top of the many missed global health-related goals.
⇒ We review the current national public health capacity assessment tools and identify key approaches and areas for improvement to deliver better-informed, sustainable and equitable global health practices.
⇒ We provide seven discussion points for improvements to how evidence-based prioritisation implementation can improve global health which focus on considering information-sharing mechanisms and developing evidence-based frameworks.
⇒ Successful, sustainable systems will develop adaptive and function-based frameworks via having diversity among decision-makers with transparent, respectful and open engagement at all levels of interaction while considering the direct and indirect determinants of health.

INTRODUCTION

Global health aims to achieve health equity for all people. Global health security (GHS) aims, further, to reduce the threat from and impact of acute public health events across regions and international boundaries (see reference 1 for a critique of GHS). Factors affecting both are the politicisation of public health, colonial structures, changing populations, urbanisation, mobility of people and goods, farming practices, wildlife trade, wars, climate change, and environmental degradation, which can all increase the risk of emerging and re-emerging infectious diseases and ecological disasters,[2] and reflect the need for a One Health approach.[3–6] One Health and the incorporation of planetary boundaries into planning and management are required for a sustainable future.[2 3]

The global spread of emerging infections, such as SARS-CoV-2 and monkeypox viruses, is occurring at unprecedented rates.[7] Increasing mobility and economic interdependence mean national borders do not protect against the rapid spread of infectious agents and their vectors. Likewise, increasing food production increases the risk of foodborne diseases, crop diseases and pests. The disruption to food supplies due to global events highlight vulnerabilities that have been evidenced by the rapid global spread of SARS-CoV-2 and the subsequent economic supply chain disruptions.[8] Food supply shortages have been caused by Russia's invasion of

Ukraine as well as war and drought in places including Syria, Yemen and the Horn of Africa.

Pandemics, health emergencies, increasing antimicrobial resistance (AMR), and weak health systems cost lives and pose great risks to security and the global economy. Besides direct effects on people's health, public health emergencies such as emerging infectious diseases disrupt routine healthcare and lead to social and economic related health impacts, and exacerbate already entrenched health inequalities within and between low-income and middle-income countries (LMICs) and high-income countries (HICs). Globally, life expectancy has consistently improved until COVID-19, yet in 2019, it ranged from 53.3 years in the Central African Republic to 85.1 years in Hong Kong[9]; an additional 30 years of life.

Numerous tools exist for assessing the national public health capacities that impact these differences and GHS generally, for example, the International Health Regulations (IHR) Monitoring and Evaluation Framework includes the Joint External Evaluation (JEE), National Action Plan for Health Security (NAPHS, with its three-step inception, development, implementation approach), State Party Annual Reporting (SPAR) and Performance of Veterinary Services (PVS) Evaluation for the animal health sector. Yet, failures in COVID-19 strategies highlight weaknesses in these irrespective of countries' incomes, as reportedly highly prepared countries such as the USA and UK had substantial mortality before vaccination, whereas less well-resourced nations such as Vietnam and Thailand limited mortality.[10–12] In May 2020, the Independent Oversight and Advisory Committee (IOAC) for the WHO Health Emergencies Programme cautioned that use of JEEs and NAPHSs had not clearly strengthened IHR core capacities, nor had it or others seen clear relationships between JEE scores, SPAR and responses to COVID-19.[10 12–14] Countries use these assessment tools repeatedly, yet repeated assessment as a strategy on its own is self-limiting and perhaps even a barrier to implementation. COVID-19 failures come on top of the many missed global health-related goals, from the Alma Ata Declaration on universal access to primary healthcare to progress towards the UN's 2030 Sustainable Development Goals. Recent assessments have recommended numerous revisions, from revising assessment tools through to governance, financing and supporting initiatives to embed universal health coverage within the GHS architecture.[15] Here, we briefly review current tools before identifying important considerations for improving GHS capability prioritisation (box 1). We focus on infectious diseases, but the approaches are generalisable.

Box 1 Key messages for building evidence-based prioritisation systems

1. Determinants of disease and One Health.
   Consider the determinants of health and mitigating these to reduce threats and improve health.
   Develop systems that strengthen collaboration, communication, capacity building and coordination equally across all sectors responsible for addressing health concerns at the human–animal–environment interface.
2. Adaptive and function-based frameworks.
   Focus on sustainable, cost-effective outcome measures based on function, rather than specific stand-alone capacities.
   Develop adaptive global health security frameworks, incorporating continuous monitoring, evaluation and improvement.
3. Evidence-based decision-making.
   Draw modelling data from diverse sources and scales.
   Model functional prioritisations for multiple scales.
4. Engagement at multiple levels.
   Engage with senior government during prioritisation processes.
   Engage with multiple governing sectors from local, national, regional and international.
5. Communication and misinformation.
   Have transparency in data ownership, modelling, collaboration and information sharing.
   Have respectful and open engagement at all levels of interaction.
   Enhance 'storytelling' to the public with improved clarity, visualisation and actionable targets.
6. Diversity at the decision-making table.
   Include diverse, multisectoral expertise and people in prioritisation discussions and decision-making.
7. Regional and collaborative entities.
   Develop regional approaches to strategic planning, financing, training, operations and surveillance.

CURRENT TOOLS

A strength of the JEE, NAPHS and SPAR tools is the promotion of cross-sector collaboration. The JEE provides opportunities for objective independent assessment of public health preparedness capacity, in terms of resources and system capabilities for some set criteria and identifying gaps such as laboratory capabilities. In 2018, however, fewer than half the WHO member states complied with their IHR core capacity commitments.[16 17]

Many factors that affect preparedness are outside the JEE scope, such as trust and governance.[11 12 14] The majority of countries were ill prepared and struggled to implement public health measures in response to COVID-19, whereas a number of countries such as New Zealand, which did not even self-report SPAR in 2019,[12] successfully adapted national pandemic influenza action plans.[18] Other analysis tools (eg, PVS Pathway and SPAR), resource mapping, bottleneck analysis and After Action Reviews from live or simulation events, expert consultations or, often, views of external donors, similarly provide countries with lists of technical areas to improve. However, like JEE and NAPHS, these tools identify gaps, but how to prioritise among the potentially many gaps remains challenging.[19] This shortcoming was recognised in the IOAC recommendation for a review of core capacities, existing tools and frameworks for national and international preparedness.[10] Further, none of these tools are geared towards minimising the likelihood of pandemic events.

Systems are being developed or improved following the COVID-19 experiences. The Surveillance Outbreak Response Management and Analysis System supports data management and has helped countries, such as Ghana and Nigeria, to manage COVID-19.[20] Nigeria also has used Public Health Emergency Operations Centre in response to COVID-19 to increase its molecular laboratory network from 29 states pre-2020 to 36.[21] The Dynamic Preparedness Metrics[22] by the WHO may be useful, yet will depend on evidence from high quality data and modelling to determine its three key areas of hazards, vulnerability and preparedness capacity. WHO's new Universal Health and Preparedness Review (UHPR) draws on JEE and SPAR reviews to support subnational and health system development and includes recommendations that will be followed up and monitored, yet is voluntary and potentially suffers from similar limitations to JEE and SPAR.

The new JEE incorporates some lessons and includes new areas such as infection prevention control, legal instruments and financing, which were previously captured within one indicator (National Legislation and Financing). It also incorporates aspirations for reducing AMR with a One Health approach. The domestic animal health sector's equivalent external evaluation, the PVS Pathway, is also changing by transforming its data and insights on the strengths, weaknesses and recommendations across its 45 critical competencies and the more than 140 countries that have engaged with PVS into a more accessible database using artificial intelligence to inform prioritisation efforts at the global level. These changes are in response to the legal challenges faced in countries' COVID-19 responses related to liability and medical countermeasures and regulatory mechanisms. Country assessments of financing are inconsistent and typically unlinked to national budget documents, therefore they often do not identify gaps in financing. Separating these indicators will help to address these challenges. An important step is to prioritise capabilities and mobilise resources in a cost-effective and sustainable manner.

BUILDING EVIDENCE-BASED PRIORITISATION SYSTEMS

Determinants of health and One Health

Multiple factors determine the health of individuals and communities, including location and environment, genetics, income, educational access and other social factors. One Health provides an important overarching framework to work within.[3] While not all global health issues, such as vaccine preventable diseases like measles are seen as direct One Health issues, most health security threats are. One Health aims to reduce the overall threats to global health and its security, through reducing the risk of emergence at its source. A new One Health Joint Plan of Action (JPA) was launched by the Quadripartite —the Food and Agriculture Organisation of the United Nations (FAO), the United Nations Environment Programme, WHO and the World Organisation for Animal Health (WOAH, founded as OIE). This JPA aims to create a framework to collectively better prevent, predict, detect and respond to health threats. Developed through a participatory process, it aims to strengthen collaboration, communication, capacity building and coordination equally across all sectors responsible for addressing health concerns at the human–animal–ecosystem interface,[3 4] where acute public health events typically begin. Strengthened surveillance systems across all sectors, including animal health, will help identify emerging threats to human and animal health, as evidenced by improvements in food safety.[23] Further, monitoring drivers of pathogen spillover such as land use change, population growth or wildlife harvesting and farming and the socioeconomic drivers of these will help inform better decision-making when considering future scenarios.[24–27]

Evidence-based decision-making

Following technical assessments, such as JEE, PVS and NAPHS, scientific evidence for effective action is limited.[6] Routine communicable diseases, emerging and re-emerging outbreaks, or the most immediately achievable option may be chosen to fill short-term needs due to urgency, pressure and limited resources. Evidence from research outside the assessment tools, however, must also be considered, for instance operational and implementation research can help decision-making to maximise strategic value of services and systems.

Lack of diversity can influence the gaps addressed and where resources are allocated.[12 28] This may neither support strategic capacity building nor leverage analytical expertise or data. Priorities and indicators working towards sustainability are likely to be different than for short-term improvements. Key stakeholders need to know the financial, intellectual and time investments they are making will be cost-effective, sustainable, likely to succeed and facilitate future capacity building.

Evidence-based decision-making allows more systematic allocation of resources and logical stepwise investments for outcomes that can take time to establish (like workforce or domestic sustainable financing). It can also allow tracking of the impact and cost of activities on response and preparedness. Political, social and financial realities still may determine priorities, but at the very least decision-makers can know the potential 'rate of return' for implementations that may increase or decrease their effectiveness, including the savings of prevention.[29]

Building an evidence base for decision-making is not a crisis activity, but a continuous process, ideally bringing new ideas and solutions as issues are identified and building trust among the information 'producers' and 'users'. The strengths of analyses rely on adequate data, modernisation and digitalisation efforts, and critical thinking about how these data and their uncertainties are synthesised into new knowledge. Iterative modelling approaches used for similarly complex systems in other

fields exist.[30 31] Optimal analyses identify key functionalities and goals and then include quality data from diverse sources, yet are transparent, inclusive and fast enough to be practical. Multiple scales are likely to require modelling to ensure diverse needs do not negatively impact each other. In addition, experts involved in building an evidence base should be present during discussions, to communicate the strengths and limitations of available data and analyses. This represents substantial but necessary commitments to pursuing solid evidence-based approaches for improving prioritisation.

Adaptive and function-based response and delivery frameworks

Existing metrics for public health preparedness and healthcare capacity do not reflect the range of variables affecting a country's response to events.[10] A functionality focus—identifying and leveraging common processes and systems—would help develop sustainable investment instead of just improving immediate results.

The ability to scale up or shape a response based on a country's needs is best done using a functional approach, rather than using stand-alone resources. The rapid move from an epidemic to pandemic situation with COVID-19 demonstrated the need for ensuring surge capacity, resilience and flexibility for responses to large-scale emergencies. Establishing ambitious targets can help if appropriate resources are available. For example, a 7-1-7 target, with 7 days to detect, 1 day to notify and 7 days to mount an effective response to infection,[32] and bottleneck analyses with immediate funding enabled a rapid change to reduce SARS-CoV-2 testing time in Nigeria, where these and other initiatives have reduced times from 7 to 2 days for a PCR test.[33] These provide targets that teams can aim to achieve.

Purely cost-effectiveness studies, which may work for clinical interventions, may not work as well for complex system interventions. Rather, assessing the functional interaction of capacities against the goals of the system and the priorities may present a better approach. We need to embrace complexity and a One Health approach to find potential win-win solutions and find short-term and medium-term trade-offs.[3] The Economic Community of West African States[34] workshop on epidemic disease, for example, prioritised zoonotic diseases, but when responding to COVID-19 it proved better to prioritise general capacity and preparedness, rather than a specific disease. An adaptive modelling approach would use updated, evidence-based decision-making to assess trade-offs and relative gains by capacities against goals, including responses to interventions. The COVID-19 pandemic provides a stark example of the need to assess responses to decisions, such as non-pharmaceutical interventions to emerging threats.

Engagement at multiple levels

Global health systems are complex, where one capacity has direct and indirect impacts on the effectiveness of another, and these may be influenced at local, national, regional and international levels.[35] These are frequently dependent on workforce development and governance structures. Engagement of senior government officials is critical in gaining political buy-in and navigating differences in priorities at multiple levels (global, regional, subregional and national) and among organisations (multilateral entities, donors, etc). Political commitment is also essential for development of NAPHS, implementation of recommendations from evaluations such as JEE and PVS, and meaningful engagement with regional entities. For example, as of 1 January 2021, the Africa Centres for Disease Control and Prevention (CDC) had received 68% of pledged member states' and 40% of pledged multilateral funding, indicating a shortfall of investment and buy-in.[36] Equally, COVID-19 revealed that some HIC countries' leaders ignored risks and health-expert recommendations, leading to high early death tolls prior to the availability of vaccines. For example, the USA and the UK were, respectively, ranked first and second for pandemic and epidemic preparedness by a 2019 Global Health Security Index (GHSI), but suffered greater mortality early in the pandemic relative to several WHO Western Pacific region countries that had been ranked much lower.

Each region, country and their communities have health priorities that need to be factored into discussions to ensure long-term sustainability. Addressing this within-country diversity requires planning. For example, a national action plan for Nigeria, which has managed recent outbreaks of COVID-19, Lassa fever, Ebola virus disease, meningitis, yellow fever, measles, cholera and mpx,[33 37] needs to consider managing 36 subnational entities and an estimated >200 million people.[38] Systems interoperability across multiple sectors using a One Health approach is central for this.[3] Coordination and leadership are necessary across ministries, departments and agencies, including health, agriculture and environment ministries for zoonotic diseases and include emergency response coordination, health laboratory services, surveillance and epidemiology, case management, infection prevention and control, risk communications, logistics and supply chains.

Coordinated and collaborative financing platforms,[39] including regional initiatives (see below) can help promote domestic investment and direct existing and gap-filling international financing to where it is needed most. Funding mechanisms for this can include a Financial Intermediary Fund for pandemic prevention, detection, and preparedness and response to provide catalytic and gap-filling funding and contingency funds for emergencies (eg, with FAO, WHO and WOAH) to ensure rapidly scalable financing for response.

Communication and misinformation

Prioritisation involves consideration of social context, including engagement of communities, local media, social cohesion and misinformation management.

Misinformation, particularly but not only on social media, is a challenge to GHS, evidenced by the resurgence of poliomyelitis in Pakistan[40] due to misinformation about polio vaccines and any number COVID-19 responses in LMICs and HICs.[41 42]

Transparency in knowledge and information sharing on platforms that are easily accessible to the public may help build trust.[43 44] This includes communicating scientific uncertainty effectively to decision-makers and communities, without increasing negative behaviours such as vaccine hesitancy.[45] Expertise from social and computer sciences also may help minimise the development and spread of misinformation and maximise spread of accurate, defensible, authoritative information, such as using 'storytelling' with clearly visualised actionable targets, which have been used to limit SARS-CoV-2 spread.[46] Engagement at multiple levels (#4 above), with greater inclusion (the following two sections) further help develop trust and prevent misinformation. Ultimately, community engagement is a core activity in planning for pandemics and other global health crises, helping address misinformation and protect and strengthen societal cohesion.[47]

Diversity at the decision-making table

Prioritisation itself needs a good governance model.[35] To create 'stronger and more inclusive health emergency preparedness, response and resilience architecture',[39] prioritisation needs to operate within marginal economies, be accountable, transparent, participatory, equitable, consistent with the rule of law and evidence based. As illustrated by mpx,[48] all countries would categorically benefit from supporting better routine surveillance, and equitable distribution of diagnostics, therapeutics and vaccines, for numerous infectious diseases that are incorrectly and unethically perceived as only LMIC problems. Similarly, experience with SARS may have helped some Western Pacific region countries respond better to COVID-19 than some HICs such as the USA and UK. Greater diversity and openness to others' experiences may help improve decision-making and avoid hubristic decisions.

Presently, prioritisation largely includes a technical assessment and a financial and political analysis. The technical assessment generally consists of subject-matter experts providing opinions. This has led to criticism such as JEE assessments being susceptible to cognitive closure and groupthink and creating GHSI blindspots.[12] Science can inform and optimise prioritisation. Although experts may be knowledgeable, the outcomes will be limited and less optimal if a diverse set of skills, perspectives, knowledge and experiences are not incorporated into collaborative data collection phases and not included in decisions. Diversity across these sectors includes age, gender, race, ethnicity and people with disabilities, who may experience outbreaks very differently than other groups.

Stakeholders include public health, medical and veterinary personnel, scientists from disciplines including life and social sciences; science communicators; communities; representative countries and regions; industry and academia. Key sectors include public health, animal health, trade and production, environment, research, and defence and security, which are often engaged in response but not adequately leveraged for preparedness.[35] Financial ingenuity can enable mobilisation of resources for public goods, which cannot depend solely on public financing. Therefore, it is critical to engage the finance sector, including private financing (ie, financial markets, impact investments, catastrophe bonds), in prioritisation processes. In addition, clinical care is often not included in GHS assessments, yet the COVID-19 pandemic has shown the importance of countries' ability to surge intensive care, including such as quickly scaling up oxygen support.

Africa CDC recently commented that while it was established by the African Union to deal with disease threats, it is currently unable to participate in the first call for proposals for the World Bank Pandemic Fund for Pandemic Prevention, Preparedness and Response. In a global context, inclusion of diverse stakeholders from HICs and LMICs in GHS prioritisation, including those dependent on decision outcomes, would enhance dialogue and outcomes and promote a whole-of-society approach to challenges.[49] Outcomes are frequently made based on the people present and 'voices heard' during decision-making and once a diverse range of stakeholders are in the room, it is difficult to leave these stakeholders and sectors out. Diverse expertise is more likely to construct cost-effective, just, and impactful interventions that will be taken up by communities and avoid negative consequences such as environmental harm.[2–4] Expanding the number and type of sectors involved increases the complexity of prioritisation, but the benefits of reaching consensus can be significant[50] and the approval on 30 June 2022 for the inclusion of civil society organisations into the World Bank Pandemic Fund should strengthen the outcomes.

Regional and collaborative entities

Frequently missing in prioritisation discussions is the importance of regional entities.[6 35] Individual states can benefit from collaborative action with international and NGO groups, including private sector companies, to optimise collective efforts for information sharing, planning, surveillance, financial support, access to equipment and pharmaceuticals, technical training and capacity building. Such collaboration is voluntary. For example, under IHR all WHO Member States are legally bound to work together for GHS, yet the WHO has limited power and the IHR does not provide the WHO Secretariat with authority to impose sanctions on countries for non-compliance.[9] Member States are responsible for adhering to regulations. However, the benefits of adhering and collaboration to capacity building can be manyfold.

Many capabilities needed for pandemic prevention, response and preparedness require broad regional coordination, for example, surveillance in particular, but also laboratory systems and training, and managing infectious diseases and their drivers.[51] The complexity of multiple services and organisations working across multiple scales can be a barrier to successful outcomes, but coordination across scales can help with knowledge sharing and capacity building if all parties communicate and coordinate, meaning global, regional and subregional agencies such as WHO, Africa CDC and West African Health Organization (WAHO) can facilitate improved decision-making and prioritisation. The expansion of diagnostic PCR capability in multiple African countries through numerous entities working together during the COVID-19 pandemic highlights the advantages of regional collaboration to leverage knowledge sharing and capacity building[27 32] without multiplying infrastructure which may be difficult to sustain. New technologies will help this in all global regions, such as the expansion of open-source tools to help with surveillance activities (eg, https://pathogen.watch/).

Africa CDC's Biosafety and Biosecurity Initiative went through an extensive consultation process using five subregions to establish joint priorities which were used to drive initiatives (including donor engagement), leading to regionally led efforts. These models are critical and can help share the burden (from advocacy to capacity building), aligning common needs and goals and strengthening the network of health emergency coordination hubs. This standardisation of approaches to strategic planning, financing, operations, monitoring of health emergency preparedness and response can help globally but also over time, reduce reliance on donors.[49]

CONCLUSION

In summary, tools such as the current JEE and NAPHS focus primarily on response capabilities, rather than on the prevention of outbreaks. Using an evidence-based framework within a One Health philosophy with greater inclusivity and social engagement, drawing on a wider range of skills and the experience and insights gained from a more diverse representation in decision-making will contribute to improved global health through greater trust, connection and communication, and focus on prevention. Moreover, adaptive, function-based approaches are sustainable, scalable and can be responsive, whereas information sharing and collaborative approaches can highlight and problem-solve gaps for further improvement and provide a more effective response to disease outbreaks. Taking an evidence-based functional and adaptive approach to achieving equity in global health requires collaborative engagement, trust and is needed in LMICs and HICs.

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