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7-1-7: an organising principle, target, and accountability metric to make the world safer from pandemics

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Introduction

COVID-19 makes it both possible and necessary to review lessons learnt from recent epidemics, re-evaluate approaches, and develop a framework that accelerates progress to make the world safer from epidemics. Every country and every community must be able to rapidly detect, report, and respond effectively to any potential major new health threat. Notably, wide variation in capacities exist across countries.^{1,2} To improve early detection and rapid control of health threats, clear performance targets need to be set, cross-country variations need to be better quantified, factors responsible for these variations need to be identified, and speed and quality of detection and response need to be improved.³

Since the west Africa Ebola epidemic of 2014–16, several frameworks have been developed to measure readiness capacity. These frameworks focus on discrete components of health systems (eg, laboratory, surveillance^{4,5} and

universal health coverage⁶) rather than overall system performance, and do not adequately account for less easily measurable capacities, such as access to rapid financing and logistics, transparency, governance, leadership, or overall system fairness.⁷

How fast a system detects and responds effectively to a threat is the optimal measure of performance.^{8,9} Continuously evaluating and improving timeliness can identify performance bottlenecks and help to accelerate progress, improving detection speed and response quality.^{8–11} Timeliness metrics have been integrated into the WHO after-action review process¹² and the Triple Billion targets for its 13th General Programme of Work (GPW13).¹³ However, clear targets for time to detection and response have not yet been described. These metrics can supplement existing capacity measurements of the International Health Regulations (2005), including the Joint External Evaluation, which have been shown to be useful but not sufficient to predict effective response to COVID-19.²

The COVID-19 pandemic provides a galvanising moment to set clear and ambitious goals to promote accountability and to align stakeholders, including communities, countries, global health institutions, and donors. Ambitious but achievable goals are an essential communication tool to improve the identification and control of health threats. Establishing objectively verifiable benchmarks will give countries clear guidance, will give partners, civil society, WHO, and donors a clear pathway forward for measurement, accountability, and improvement, and will help governments and civil society to focus attention and resources.

Part of the reluctance to fund health preparedness stems from the absence of simple measurements of progress. One reason for broad support for the global initiatives against HIV and malaria has been the appeal, to politicians and voters alike, of clear metrics: the number of people treated, the bednets distributed, and the lives saved. For HIV, the 90-90-90 goal established by the UN¹⁴—ensuring that 90% of people infected with HIV know their status, 90% of those diagnosed receive sustained treatment, and 90% of patients receiving treatment have undetectable viral load—translated evidence of the benefits of antiretroviral therapy into targets for harmonised global action on solid, life-saving outcomes.¹⁵ Generating enthusiasm and support for a public health programme is easier if it has a performance metric that is straightforward, easily remembered, and will catalyse progress on the problem being addressed.

We suggest a new global target of 7-1-7 (panel) whereby every suspected outbreak is identified within 7 days of emergence, reported to public health authorities with

Panel: 7-1-7 target for outbreak detection, notification, and response

Suspected outbreak detection (time to target: 7 days)

Required capacities and response components:

- Access to medical care and treatment
- Health workers trained on case definitions with the ability to detect suspected outbreaks
- Laboratory diagnostic capacity for differential diagnosis

Public health authorities are notified and the investigation is initiated (time to target: 1 day)

Required capacities and response components:

- Clear reporting structures
- Data systems and training for reporting from clinical and laboratory facilities to public health
- Public health workforce receives alerts and initiates investigation and response

Effective response measures are put in place (time to target: 7 days)

Required capacities and response components:

- Component 1: response initiation
- Component 2: epidemiological investigation
- Component 3: laboratory confirmation
- Component 4: medical treatment
- Component 5*: countermeasures
- Component 6*: communications and community engagement
- Component 7*: response coordination

*Components 5, 6, and 7 might not be required for all responses (see appendix p 4 for details).

See Online for appendix

initiation of investigation and response efforts within 1 day, and effectively responded to—as defined by objective benchmarks—within 7 days (appendix p 1). This 7-1-7 target can provide a global basis for accountability, be applied at country level to assess and improve performance, and can also be applied locally to promote equity in detection and context-appropriate response capabilities.

Detect within 7 days and notify, investigate, and begin response within 1 day

Setting a performance standard of 7 days from the emergence of an outbreak to recognition and 1 day for notification, investigation, and initiation of response allows for the assessment of the performance of surveillance, reporting, investigation, and response systems. A 2010 study that examined timelines for 281 WHO-verified outbreaks reported between 1996 and 2009 showed that the timeliness of outbreak start to outbreak discovery improved from a mean of 29·5 days to 13·5 days.¹⁰ With most outbreaks and delays recorded in Africa, WHO reviewed timeliness metrics for 296 substantiated outbreaks in the African region that were reported using the Integrated Disease Surveillance and Response strategy during 2017–19.¹⁶ There was a median of 8 days (IQR 2–28) for time to detection and 3 days (IQR 0–9) for time to notification. During these 2 years, timeliness for detection improved substantially, indicating advances in surveillance systems, although time to disease notification increased.¹⁶ A study of timeliness intervals for outbreaks in fragile states from 2000 to 2010 showed a similar median delay of 29 days (range 7–80) for outbreak discovery.¹⁷ The 7-day target for detection is ambitious and varies by pathogen; however, as shown with the data from Africa, it is possible to detect events within 7 days. Notification of a Public Health Emergency of International Concern within 1 day (24 h) is already required under the International Health Regulations (2005);¹⁸ delays in notification must be reduced substantially to provide timely awareness of new and unfolding potentially serious public health events. The initiation of investigation and response within 1 day is a mark of a responsive public health system. Measurement of the time from outbreak emergence to detection often requires a retrospective analysis after an outbreak has been fully investigated. Although not all emerging threats merit an urgent response, starting the investigation and response in 1 day is indicated because the extent and cause of suspected outbreaks, and therefore the potential that these will be catastrophic, is not known until the investigation is undertaken. Although some pathogens (eg, *Neisseria meningitidis*) need detection and response in less than 7 days, and others (eg, *Mycobacterium tuberculosis*) might not be detected in this time frame, establishing a single metric is a route to standardised assessment and comparisons

across countries and over time; stratified analysis might provide for a refined indicator as more data become available, with standard definitions and data collection.

Mount an effective response within 7 days

After notification, the outbreak response should begin immediately. The proposed target to establish effective control measures includes seven response components; each of the applicable measures should be completed within 7 days (panel, appendix pp 2–4). In comparison with data on detection and reporting, fewer retrospective data are available for the timeliness of response actions because there are uncertainties about what constitutes a response action. The WHO GPW13 methods describe the “earliest date of any public health intervention to control the event”, which can include the time the field investigation started, the time the incident management system was established, the time the vaccination campaign started, the time the rapid response team was established, the time the vector control programme was launched, the time the food product was recalled, or the time that risk communications were started.¹³ The 7-1-7 target makes clear that multiple response components must be in place for a response to be considered effective, and that the relevant components should all be in place within 7 days of notification to public health authorities. Although different pathogens require different paces and types of intervention, the seven components are broadly applicable. Obtaining detailed epidemiological and laboratory information is foundational in any outbreak response. The provision of medical treatment and supplies, including personal protective equipment and other appropriate countermeasures, is required for most outbreaks, as is effective communication and community engagement. In any large event, the establishment of an incident management system is essential to ensure effective coordination of stakeholders across sectors. If any one of the applicable steps has not been taken, the 7-day metric would not be considered met. This clear, simple yes-or-no approach increases accountability and provides a roadmap for initiating early and effective responses. More details are provided in the appendix (pp 2–4).

The 7-1-7 target provides a common benchmark to assess the effectiveness of clinical, laboratory, and public health detection and response systems. Although this 7-1-7 target is ambitious and exceeds the performance levels of some recent outbreaks, including the initial emergence and cross-country spread of COVID-19, it is feasible, even if this approach is not achievable in every instance. Synthesising data into the 7-1-7 metric will integrate and improve the use of data collected through existing systems, including Integrated Disease Surveillance and Response reporting, laboratory information management systems, and various surveillance platforms, including District Health Information Software 2-based systems. Event management systems could serve as an efficient platform to integrate data from across departments and sectors.⁹

WHO should consider adopting the 7-1-7 target as part of its reporting to establish a standard measure of how well countries are detecting and responding to outbreaks. Countries would be able to simply and regularly assess their performance as well as identify areas for improvement. The 7-1-7 target would also improve global preparedness accountability and could further catalyse action and funding from donors and entities, including the World Bank and other international financial institutions. Formal adoption of the 7-1-7 metric by WHO (eg, as part of its Triple Billion initiative) could increase funding for national and international epidemic response agencies, as well as increase financial commitments from countries.

Although the 7-1-7 metric is a global target, implementation of and accountability for this target must be accomplished by countries, where national public health institutes or ministries of health have primary responsibility for collecting data and routinely assessing performance to identify lessons learnt, best practices, and areas for improvement. National public health institutes can accelerate progress towards the 7-1-7 target,¹⁹ as shown by the Nigeria Centre for Disease Control and others,²⁰ if these institutes are well integrated into the overall public health system, including at the subnational level, and have sufficient autonomy and protection from political interference. Although countries will vary in their performance on the targets, a global target can help identify priorities for donor investments and technical assistance as well as allow all countries to identify system bottlenecks and align health security goals among stakeholders.

We are at a now-or-never moment to improve global readiness for disease threats. We cannot know the character or timing of the threats ahead, but we can be certain that such threats are inevitable. The urgent need to improve speed and completeness of detection and reporting, and quality and timeliness of response, is clear. Establishing the 7-1-7 target will provide impetus and accountability to make the substantial financial, technical, and political investments needed to strengthen global health protection by improving our capacity to find, stop, and prevent future pandemics.

Contributors

TRF developed the concept for this Viewpoint and led drafting and revision. CTL led the data analysis and contributed to drafting and revision. AFB, along with CTL, led the creation of the appendix and contributed to the analysis, drafting, and revision. MB and AM contributed to conceptualisation of the Viewpoint and participated in drafting and revision.

Declaration of interests

We declare no competing interests.

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