



The Next Pandemic Won't Wait:

What World Leaders Can Do to Strengthen Outbreak Detection, Analytics, and Data Systems

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Introduction

The exponential growth in data and dramatic advances in technology are transforming everyday decision-making, yet much of the world is still flying blind when it comes to predicting and managing pandemics. COVID-19 has made the world keenly aware that many parts of the world do not have the capacity necessary to implement a data-driven response. Sharing of data and timely information is critical to making decisions on how best to respond to public health emergencies, particularly in the face of uncertainty. While some countries are applying cutting-edge outbreak science to decision-making during this current pandemic, big gaps still exist in our global capacity to do so. For example, robust testing and infectious disease modeling have been critical in guiding response decisions in many countries. But testing has been unevenly available among nations, and infectious disease forecasting capabilities remain in an early stage of development. Targeted, sustained, and substantial investments in modernized data acquisition and analytics are needed to transform national and global outbreak response abilities.

While data technologies have transformed the world in many ways, they have yet to revolutionize global and public health capacities. There are several reasons for this, including a persistent failure to invest in sufficient data systems to support and guide public health. Transitioning private sector solutions to address these shortfalls can dramatically improve how public officials can use data for better decision-making in the face of outbreaks and emerging pandemic threats.

Novel data sources, combined with tools such as geospatial mapping and next generation DNA sequencing, along with advances in mathematical modeling and machine learning, can dramatically improve how we predict, detect and respond to infectious disease outbreaks. We need robust and aligned efforts to advance the state of outbreak science, including collecting better data, developing better models, applying results to guide more effective public health responses and leveraging capabilities from the private sector, to develop and scale analytics that can be used by health officials across the world.

Policymakers must consider countries' need for suitable tools and capacity to properly manage outbreak data collection and analysis in order to adequately respond to COVID-19 and prepare for future infectious disease threats. The Pandemic Action Network proposes three key actions for world leaders to close critical gaps in global outbreak detection, analytics, and data systems:

- 1. Bolster global data access initiatives for infectious disease outbreak detection and prevention.**
- 2. Create an international fund to support private sector innovation for global, public health data systems.**
- 3. Modernize national data and analytical capabilities to guide outbreak response.**

Overview of key challenges to effective outbreak detection

Decision-makers lack up-to-date, complete, and actionable data to implement effective pandemic response measures.

Countries need substantial infrastructure and capacity to capture, aggregate, and share real-time disease surveillance data. However, in the face of limited resources and capacity, countries, particularly lower- and middle-income countries (LMICs) need incentives and technical support to invest in, and maintain, that infrastructure. Otherwise, they are left with crippled data systems that are, at best, barely equipped to deal with the last crisis, let alone for the next one. Further, as COVID-19 has highlighted, political pressures at the local, national, and international levels create disincentives for timely data sharing at critical junctures in outbreaks. Together, these challenges leave key decision-makers with low-quality data and a well-warranted lack of trust in the information they're receiving. Meanwhile, the global tools that currently exist to measure and enforce countries' capacities to respond to outbreaks, such as the [Joint External Evaluations](#) (JEEs) and the [Global Health Security Index](#) (GHS Index) do not adequately account for countries' analytical capabilities or the quality of their data.

Although the recent promising, exponential growth in novel data sources (e.g., mobility data, local population sizes, genomic sequence data, healthcare provider capacity, public health capacity, types of interventions used) is increasingly proving valuable for some early disease detection and precision response efforts, this information has gone largely untapped to improve outbreak preparedness and response. Public health professionals and disease modelers do not have sufficiently accessible methods for collecting, vetting, integrating, and analyzing this data. At the same time, those with access to novel data do not share them regularly because transaction costs for doing so are high. Vetting requests for data and creating and enforcing legal agreements to operationalize data sharing requires significant overhead and serves as a disincentive. When sharing does occur, it is often ad hoc and only provided to a highly limited set of users. Data owners also may have little insight into how their data may be useful for pandemic use-cases.

Outbreak science is highly fragmented and underfunded.

While academia has been advancing cutting-edge work, incentives are misaligned, largely driven by a mandate to publish rather than develop actionable tools that support decision makers. There are too few experts with capacity and skills to support a global response to a pandemic. The tech industry has relevant skills that are transforming healthcare but has been largely untapped for public health. Finally, health responders, who are key users of the insights generated via outbreak science, are often excluded from discussions over what innovations are needed to better respond to outbreaks. Rarely have we seen these key groups of academics, policymakers, and frontline healthcare workers collaborate across sectors to leverage their unique skills and make meaningful progress toward strengthening tools and capacities for outbreak science.

One of the key challenges is that outbreak science has typically been excluded from government budgets for pandemic preparedness. In the absence of sufficient public capacity, the private sector has played a considerable role providing technologies and analytics to respond to the COVID-19 pandemic. This year, the world's top tech companies have developed

exposure notification apps to scale contact tracing capabilities, while collaborations across the private sector and civil society groups have created an array of essential digital tools that have become the backbone for global surveillance of COVID-19, including [The COVID Tracking Project](#), [COVID Exit Strategy](#), [COVID Local](#), and the Johns Hopkins University (JHU) [COVID-19 Dashboard](#).

While the entrepreneurial, all-hands-on-deck nature of the COVID-19 response has been dynamic and inspirational, it has also been ad hoc. There is currently no organized international structure to take on the complex challenge of developing and deploying frontier analytics for enhanced global epidemic and health intelligence. Given emerging pandemic threats, governments should treat this as a global public good and as an urgent and essential investment priority for national and global security.

Leadership matters.

A number of countries that have done exceptionally well in controlling COVID-19, such as South Korea and New Zealand, have prioritized widespread testing and rapid data sharing in their responses. Other countries, including the United States, have suffered greatly from the lack of a coordinated national testing strategy, political interference in data collection and reporting, and the failure to systematically develop and deploy the epidemiological modeling and forecasting capabilities needed to guide states and local jurisdictions in their policy and funding decisions. More than ever, today's digital technologies offer potentially powerful tools to predict and contain pandemic threats, but they depend on leaders' willingness to invest in, and be guided by, data and science.

An agenda for international action

1. **Bolster global data access initiatives to improve the quality, accessibility, and use of both traditional and novel data for outbreak prediction, detection, and response.**
 - **Incentivize timely and quality data collection by providing technical support, project management, and funding for data and analytics to LMICs.** This will improve both sentinel surveillance and event-based surveillance systems and is critical for collection of real-time health data from the frontlines. To this end, the World Health Organization (WHO)-led [Review Committee](#) on the Functioning of the International Health Regulations during the COVID-19 response should consider strengthening disease surveillance data collection requirements.
 - **Invest in a neutral global interface to enable increased data access by vetting novel data sources and rapidly facilitating data sharing agreements between data owners and users.** Such options could include supporting and enhancing an effort such as [DataPartnership.org](#), a joint effort of the World Bank, the International Monetary Fund and Inter-American Development Bank which already has data sharing agreements with dozens of companies; [The Trinity Challenge](#); or establishing a similar structure through another entity. A widely reputable academic or non-profit organization should convene a consortium of international funders, private sector data owners, and academic data users to develop the neutral interface for data sharing.
 - **Convene leaders of recently created, crowdsourced data collection networks to develop a roadmap for transitioning them from bespoke COVID-19 response efforts to permanent elements of the global health security architecture.** Such platforms include JHU's [COVID-19 Dashboard](#) and [The COVID Tracking Project](#), which have provided valuable checks and balances on official government data systems. As part of its inquiry, the [Independent Panel for Pandemic Preparedness and Response](#) should identify and publish lessons learned from across these efforts, and determine how best to maintain, grow and systematize them as complements to existing data systems. In parallel, international funders should support a series of convenings and tabletop exercises that bring these informal, “bottom-up” groups together and situate them as critical components of the global public health infrastructure. An appropriate journal could then publish a series of papers on lessons learned from these efforts with a roadmap detailing the potential governance structures and funding requirements to sustain them.
2. **Create an international technology innovation fund to support private sector innovation for global health data systems.**
 - **Convene a high-level global virtual meeting to discuss the creation of a global fund for advanced outbreak analytics and make specific recommendations for how the fund will operate, and how it will be financed.** The World Economic Forum (WEF) and The Rockefeller Foundation are best positioned to convene such a meeting as a sidebar during their annual meeting, or as a separate [Bellagio conference](#), respectively.

- **Align constituent members and key stakeholders to evaluate and organize means of supporting public-private partnerships for data sharing.** As an established and reputable research alliance, [GloPID-R](#)—in collaboration with the [WHO TDR](#)—could convene this group and expand their own data sharing framework to more explicitly determine how to incentivize private sector involvement in data technologies for global health and pandemic response. GloPID-R should also convene a meeting with the WHO to revise their data sharing framework.
- **Establish and finance the fund by the end of 2021.** Announce the key stakeholders, size and scope of the fund and fund managers at the WEF Annual Meeting to capitalize on current engagement from the private sector and create sustained attempts at involving the private sector in building technologies for outbreak analytics.

3. Invest in and modernize national data and analytical systems and capabilities to guide outbreak preparedness and response.

- **Ensure that every country’s national health security action plan prioritizes strengthening their outbreak analytics capacity, embedded in their Emergency Operations Centers.** This requires not only investing in smart technologies but also in providing the necessary technical and management support to ensure that data is properly collected, analyzed, and used for effective decision-making for outbreaks. The ongoing global COVID-19 response efforts, including the [Access to COVID-19 Tools-Accelerator](#) (ACT-A) and its focus on better data as an enabler to support LMICs’ planning and rollout of COVID-19 diagnostics, vaccines, and therapeutics, provides a real-time opportunity to prioritize this support.
- **Catalyze international support for outbreak analytics.** The WHO Executive Board should propose a measure for adoption by the World Health Assembly that will call for a coordinated international effort to enhance outbreak analytics capabilities to prepare for and respond to global health emergencies, and galvanize national, regional, and global initiatives and sustainable funding.
- **Strengthen existing global health security measurement tools by adopting enhanced metrics that include data analytics to more comprehensively assess countries’ ability to respond to outbreaks.** Specific recommendations are listed below, and should inform the ongoing review of the JEEs, the IHR Monitoring and Evaluation Framework, and the implementation of the Global Health Security Agenda and the GHS Index:

New Metric	Tool
The presence and use of data sharing technologies (e.g., electronic case records, electronic lab records).	JEE
The use of and plans to expand dedicated analytical capacity that can provide epidemiological modeling results that support outbreak response decisions.	JEE, GHS Index
Timeliness metrics , that measure the speed with which an outbreak is detected, verified, communicated, and ended. This will help countries to measure the actual impact of certain investments in disease surveillance and better understand where they stand to improve.	JEE

- **Before the end of 2021, agree on a roadmap to establish a global, interoperable outbreak detection system that will integrate available national and international data sources.** Inspired by the [Famine Early Warning System](#), this type of tool would use well-vetted, internationally available software and provide countries with the most up-to-date analytics for supporting decisions about outbreak management that can be customized to fit their national needs, while also providing a reliable international dashboard that will enable national systems to talk to each other and better manage these cross-border threats.

Conclusion

The COVID-19 pandemic has exposed the world's extreme vulnerability in the face of a highly infectious disease threat and has underscored the urgency to strengthen global and national preparedness. It is well past time for world leaders to put preparedness front and center on the political agenda and stop the cycle of panic and neglect once and for all. While addressing the urgent funding needs for the global response, leaders must also take concrete steps to put in place robust action plans linked to sustainable financing mechanisms to prepare for, and respond to, emerging pandemic threats. International cooperation and targeted investments will be essential to help ensure another crisis like COVID-19 never happens again.

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This paper is one of a six-part Pandemic Action Agenda series urging world leaders to take action to strengthen pandemic preparedness. For other papers in this series, please visit pandemicactionnetwork.org.

For questions about the paper or the Working Group, please contact Carolyn Reynolds at carolyn.reynolds@pandemicactionnetwork.org.