

Finding Outbreaks Faster: Measuring Timeliness of Outbreak Detection

Using timeliness of outbreak detection, verification, and control as key metrics for global health security

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Background

The 2005 revision to the World Health Organization's (WHO) International Health Regulations (IHR) created a new framework for disease reporting that would enable faster response to public health emergencies of international concern (PHEIC). In 2014, the United States announced the creation of the Global Health Security Agenda (GHSA), established to "accelerate progress toward a world safe and secure from infectious disease threats." In establishing the GHSA, the United States has pledged to work with over 30 international partners. In order to reduce the impact of infectious diseases and diminish the threat of global pandemics, the world must leverage emerging technologies and new networks to find outbreaks faster. There is a need to measure progress and identify key metrics that demonstrate the impact of these surveillance measures.

In 2010 *Chan et al.* published "Global capacity for emerging infectious disease detection" analyzing the timelines for 281 WHO-verified outbreaks reported in *Disease Outbreak News* (DON) from 1996 to 2009. The study determined the median time from outbreak start to outbreak discovery fell from 40 days to 19 days during the 13 year period by measuring the elapsed time between outbreak "milestones" that included outbreak start, outbreak discovery, laboratory confirmation, and public communication about the outbreak. A five-year update to this research will soon be complete.

In 2014 researchers from HealthMap, ProMED-mail, TEPHINET, and the Skoll Global Threats Fund convened a working group to adapt the methods from the original Chan et al. study for use on a national level. This framework has been implemented by the Field Epidemiology Training Programs (FETPs) in Kenya, Pakistan, Taiwan and Zimbabwe. Results of the studies, along with best practices and lessons learned, will be shared with other FETPs at the TEPHINET Global Scientific Meeting in September 2015 in order to refine the methodology. A second round of pilot studies will soon be launched through the FETPs in Haiti, India, and Indonesia.

Acknowledgements

The Skoll Global Threats Fund would like to acknowledge the authors of *Chan et al. (2010)* for their work in developing this approach. We would also like to thank Larry Madoff (ProMED-mail), Sumiko Mekaru (HealthMap), Sheryl Gordon (HealthMap), Anika Vinze (TEPHINET), and Marlo Libel (Global Health LLC) for their contributions to developing this methodology for use by FETPs at the national level.

Methods

SGTF has specifically supported studies to establish a 10-year baseline for measuring timeliness of disease outbreak detection and associated metrics in each pilot country. The baseline data include all outbreaks of diseases meeting the country's specifications, excluding the following:

- isolated cases of disease,
- disease occurring only in animals,
- foodborne outbreaks,
- non-natural cases (e.g. lab accident, bioterror),
- and other non-infectious health events

The time interval from outbreak start to outbreak milestones is measured for each outbreak, and median time calculated. A univariate Cox proportional hazards regression analysis is then applied to analyze the changes in time to each outbreak milestone over time. Significant changes to surveillance practices during the time period examined should be noted and data stratified by these time periods for additional examination to assess impact of timeliness of outbreak detection.

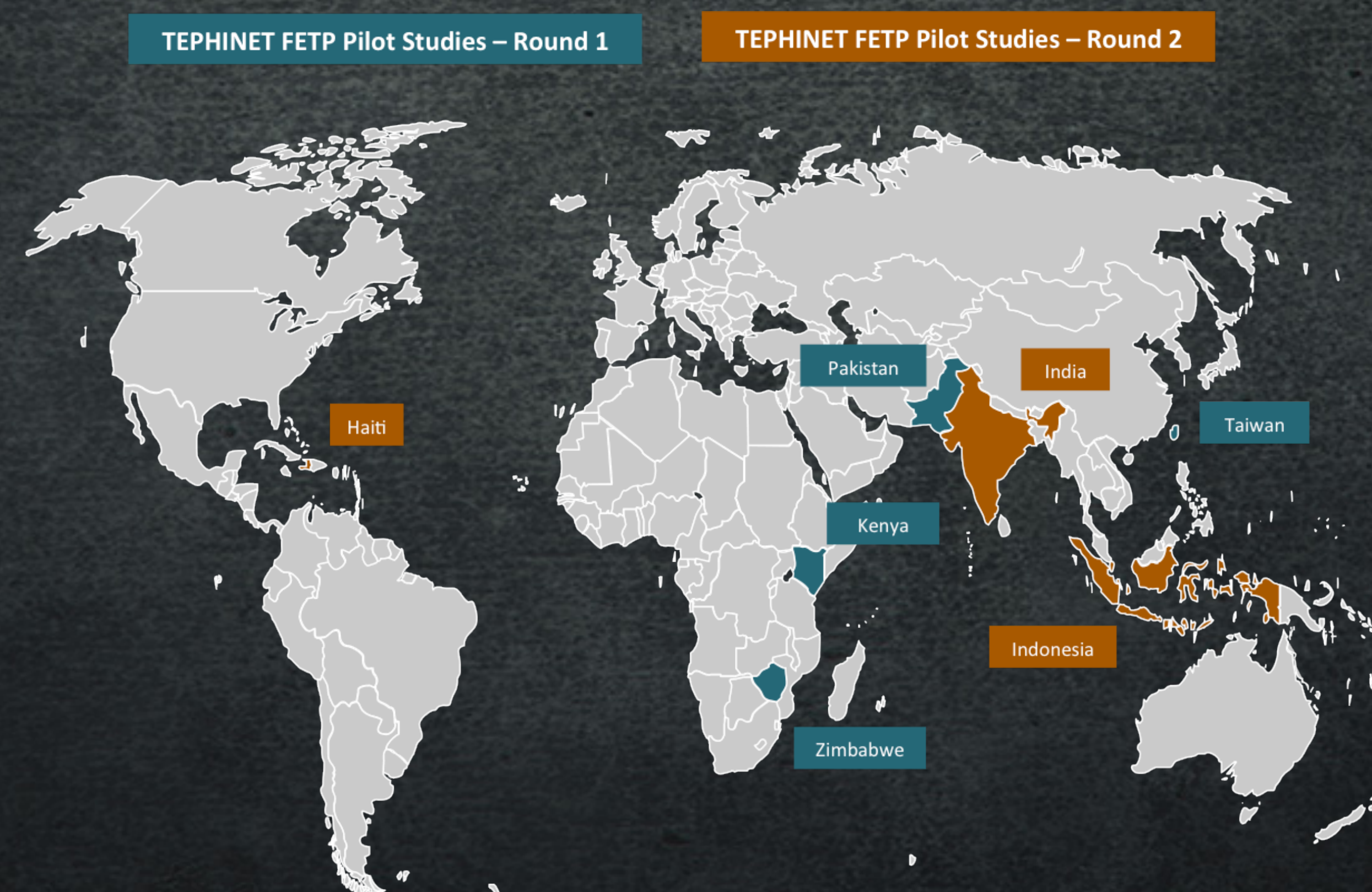
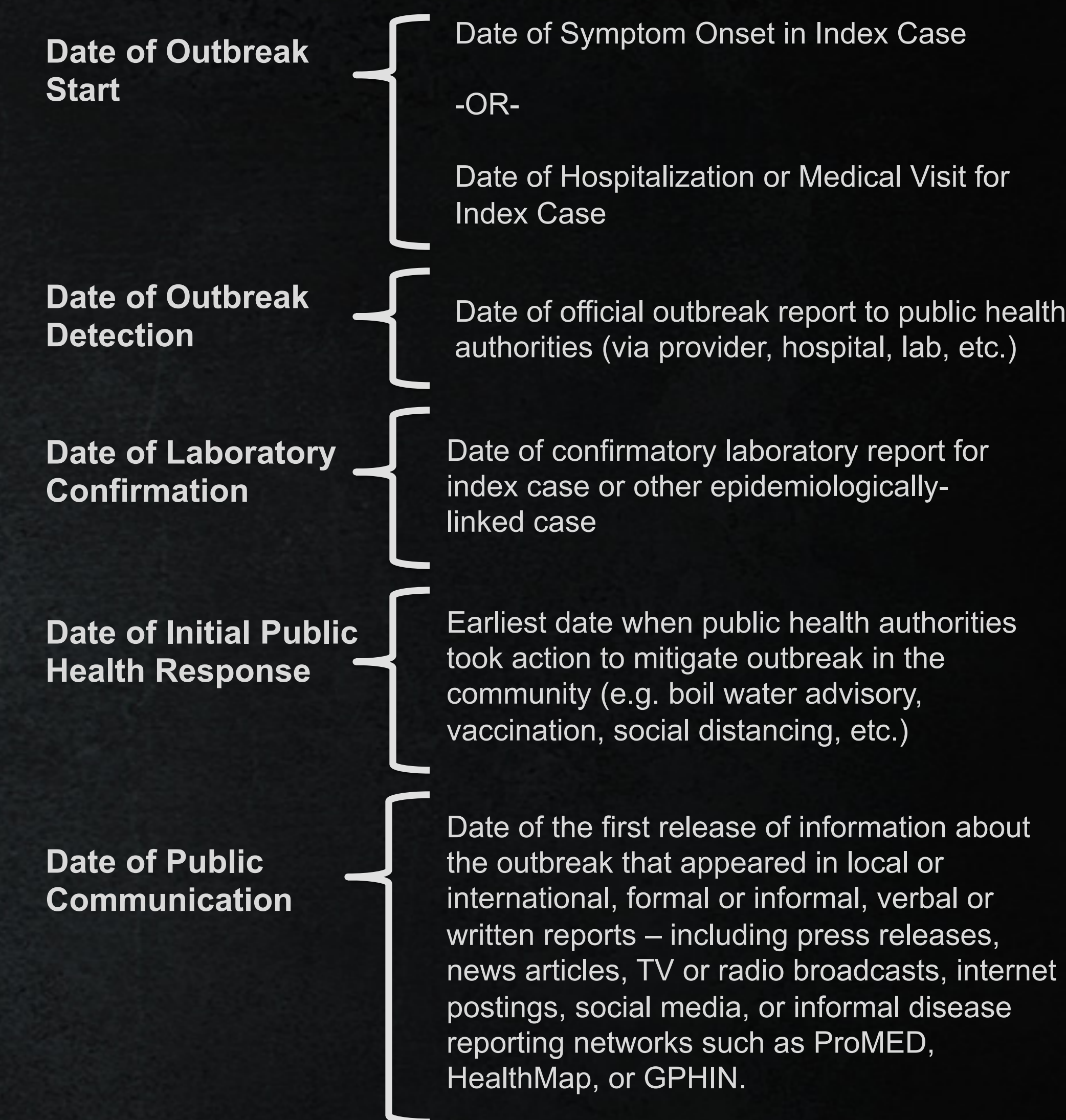
Additional methodical details can be found in *Chan et al. (2010)*

Impact

The Skoll Global Threats Fund supports adoption of these metrics in order to inform and strengthen disease surveillance at the international, national and sub-national levels. Results across countries are not meant to be directly comparable due to differences in disease burden, surveillance infrastructure, and reporting practices. Establishment of a 10-year baseline will enable ongoing measurement, allowing countries to track progress over time and establish objectives based on their specific context.

Nations that undertake the effort to establish their "time to detect" retrospective ten-year 'baseline' will be able to learn whether changes to reporting policies, implementation of the IHR core competencies, use of novel disease reporting systems, or increased investments in disease surveillance have improved the speed of detection and response capabilities. These Ministries of Health will not only be able to assess progress to date, but identify programmatic or geographic gaps that can inform resource allocation and strategic planning. Governments, NGOs, and philanthropies, working in partnership, will be able to better understand which investments have the biggest impact in the area of rapid detection and response, and can share these learnings to ensure efficient use of limited public health funds.

Outbreak Milestones



About the Skoll Global Threats Fund

The Skoll Global Threats Fund's mission is to confront global threats imperiling humanity by seeking solutions, strengthening alliances, and spurring actions needed to safeguard the future. We work proactively to find, initiate, or co-create breakthrough ideas and/or activities that we believe will have large-scale impact, either directly or indirectly, and whether on cross-cutting issues or individual threats.