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Editorial: Public health surveillance systems and outbreak response: evidence from the field

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Editorial on the Research Topic
Public health surveillance systems and outbreak response: evidence from the field

Editorial

The concept of public health surveillance dates back to the 31st century BC when it was first mentioned in Egypt (1). Over the centuries, the practice of public health surveillance has evolved in keeping with civilization and the changing dynamics of public health threats and events. This continual transformation has been, and continues to be driven by advancements in knowledge, technology, and the tools required for prevention, detection, and control of diseases. However, the technological, financial, and human resource capacities for the effective practice of public health surveillance remain limited with unequal global coverages (2). In the 21st century, more than ever, the conduct of public health surveillance has advanced to include the application of increasingly sophisticated molecular diagnostic techniques and digital applications for both nowcasting and forecasting of health threats for prompt interventions. The inequities are seen in the discrepancies in the current public health surveillance systems in different geographical settings. The implementation of these robust systems at scale in lower-middle income countries (LMIC) is particularly challenged by limited information and communication technology infrastructure (ICT) which also border on cost (3, 4).

The disparity in technological capacity between high income and LMIC was demonstrated by Dorabawila et al., who compared COVID-19 home-testers and laboratory-testers in New York State and how some people being able to test for COVID-19 in their homes voluntarily reported to local health departments (by phone, email, and online) to have their data captured in the public health surveillance system. This is a reflection of how advancement in technology and a functional health system with

available resources are being utilized in public health surveillance. However, this was different in most LMICs where basic infection prevention equipment, personal protective equipment, and testing kits were in short supply even at the limited health facilities (5). This was as a result of the weak health systems and lack of adequate human and logistics resources.

Routine surveillance data: the conventional source of evidence for public health action

Although, LMIC have their challenges, they are still able to generate relevant information from the data collected by their surveillance systems to inform public health action. Over the past ten years, African countries have leveraged on the District Health Information management system (DHIS 2) to achieve this (6). This is evidenced in the study by Sheriff et al., on Ghana's progress towards measles elimination through the analysis of routine surveillance data in the Greater Accra Region. The findings showed an improving trend of performance indicators. Similarly, Gborie et al. analyzed routine surveillance data on dog bites in the Volta Region of Ghana and found a high incidence of dog bites and rabies mostly among children and adolescents. These findings are relevant to the regional health directorate and veterinary service department to develop robust strategies to control stray and free-roaming dogs. In spite of these gains, limitations such as aggregated data collected on monthly basis with DHIS call for action. For example, in Ghana, the electronic tracker (e-tracker) application was introduced to provide real-time surveillance data on a pilot basis (7). The system has however not been scaled up, thus these gaps widely exist in various LMIC.

Pushing the frontiers of the evidence field through a broader participation in surveillance

Conventionally, outbreaks are detected by formal public health surveillance systems when a rise in the number of cases of a disease exceeds the expected. However, questions remain on how wide the surveillance field has been, and whether or not public health actors have optimized the representativeness of the data sources for which lack of technology may not be a barrier. In their study on the role of traditional healers in outbreak detection and response in Ethiopia, Gietaneh et al. demonstrated that informal settings are important data sources without which the formal public health system is likely to miss outbreaks. They found that traditional healers and healing sites played a dual role in preventing and controlling local disease outbreaks by encouraging their clients to report to formal public health systems. In spite of the differences in their mode of operation, the trust the local communities have in these traditional healers makes them relevant in public health surveillance activities (8).

Whereas traditional healers are not expected to participate directly in data collection, training and motivating them to identify suspected cases and notify the public health system will increase the representativeness of data sources. For example, the successful campaigns on smallpox eradication and guinea worm elimination in Niger benefited from the active participation of informal health actors in case identification and notification (9). In the ongoing efforts towards HIV/AIDS control in Africa, traditional healers have been recognized as partners for comprehensive control strategies (10). Thus, the findings of Gietaneh et al. highlights a longstanding concern that some key stakeholders are not adequately engaged in active surveillance, outbreak detection, and response despite the demonstrated benefits. In addition to casting the surveillance net wide, such approaches will motivate non-formal actors to participate more actively in other public health campaigns.

The way forward

The evidence published so far in this Research Topic showcases how technology depends on community participation for optimal utility. Further, the evidence demonstrates that community and informal health sector participation without technological support is still useful in the early detection of diseases and outbreaks. As we look forward to bridging the capacity gaps in the conduct of public health surveillance and outbreak response, the evidence herein demonstrates that public health systems in LMIC have not taken full advantage of strategies such as community and non-formal sector participation that do not require the yet unavailable advance technologies. Future research should consider demonstrating improvements in expanding surveillance data sources whiles filling the current gaps that exist in the current surveillance systems such as data completeness, timeliness, representativeness following enhancements with digital applications and broader participation. A cost benefit analysis of already enhanced surveillances systems could offer insights into context relevant sustainability strategies.

Author contributions

EK: Writing – original draft, Writing – review & editing. DB: Writing – original draft, Writing – review & editing. BK: Writing – original draft, Writing – review & editing. JD: Writing – original draft, Writing – review & editing.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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