Health & Medicine | Landry Ndriko Mayigane & Stella Chungong

The 'Nuggets' of Knowledge (NoK) platform

How past experiential health emergency knowledge can inform future responses

The knowledge gained during the COVID-19 pandemic and other health emergencies could prove invaluable for devising responses to and planning for future health crises. Dr Landry Ndriko Mayigane and Dr Stella Chungong from the Health Security Preparedness Department of the World Health Organization's Health Emergency Programme recently devised the 'Nuggets' of Knowledge (NoK) platform, an open-source platform, to facilitate effective knowledge management and knowledge continuity during health emergencies. The NoK platform collates vital knowledge collected by first responders during past and present health crises to inform the planning of interventions and actions during future emergencies.

During health emergencies, such as the COVID-19 pandemic, first-line responders meet to devise a plan of action. The response plans they devise are often based on their expertise, their experiences, and information gathered during previous health crises. In the initial phases of the COVID-19 pandemic, for instance, some countries implemented response plans previously used to tackle the influenza pandemic, while others, such as Guinea, relied on resources that were originally established to address a previous outbreak of the Ebola virus disease (EVD).

The World Health Organization (WHO) and other institutions use information management systems (IMSs) to record and store information related to health emergencies. These are platforms that can be used to collect data during health emergencies and can later be easily accessed by those planning responses to future crises.

While these systems can be very useful, they often fail to record invaluable knowledge gathered at the time of an emergency, such as the intuitions, thoughts, perspectives, and first-hand experiences of first-line responders. Such knowledge is referred to as tacit knowledge. Unlike tacit knowledge, explicit knowledge consists of information that can be easily summarised and stored, for instance in the form of reports, written procedures, and guidelines. Tacit knowledge, on the other hand, is far more challenging to capture, as it could include things like the intuitions, perspectives, learned experiences, and mental models of those who dealt with an emergency first-hand. This undocumented tacit knowledge, shedding light on criticalities or challenges encountered in the past that might otherwise be overlooked, could prove invaluable for planning effective interventions.

Dr Landry Ndriko Mayigane and Dr Stella Chungong, working for the Health Security Preparedness Department of the WHO's Health Emergency Programme, recently developed a knowledge management system (KMS) of which the Nuggets of Knowledge (Nok) platform is a key component. The NoK platform is designed to capture undocumented tacit knowledge. By capturing the tacit knowledge gained by front-line responders during health emergencies and summarising it in the form of digestible 'nuggets' (ie, small pieces of information), the NoK platform could facilitate the planning of effective actions during outbreak response meetings and in preparation for future emergencies.

DRAWING FROM REAL-WORLD EXPERIENCES

Typically, when the outbreak of a particular disease is confirmed, WHO supports its member states in reviewing response actions. These Action Reviews are known as Early-Action Reviews (EARsw), Intra-Action Reviews (IARs), and After-Action Reviews (AARs).

EARs are carried out shortly after a health crisis begins, to prevent the escalation of an outbreak. IARs, on the other hand, are held periodically throughout the course of a protracted health emergency, to review response actions taken during the course of the same emergency and their outcomes, and revise existing strategies as needed. Finally, AARs are carried out at the end of a health emergency to summarise lessons learned and best practices that were most or least helpful in preparation for future outbreaks.

Notably, many individuals who took part in the AAR to the EVD in the Democratic Republic of Congo between 2018 and 2021 highlighted the limitations of these meetings, suggesting that some responders who had dealt with a crisis first-hand were absent and unreachable by the time these meetings were held. As a result, the invaluable knowledge the responders in absentia had acquired was not recorded.

Akili, for example, who works for the Ministry of Health in her country and is a member of the outbreak response team, participated in meetings following the fourth outbreak of cholera in her region. She noted that some emergency responders who had witnessed previous outbreaks of the disease first-hand were unreachable, while most emergency responders who were part of the current team, although qualified and highly experienced, had not been involved with responding to previous cholera outbreaks in her region.

'Each time we must track down a prior report, resurface old emails, retrieve documents and logs from our archives or call someone,' Akili says. 'Sometimes, these persons are not even reachable. We have always lost valuable time during which lives may have been lost because of our inactions. We cannot go on like this!'

The knowledge failures mentioned by Akili have also been reported by other members of outbreak response teams. Dr Mayigane, Dr Chungong, and their colleagues thus set out to develop a KMS that could help to capture and store this critical knowledge, ensuring that it is not lost and can be easily accessed during future emergency meetings.

KNOWLEDGE LOSSES IN EMERGENCY MANAGEMENT

The loss of health emergency-related knowledge often occurs due to a lack of cohesion or communication between members of an organisation. For instance, first responders might be difficult to reach after a health crisis is over, as they might have only been in the affected country to help deal with the emergency, or they might have left the organisation they were working at entirely.

Yet, failing to collect the knowledge gained by these respondents could have detrimental effects on responding to future emergencies or planning of future emergency responses. These knowledge losses could result in policymakers, governments, and health institutions failing to consider aspects of a response plan that proved to be crucial in the past.

COLLECTING BOTH EXPLICIT AND TACIT KNOWLEDGE

The NoK platform is part of a KMS designed to facilitate effective knowledge management and knowledge continuity during and after health emergencies.

The WHO has already established procedures and systems for the management knowledge gained during health emergencies. These include the Action Reviews, aimed at discussing and reviewing planned responses to public health emergencies, as well as SimEx (simulation exercises).

SimEx are theoretical or practical tasks designed to simulate specific emergency situations and validate proposed response plans. A SimEx could entail discussing a possible scenario with others, or running drills, and practicing response interventions that usually occur in real-world settings. Action reviews and SimEx have proved valuable for capturing data and knowledge gathered during a health crisis. However, reports from outbreak team members suggest that they often fail to capture tacit knowledge.

CAPTURING KNOWLEDGE DURING HEALTH EMERGENCIES

The NoK platform relies on a close collaboration between the KMS secretariat in WHO and emergency responders, who will both contribute to the platform and access the knowledge it contains. The NoK platform is an open-source digital platform that respondents can easily access online.

Notably, this new knowledge management system will contain both captured (explicit) and uncaptured (tacit) knowledge. The knowledge will be drawn from published scientific papers, government documents, and reports summarising what was discussed at Action Review meetings, as well as interviews with respondents who participated in an emergency response.

Moreover, knowledge will captured during a series of activities, including knowledge jams, SimEx, action reviews, and key informant reviews. Knowledge jams are workshops designed to

WHO's response to Ebola virus disease (EVD) outbreak in the Democratic Republic of Congo.

The NoK platform is part of a knowledge management system designed to facilitate effective knowledge management and knowledge continuity during and after health emergencies.

Guinea: Women community meeting.

Photo credit: WHO / Blink Media – Rica Shryock.
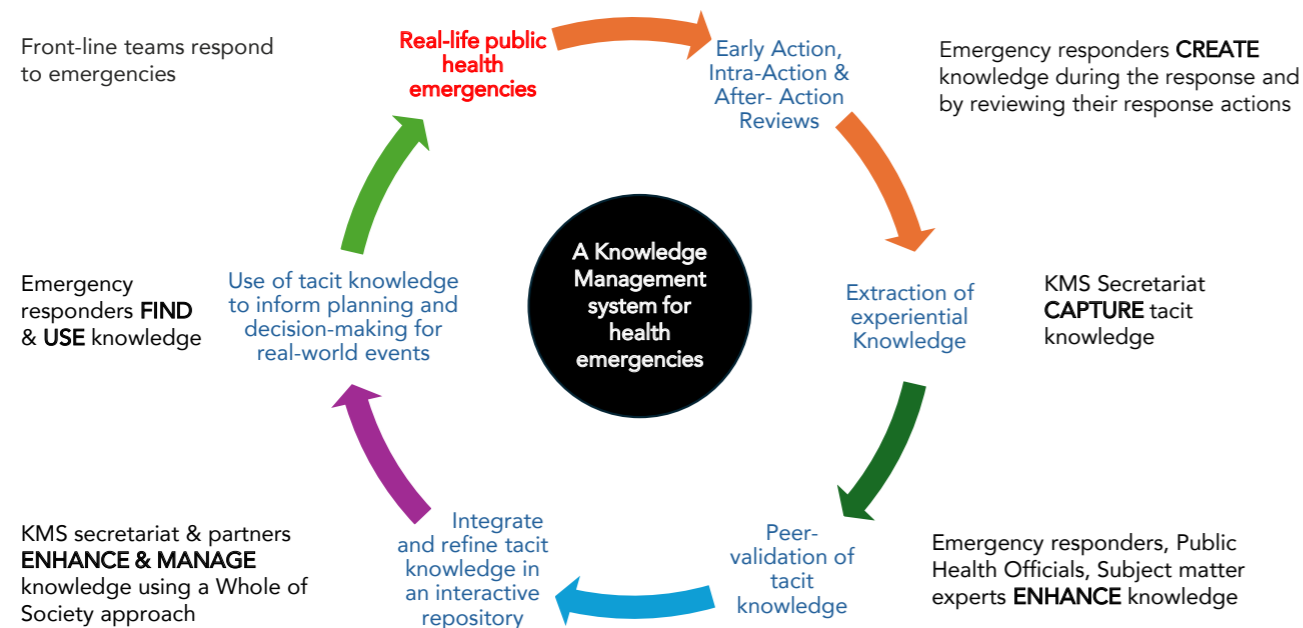
Photo credit: WHO / Christopher Black.

Figure 1: The proposed KM Action Wheel for the NoK Platform for health emergencies.

facilitate discussions among emergency respondents about the lessons they learned and knowledge they acquired.

A key feature of the NoK platform is that instead of including full documents, interview transcripts, reports, and articles, it summarises all these sources of knowledge into 'bite-size' texts that are easy to read and understand. These 'nuggets' of knowledge could then inform the preparation for and responses to future public health crises. All NoKs will contain links to their source documents or details of their contributors.

THE KNOWLEDGE MANAGEMENT ACTION WHEEL
The researchers adapted the Knowledge Management (KM) Action Wheel designed by Walh (2017)[1] to show the cyclic pattern through which

knowledge collected on the NoK platform during and after health crises can inform future responses (Figure 1).

Firstly, front-line teams create knowledge as they respond to health emergencies and by reviewing the actions taken and assessing the impact of those actions. This knowledge is in part summarised in the reports prepared following early action, intra-action, and after-action review meetings.

Furthermore, the secretariat of the knowledge management system (KMS) will capture additional tacit knowledge from first-line responders, via key informant interviews, knowledge jams, and simulation exercises. All experiential knowledge collected will be peer-reviewed by subject matter experts, then refined by the KMS secretariat and integrated into an interactive digital

platform (ie, the NoK platform). Finally, emergency management teams will access the NoK platform to guide their decision-making and actions before and during future emergencies; a step that leads back to the first step of the wheel, with front-line teams responding to an emergency and gaining new knowledge in a subsequent public health emergency.

USING NoK TO DEVISE EFFECTIVE EMERGENCY RESPONSES
The NoK platform could soon become a vital tool for ensuring the continuity of knowledge gained during public health emergencies. By collecting both explicit and tacit knowledge, including the experiences gained by respondents who dealt with emergencies first-hand, the NoK platform could be an invaluable resource for outbreak response teams, helping them to devise more effective plans of actions.

The platform could also be a reliable source of information both those planning interventions to mitigate the impact of public health emergencies. In addition, it could offer an easily accessible space where emergency responders can share their views and what they learned in the field, ensuring that governments and health institutions are better equipped to deal with similar crises in the future.

> *By collecting both explicit and tacit knowledge, including the experiences gained by respondents who dealt with emergencies first-hand, the NoK platform could be an invaluable resource for disease outbreak preparedness and response teams.*

[1] Walh Z. Knowledge Management in 2017. Enterprise Knowledge [Internet]. Available from: enterprise-knowledge.com/knowledge-management-2017/.

Behind the Research

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Research Objectives

WHO introduces the Nuggets of Knowledge (NoK) platform designed to capture the explicit and tacit knowledge gained by front-line responders during health emergencies to facilitate the planning of effective actions before and during future outbreaks.

References

Mayigane, LN, Burmen, B, Mbanya, A, et al, (2024) A Knowledge Management System for health emergencies: Facilitating knowledge continuity and timely decision-making for frontline responders using experiential knowledge captured during action reviews. *Frontiers in Public Health*, 12. doi.org/10.3389/fpubh.2024.1427223

Detail

Bio
Dr Landry Ndriko Mayigane is the Acting Unit Head of the Country Simulation Exercises and Reviews (CER) Unit within the Health Security Preparedness (HSP) Department of the WHO Health Emergencies Programme (WHE). He is a trained field epidemiologist and a Certified Emergency Manager (CEM®). Additionally, Dr Mayigane is a Certified Knowledge Manager (CKM®), a Scrum Master, and a Lean Six Sigma Black Belt. He has received multiple awards for his contributions to global health security in Africa.

Dr Stella Chungong is the Director of the Health Security Preparedness (HSP) Department in the WHO Health Emergencies Programme (WHE), in Geneva. Prior to that, Dr Chungong worked at the national level, and at the global level in various capacities on surveillance and response systems strengthening, the International Health Regulations, health security, and country preparedness for health emergencies.

Collaborators
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Personal Response

How can emergency responders use NoK and in what instances could it prove most valuable?

Public health emergency managers could access the NoK platform in **advance of public health emergencies** to institute effective actions to enhance emergency preparedness capacities in their countries. Emergency responders could use the knowledge in the NoK platform **during outbreak response** to inform response actions.

Moreover, all emergency response personnel can use the NoK platform **as a learning resource** by sharing lessons learnt and best practices used during past and on-going emergencies with their peers globally either by directly accessing the NoK platform or downloading and sharing knowledge 'nuggets' with their colleagues.

Where lives are at stake, it's imperative for emergency responders to absorb wisdom not only from their own experiences, but also from the insights gained by their predecessors. Communities must maintain the continuity of shared wisdom so that the exit of a single guardian of knowledge does not lead to a decrease in the communal pool of understanding.

Photo credit: WHO.

Action review meeting following measles outbreak, Georgia.