

Towards One Health Intelligence surveillance systems

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The increase in global diseases and other health threats in recent decades has necessitated the importance of strengthening our surveillance systems towards early detection and monitoring of drivers

The recent COVID-19 pandemic has exposed the vulnerability of countries to such global health threats, which requires collective actions beyond individual organisations and countries (Agenda 2024, 2020). There was a global call to strengthen health surveillance systems (WHO, 2007; FAO, OIE and WHO, 2010), and countries deliberated to depart from traditional reactive surveillance to novel proactive approaches, including integration of the systems (Shuai et al., 2006; Wahl et al., 2012; Lwin et al., 2014).

The need for a One Health intelligence system

One Health intelligence surveillance systems are tools and resources that collect, analyse, and share information about human, animal, and environmental health.

Through the integration of surveillance and other relevant activities across one health domain, the capability and capacity to detect and respond to emerging and ongoing threats will improve (FAO, 2022).

Efficient systems require reliable data management platforms, Artificial Intelligence methods that will enable analysis of massive infectious diseases, and surveillance data to support response to diseases in the future (Wong et al., 2019).

Big data analytics helps to understand health risks and minimise the impact of adverse health issues by identifying high-risk populations, and combining data or processes acting at multiple scales. These futuristic innovations can also benefit One Health's intelligence surveillance systems if there are appropriate systems and collaborations among stakeholders.

How does SACIDS enhance intelligent systems?

Over the years, SACIDS has built a strong domain in health surveillance systems, technologies, and data sciences in order to enhance prevention, early disease detection, and respond to infectious diseases including Antimicrobial resistance.

One Health intelligence systems is anchored on leveraging digital technologies to improve existing surveillance systems and use data sciences for analysis, visualisation, and prediction (Fig. 1).

We always aim to improve disease detection through syndromic surveillance, monitoring status for endemic diseases, and monitoring drivers that may signal health threats. That has been done through the development of digital surveillance tools such as AfyaData and AfyaWatch for real-time data collection at the least cost.

The data science arm makes use of massive data generated to analyse, visualise, and train models for the prediction of health threats including infectious diseases and antimicrobial resistance.

The ultimate goal is to contribute to country-level and international One Health intelligence systems for early warning through the interoperability of surveillance and other systems, data sharing across sectors, enhanced decision-making processes, and cross-sectoral and multi-sectoral collaborations.

To ensure the acceptability, ownership and sustainability of the work that we do, our overall approaches are as follows:

- EpiHacking which involves a gathering of professionals from the fields of public health, animal health and environmental health (epidemiologists), together with software developers to come up with solutions through a systematic hacking process that involves defining challenges, brainstorming and creating prototypes;
- Community-centred where prototypes are tested to ensure they are at the epicentre of surveillance for enhancing timely reporting;
- Multi-actor participation whereby we ensure all important stakeholders in surveillance are taken aboard and understand and own the development process; and
- Flexibility and adaptability are our core principles where we aim at developing systems that are flexible enough to incorporate new variables and changes but can also be adapted to suit the context and purpose.

Our experience in developing early warning systems

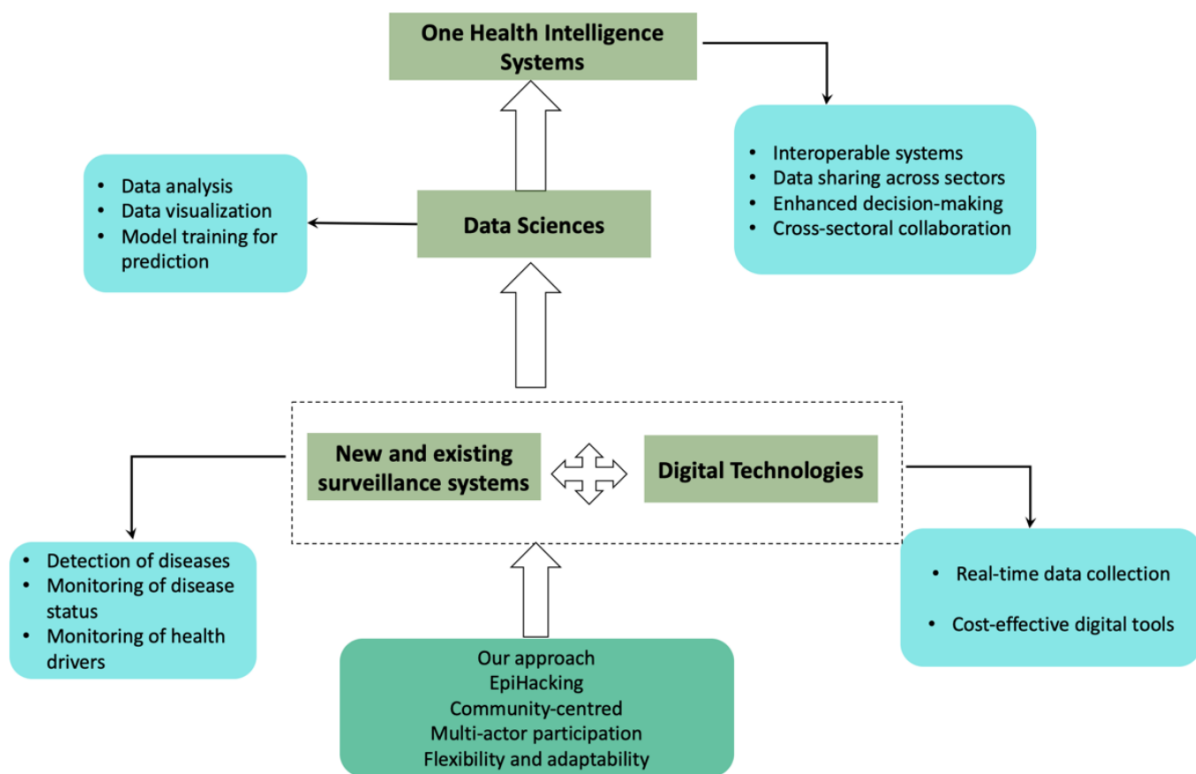


Figure 1

Development and Deployment of AfyaData

In December 2014, with funding from Skoll global threats (now Ending Pandemics) SACIDS teamed up with InSTEDD, EAIDSNet to host an EpiHack event that gathered human health, animal health, ICT specialists, and community members from over 14 countries to brainstorm and collaboratively prototype fit for purpose digital solution to detect infectious disease outbreaks through strengthened inter-sectorial and cross-border disease surveillance.

During Epihack event four prototypes were designed and presented, Community Surveillance, Official reporting, Feedback and Contact tracing.

In 2016, with funding from SKOLL global threats (now ending pandemics), SACIDS developed the AfyaData tool and initiated a community-based surveillance platform. We built a methodology of recruiting, training, and integrating community based surveillance with official surveillance systems.

We trained 144 community health workers 108 health (human and animal) officials.

The AfyaData app was deployed to support community-based surveillance in Tanzania.

The collected data is accessed in near to real-time by all relevant authorities through specific access code. Since the deployment of the AfyaData in August 2016, a total of 7,340 human and animal disease events have been detected and reported from communities and received prompt responses from the district authorities.

Development of the One Health digital surveillance platform in Tanzania

The initial step in the creation of the One Health Digital platform took place in December 2019, during a consultative meeting organised by the One Health Desk, now section (OHS) within the Prime Minister's Office (PMO).

Key stakeholders from various sectors, including the Ministry of Health (MoH), Ministry of Livestock and Fisheries (MoLF), Ministry of Natural Resources (MNRT), and SACIDS Foundation for One Health (SACIDS), discussed the establishment of a National One Health Information Sharing Platform. It was collectively agreed that the platform was timely and should be hosted and coordinated by the PMO OHS.

SACIDS, with funding support from Ending Pandemics, took on the project of developing the surveillance system platform. Their strategy focused on a collaborative approach of co-creation and co-deployment.

They initiated the development process by hosting an EpiHack event, which brought together multidisciplinary experts and the community to identify health challenges and conceptualize solutions. IT experts then built prototypes based on these discussions, which were later showcased at the event. This approach proved effective in identifying challenges and generating solutions.

Conclusion

Our experience has shown us that it is possible to achieve efficient and intelligent surveillance systems for health threat detection, such as infectious diseases and antimicrobial resistance.

Technologies may help us achieve the development of the systems, but the operationalisation requires intensive stakeholder engagement and institutional commitments to make that happen.

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