

WHAT DOES IT TAKE TO ESTABLISH EFFECTIVE DISEASE SURVEILLANCE MECHANISMS?

SIX LESSONS LEARNED FROM THE NATIONWIDE DEPLOYMENT OF A DHIS2-BASED INTEGRATED NOTIFIABLE DISEASE SURVEILLANCE SYSTEM IN LAOS

Strong surveillance systems that collect timely case-based data on notifiable diseases are a core component of early warning and response mechanisms.

These surveillance systems are required to ensure that outbreaks are rapidly identified in order to conduct appropriate outbreak investigation and response.

When fully incorporated into the routine health information system, they provide a solid basis for Ministries of Health and Public Health Emergency Operations Centers (PHEOCs) to swiftly act on surveillance data.

This brief presents achievements to date and lessons learned from the nationwide roll-out of a new notifiable disease surveillance module within the national health management information system (HMIS) in Laos.



THE CONTEXT

In early 2022, the Ministry of Health of Laos adopted a new case-based disease surveillance system, fully integrated within the national HMIS. This major overhaul was guided by the desire to improve its capacity to identify and contain outbreak-prone diseases, in line with the recommendations of the Joint External Evaluation conducted in 2017.

Under the leadership of the National Center for Laboratory and Epidemiology (NCLE) within the Department for Communicable Disease Control (DCDC), and with technical support from PSI and the World Health Organization country office, the transition from the old “Lao-EWARN” disease surveillance database to DHIS2 was accomplished between 2019 and early 2022. Lao-EWARN, which was built on outdated technology (Microsoft Access), had limited analytical and reporting functionality. In contrast, the switch to DHIS2 would allow for the capture of more granular case-based surveillance data that fully integrated with other health statistics.

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THE PROCESS

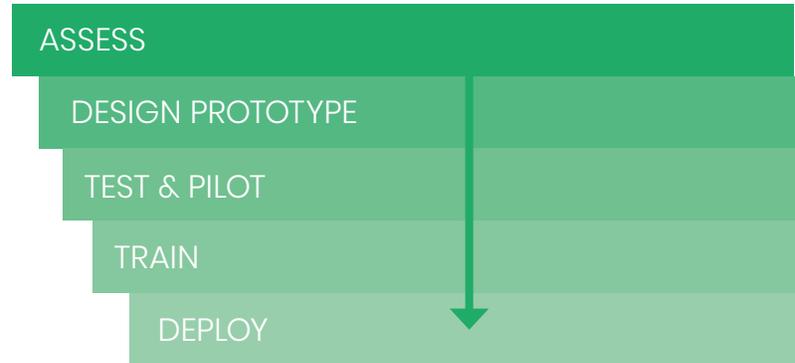
Following an assessment of Lao-EWARN, the Ministry of Health conducted comprehensive internal assessments and external consultations with PSI and other key technical partners at the World Health Organization and US Centers for Disease Control and Prevention (US CDC). These discussions enabled the team to develop a prototype of the indicator-based surveillance module in 2019. The new reporting tool was extensively tested, then piloted in Vientiane Capital province in early 2020. Further adjustments to the data entry form and reporting protocol were made in response to feedback gathered during the pilot.

A central Training of Trainers workshop conducted in July 2020 was followed by provincial-level training workshops for epidemiology staff from all district health offices and hospital staff in charge of reporting. The system was deployed in all 148 districts and all public and army hospitals in the country, where it was used in parallel with the existing Lao-EWARN system during a transition period that ended up being substantially disrupted by the COVID-19 pandemic. Throughout this period, additional improvements were made to the module and to the associated dashboards, while the national HMIS was upgraded to a more recent DHIS2 version to include feature and performance improvements. Combined with the extended transition period, these factors resulted in the need for refresher training, which incorporated a greater focus on data quality and data use.

More than a year after the nationwide deployment, in February 2022, the Ministry of Health formally declared DHIS2 the sole reporting tool for notifiable disease surveillance, marking the official adoption of the new integrated surveillance system.

In parallel, PSI and partners worked towards establishing a network of functional provincial Emergency Operations Centers, while at the same time strengthening the core capabilities of the central PHEOC. These centers are designed to be rapidly activated to coordinate public health emergency response activities. District Health Offices and hospitals were provided with adequate ICT equipment to ensure that they can access and use the online reporting tool.

TRANSITION PROCESS FROM LAO-EWARN TO DHIS2



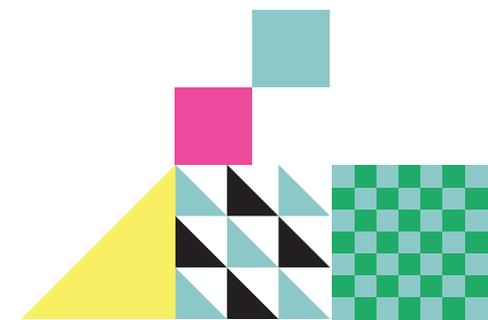
KEY RESULTS

By May 2022, more than 660 Ministry of Health staff from all provincial and district health offices and from all public and army hospitals were fully trained on the use of the system. Additional health center staff were trained in two provinces in the second half of 2022. Case-based data from health centers are now routinely reported for all 18 notifiable diseases under the responsibility of NCLE.

PSI and WHO supported NCLE to develop a set of dynamic interactive dashboards for each group of diseases (vaccine-preventable, food- and water-borne, dengue fever, respiratory infections, zoonotic diseases) and for data quality monitoring. The dashboards contain clear visuals and summary tables, taking advantage of the latest advanced DHIS2 analytics functions.

As a result, end users from central, provincial, district-level, and facility-level epidemiology units now all have easy access to tailored comprehensive disease surveillance information. These are also used by the PHEOC and provincial EOC units in combination with supply chain and logistics dashboards.

During the first six months following the formal adoption of the system (March–August 2022), more than 80,000 cases were reported, the majority relating to diarrheal disease, dengue, and respiratory infections.





SIX LESSONS LEARNED

We learned many valuable lessons during this transition process, all of which should be applicable to similar health information system strengthening activities in other settings. While we can't capture all of them in this brief, we highlight the following six key insights:

1. Adopt flexible, user-centered tools and technology design practices

It is essential that digital tools such as the DHIS2 reporting module are designed with the end-user in mind: the design process must be iterative and the digital solution needs to be flexible, so that the tool can continue to evolve over time as new needs arise. The configuration of the new modules in DHIS2 resulted in analytical dashboards that can be customized and easily updated in response to evolving user requirements for informed decision making.

Moreover, the inclusion of the disease surveillance modules in the national HMIS was a deliberate choice, as this paves the way to further integration with other health information (including routine monthly health facility reports, essential commodities, laboratory, and human resources), resulting in more comprehensive analysis options than stand-alone systems.

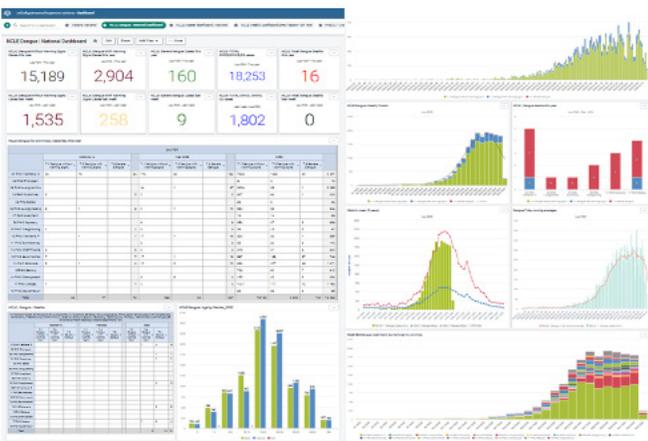
2. Cascaded training for optimal deployment and to promote local capacity

Even in a relatively small country such as Laos, deploying a new surveillance system at scale is a daunting task, requiring many hundreds of health workers to be trained and supported throughout the implementation phase. A cascaded strategy based on a "training of trainers" approach that relied on local champions within each provincial health office ensured that we could rapidly roll out training programs with minimal need for central-level support. This turned out to be a particularly effective strategy as the COVID-19 pandemic and its ensuing travel and gathering restrictions disrupted initial roll-out plans and required greater local involvement.

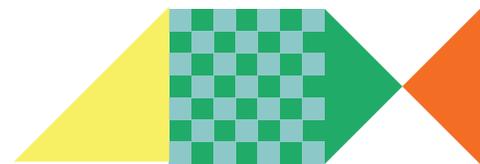
Compiling disease surveillance trends and monthly reporting used to take me more than a week in Lao-EWARN, but now thanks to DHIS2 it is very easy and only takes about half an hour. With data capture now happening at district and hospital level, the provincial health office has more time to monitor reporting and surveillance activities and to conduct outbreak investigation and response.

- Mr. Somechit Bounthavong,
Epidemiology staff at Phongsaly PHO

Reporting rates are steadily improving, with national means increasing from 47% on average in 2021 to 80% in October 2022. However, provincial reporting rates continue to be highly variable, currently ranging from between 40% and 95%.



National DHIS2 dashboard for dengue





DHIS2 refresher training for Vientiane Province epidemiology and hospital staff, May 2022

3. Provide users with comprehensive, multi-channel support mechanisms

Beyond technical training, a crucial ingredient for success in deploying the new modules has been the development of a range of user support resources and communication tools: technical manuals and clearly defined standard operating procedures were complemented by short video tutorials available through YouTube, WhatsApp groups for instant technical troubleshooting, a Facebook group to communicate with the community of users, and the availability of support staff to operate a de facto helpdesk. All resources are available in Lao language and are easily accessed through a dedicated user support dashboard in DHIS2. Beyond technical support, these mechanisms also allow for feedback from the field to rapidly flow to the central level, enabling the agile development approach as described above.

4. Keep a close eye on data quality and system use

Capacity building and technical resources need to be complemented by ongoing monitoring of data quality and levels of system use. Tracking reporting rates reveal which provinces or districts are facing challenges with consistent and comprehensive reporting from the health facilities. This enables central and provincial support teams to work with the local health authorities to address any gaps. Regular monitoring is conducted using DHIS2-based checklists and is guiding the prioritization of provinces to target for on-site coaching and supportive supervision.

5. Activate the three Cs: Collaboration, Coordination & Communication

At all phases of the roll-out process, starting with the initial assessment and product design, we have worked in direct support of the Ministry of Health, and have collaborated extensively with several key

partners. This highly collaborative approach ensured that we did not have to “re-invent the wheel” and were able to draw on the skill sets and competitive advantages of each partner. While PSI provided DHIS2 technical expertise on a day-to-day basis, the ministry’s HMIS unit and the Health Information Strengthening Program (HISP/University of Oslo) provided back-end technical DHIS2 advice and configuration support, and the WHO country office provided technical guidance on disease surveillance and response best practices.

Effective collaboration required ongoing coordination and proactive communication with all involved partners, including regular progress reports to DCDC leadership.

6. Promote Local Ownership for Sustainability

Another factor for success is local ownership and commitment from senior leadership to drive the deployment process. Close involvement and buy-in from NCLE and the wider Department for Communicable Disease Control was crucial to ensure ownership of the entire process and reduce resistance to change – a natural tendency that is often inherent to the adoption of new tools. Beyond the central level, it was equally important to rally the leadership of provincial health offices and to identify the local “champions” to drive the process locally.

The clearly established strategy by the Ministry of Health to strive for a comprehensive unified HMIS, supported by a strong technical team within the Ministry, has contributed to ensure local ownership and long-term sustainability. This will also go a long way to ensure that the country doesn’t end up with a scattered ecosystem of many disconnected health information systems that remains dependent on external technical and financial support.



The Lao National Health Information System: DHIS2 login page



WHAT'S NEXT?

While the new disease surveillance modules are now routinely used for reporting and are increasingly relied on to monitor and detect outbreaks, further work is needed to fully take advantage of the new system. Several additional activities are planned during the latter quarter of 2022 and throughout 2023:

- Conduct systematic data quality assurance and supportive supervision visits, led by the provincial health offices with support from NCLE and partners.
- Organize a review meeting in the first quarter of 2023, in order to take stock of progress and remaining challenges about a year after the formal transition to DHIS2.
- Implement process improvements, in particular to increase the frequency of reporting and to expand the current list of notifiable diseases and symptoms covered by the modules.
- Further refine the surveillance dashboards tailored to users from NCLE, the PHEOC, and subnational epidemiology teams, with further implementation of automated outbreak alert notifications.
- Develop procedures and tools to routinely track the response to outbreaks, moving from a surveillance-only system to an integrated disease surveillance and response tool. This shift involves monitoring the timeliness and quality of case investigation and outbreak response based on disease-specific emergency response protocols.

As per the recommendations of the National Action Plan for Health Security (2022-25), disease surveillance will be further strengthened by improving the quality of Indicator- and Event-based surveillance systems and by establishing multi-source surveillance practices, with a greater focus on community engagement for event detection and reporting.

In the longer term, the laboratory information system is expected to be connected to the case-based syndromic surveillance system, thus enabling the combination of facility-level reporting with information collected on sample testing in the country's laboratories.

As the country nears its malaria elimination targets, it is expected that the malaria surveillance systems

will eventually be incorporated in the generic notifiable disease modules, starting with elimination areas.

INTEGRATED DISEASE SURVEILLANCE SYSTEMS FOR EARLY DETECTION AND RAPID RESPONSE... AND IMPROVED HEALTH OUTCOMES

The recent transition from Lao-EWARN to DHIS2 is already resulting in better, more timely, and more relevant disease surveillance data. Further efforts are required to increase data quality and data use, much of which will depend on streamlined reporting and response protocols. Throughout the process, we've seen that technology development is the easy part: building lasting capacity and ensuring local ownership, along with adequate change management strategies, are equally – if not more – important than the digital solutions.

A strong surveillance system, as a cornerstone of local and global health security, will ultimately lead to improved health outcomes – and to stronger, more resilient health systems.



Thanks to the new disease surveillance and response module in the national HMIS, the Ministry of Health is now able to more effectively monitor notifiable diseases and to take informed decisions to investigate and contain outbreaks, leading to better health security for the people of Lao PDR.

- Dr. Bouaphanh Khamphaphongphane,
Deputy Director, National Center for Laboratory and Epidemiology, Ministry of Health

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