

# DEVELOPING AN EMERGENCY PREPAREDNESS AND RESPONSE RESOURCES DASHBOARD **FOR THE PUBLIC HEALTH EMERGENCY OPERATIONS CENTER IN CAMBODIA**



## INTRODUCTION

Effective response to disease outbreaks and public health emergencies requires Public Health Emergency Operations Centers (PHEOCs) to have a clear overview of the resources available to conduct the response, including but not limited to human resources, infrastructure, and equipment. This information is not only necessary during an emergency to inform resource and response management, but also while undertaking activities--such as developing strategic response plans, pinpointing where to conduct training or capacity building activities, or determining the subnational allocation of resources--in preparation for a potential emergency.

The 2016 Joint External Evaluation of Cambodia's capacity to prevent, detect, and respond to public health threats found a number of gaps in achieving International Health Regulations (IHR) core capacities, especially in the areas of preparedness and response. Among other findings, the assessment highlighted a lack of an overarching national resource map and a public health risk map, both of which fit within the all-hazards public health response plan.

Population Services International (PSI) actively supports the Communicable Disease Control Department at the Cambodian Ministry of Health (CDC-MoH) to address gaps in health security, under a three-year investment (2020-2023) by the Indo-Pacific Center for Health Security to strengthen PHEOCs and improve long-term national capacity to monitor, prepare, and respond to disease outbreaks.

In 2021, PSI and the CDC-MoH initiated the process to develop an emergency response resources dashboard within CamEWARN, the national disease surveillance system hosted in DHIS2, for use by health officials for emergency preparedness and response activities. A pilot phase was successfully conducted in seven provinces over several months in 2022.

This brief describes our experience with the design, development, and piloting of the new PHEOC emergency response resources dashboard to date.

# FROM ORIGINAL CONCEPT TO DEPLOYMENT AT SCALE

After the initial assessment and ideation phase in 2021, activities began with a collaborative design phase that delineated the concept and objectives of the Resource Mapping Dashboard project, followed by a pilot phase of the DHIS2 modules developed during the design phase, and concluded with a pilot evaluation phase. Following the completion of these three phases in 2022, the Resource Mapping Dashboard project has reached the scale-up phase.

| Q1-Q2 2022                           | Q2 2022                      | Q3-Q4 2022                    | 2023                       |
|--------------------------------------|------------------------------|-------------------------------|----------------------------|
| DESIGN                               | PILOT                        | EVALUATE                      | SCALE-UP                   |
| I. Decide project terms of reference | I. Prepare for field testing | I. Conduct supervision visits | I. Develop SOPs            |
| II. Develop technical specifications | II. Select sites             | II. Solicit feedback          | II. Build capacity         |
| III. Configure the system            | III. Launch pilot            | III. Optimize system          | III. Roll out country-wide |

## THE DESIGN PHASE

### DEVELOPING TERMS OF REFERENCE

Prior to undertaking the design of the PHEOC resources dashboard, the PSI project team first sought to reach consensus among the various stakeholders and technical partners on the objectives and deliverables of the activity. Multiple EOC technical meetings and a consultative workshop with relevant departments within the MoH, national programs, Provincial Health Departments, and development partners were held throughout the first quarter of 2022.

Three key objectives were defined:

- Identify key resources to support public health emergency response at central and subnational levels, including human resources, infrastructure, equipment, logistics and supplies, healthcare delivery sites, service accessibility and coverage, transportation and supply routes, communications

technology, cold chain capacity, warehousing, etc., as well as the locations and resources available within provincial and district EOCs.

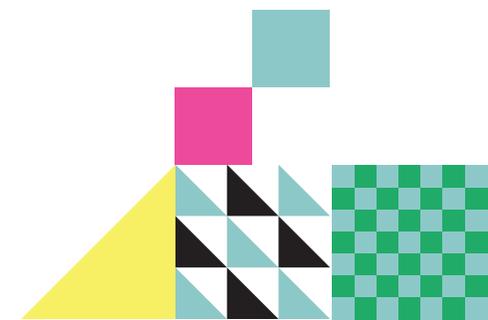
- Develop a comprehensive integrated dashboard within the MoH CamEWARN DHIS2 database.
- Define the roles and responsibilities related to emergency response resource mapping for PHEOC.

### DEVELOPING TECHNICAL SPECIFICATIONS

The initial concept was reviewed by the EOC Technical Working Group led by CDC-MoH and comprising PSI, the World Health Organization, the US Centers for Disease Control and Prevention, the Asian Development Bank, the World Bank, and others. All stakeholders reached broad consensus to develop a public health emergency response resources dashboard to be fully integrated within the existing national CamEWARN DHIS2 instance.

The team reviewed the configuration of the CDC-MoH CamEWARN DHIS2 instance and identified the platform's capacity to deploy the EOC resource dashboard. A detailed action plan was subsequently developed and shared with all partners for review.

Following a consultative workshop, the project team finalized the technical specifications for the EOC dashboard in CamEWARN, including the variables, data entry forms, and indicators, and developed an initial draft of the PHEOC emergency response resources module, including visualizations and the dashboard itself. These activities were completed based on the specific practical needs as outlined by the relevant stakeholders, including the MoH at the central and subnational levels.



## SYSTEM CONFIGURATION

A DHIS2 “sandbox” instance was used to design and configure the various data collection forms and analytical outputs, in line with the system specifications developed under the previous step. We replicated the CamEWARN organization unit hierarchy to ensure that health facilities and other reporting units and divisions were in line with those used in CamEWARN. Further mapping of facilities was required to import existing relevant datasets from the existing MoH Health Coverage Plan database into the DHIS2 database.

Throughout the second quarter of 2022, we extensively tested the initial configuration to ensure all data elements, data sets, indicators, visualizations, and the dashboard were functioning well before presenting the initial result to the CDC-MoH for review.

**Fig. 1.** Pilot DHIS2 dashboard (partial) with key indicators for Public Health Emergency Resources Mapping module



## THE PILOT PHASE

### PREPARING FOR FIELD TESTING

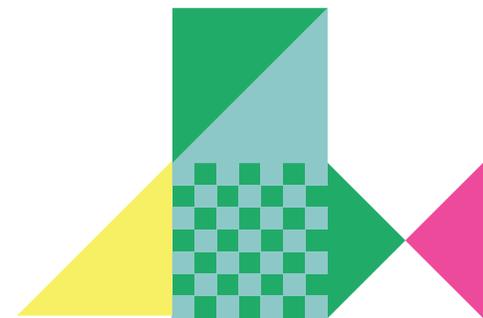
Simultaneously, the PSI and the MoH-CDC jointly developed a plan for piloting the resource mapping tools in seven provinces.

An accompanying user guide for the new tool was developed to ensure that participants in the pilot phase have access to adequate support materials.

Forty sites at varying administrative levels and across seven provinces—Battambang, Banteay Meanchey, Preah Sihanouk, Oddar Meanchey, Kratie, Stung Treng and Mondulakiri—were selected for piloting.

**Table 1.** Type and Number of Sites Involved in the Pilot

| SITES                         | NUMBER    |
|-------------------------------|-----------|
| Provincial Health Departments | 7         |
| Provincial Hospitals          | 3         |
| Operational Districts         | 19        |
| Referral Hospitals            | 4         |
| Health Centers                | 7         |
| <b>Total</b>                  | <b>40</b> |



## LAUNCHING THE PILOT

A pilot launch event was held with all participating sites at the end of May 2022. Each site was provided with guiding materials, including the user guide on piloting the resource mapping activity along with a short video tutorial, coupled with an in-person or online training.

**Fig. 2.** Pilot launch workshop, Kampong Chham, July 2022



Using the data collected from the pilot sites along with additional information from the Department of Planning and Health Information (DPHI), PSI generated a full pilot dashboard to track progress on reporting and initiate analysis of available data for the pilot sites.

Sites began piloting the module between June and August of 2022. Each of the Provincial Health Departments conducted follow-up visits to pilot sites within their jurisdiction, followed by supportive supervision visits by the CDC-MoH, the DPHI, and PSI. A supervision checklist was used to assess data quality at 27 sites, covering six thematic areas aligned with the components of the new dashboard:

1. Health Coverage Plan (health facility mapping)
2. Human Resource and Capacity
3. Medical Equipment and Infrastructure
4. EOC Equipment
5. Point of Entry Equipment
6. Rapid Response Team Registry

For each of these components, we noted if the sites 1) provided a complete data set, 2) if the data set was completed correctly, and 3) if the data set

was submitted on time. Additionally, feedback and suggestions were solicited from users for improving the resource mapping DHIS2 modules.

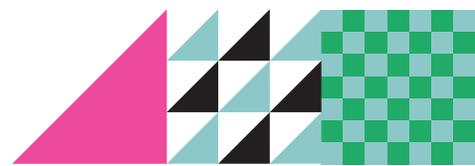
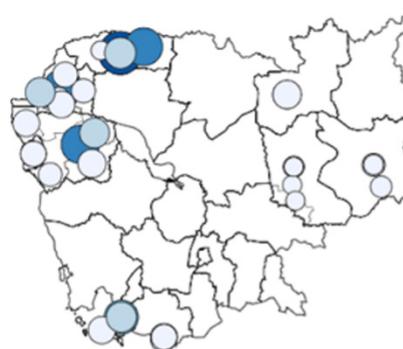
## PILOT EVALUATION

The results from the field supervision visits revealed that 15 of the 27 sites (56%) completed all data sets, 8 partially completed the data sets, and 4 did not complete any. Further feedback from users provided valuable insights for further improvement of the resource mapping for PHEOC tool. They confirmed the utility of most variables and indicated where others needed refinement or were only appropriate for particular facilities. Specific requests were made to expand the list of EOC equipment and to include more detailed options for the equipment. Points of Entry were included under the Operational District level within the organization unit hierarchy.

Other recommendations concerned the dashboard interface and user experience, updating facility GPS coordinates in DHIS2 for more accurate mapping, and amending the data entry system to allow for users to upload a variety of source documents into the system, such as pictures and files for reference.

**Fig. 3.** Number of RRT members by site in pilot provinces

### KH EOC RM - RRT MEMBER BY PROVINCE



Along with these revisions to the tool itself, users requested to have an updated user guide in the form of a MoH-approved Standard Operating Procedures (SOP) for resource mapping that includes a) definitions of all data elements, data types, and variables, and b) deadlines for data entry into the resource mapping system.

Several challenges were reported by pilot sites or were identified during the joint supervision visits at the end of the pilot phase:

- Some sites did not have all documentation required for DHIS2 data quality verification.
- Adjustments in reporting frequency for certain data sets from quarterly to semesterly rendered some previously reported data inaccessible.
- Unstable internet connection affected some users' ability to enter resource mapping data into DHIS2 and to display the dashboard and maps.
- Part of the resource mapping data points are already captured in separate MoH databases: the Human Resources Management System (HRMIS) led by the Human Resource Department and the Health Information System unit led by DPHI. As a result, there is some level of duplication, which could be avoided by rendering these disparate systems more directly compatible, though this is currently beyond the scope of the project.

## NEXT STEPS

By the end of 2022, the development of the new PHEOC Emergency Response Resources dashboard and the pilot phase of the project were successfully completed. Pilot data have been validated, and the DHIS2 configuration has been updated to reflect findings from the pilot phase, and migrated to the national CamEWARN DHIS2 system in anticipation of the scale-up phase.

We are now well-positioned to take the following next steps to prepare for the roll-out of resource mapping to the rest of the country in the first half of 2023:

- Update the user guide and develop official SOPs prior to roll-out in other provinces

- Develop a training curriculum on the new module
- Provide capacity building training for public health facilities and relevant departments (PHD, OD)
- Develop quarterly workplans for supportive supervision visits to the sub-national level

We expect the nationwide roll-out of the Resource Mapping for PHEOC tool to be completed by the end of 2023. The set of resource mapping dashboards will include country-wide data containing the six initial data sets that were piloted in 2022.

Building on this foundation, the CDC-MoH is planning to incorporate additional data sets in the dashboard so that public health staff and authorities at all levels will have direct access to the information needed to effectively manage and deploy health resources in the event of a public health threat.

The expanded dashboard will, in turn, also serve as an integrated tool for developing and implementing comprehensive plans and procedures around public health emergency preparedness and response. Ultimately, through our work on developing the PHEOC Emergency Response Resources dashboard, PSI, in collaboration with the Ministry of Health and technical partners, is further contributing to progress in bolstering the country's capacity to prepare for and respond to public health emergencies.

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