IMPLEMENTATION OF THE **HOSPITAL SAFETY INDEX** IN LAO PDR

Strengthening Healthcare Resilience

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UN-Habitat: Strengthening Healthcare Resilience: Implementation of the Hospital Safety Index in Lao PDR

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Acronyms and Abbreviations

DCDC	Department of Communicable Disease Control
DHHP	Department of Hygiene and Health Promotion
DHO	District Health Office
DHP	Department of Health Personnel
DHR	Department of Healthcare and Rehabilitation
DPC	Department of Planning and Cooperation
DPF	Department of Planning and Finance
FDD	Food and Drug Department
HEPR	Health Emergency Preparedness and Response
HSI	Hospital Safety Index
IDA	International Development Association
INFORM	Index for Risk Management
Lao PDR	Lao People's Democratic Republic
MOH	Ministry of Health
ND-GAIN	Notre Dame Global Adaptation Initiative
PHO	Provincial Health Office
ToT	Training of trainers
UNDP	United Nations Development Programme
UN-Habitat	United Nations Human Settlements Programme
UNICEF	United Nations Children's Fund
WASH	Water, sanitation, and hygiene
WASH FIT	Water and Sanitation for Health Facility Improvement Tool
WHO	World Health Organisation

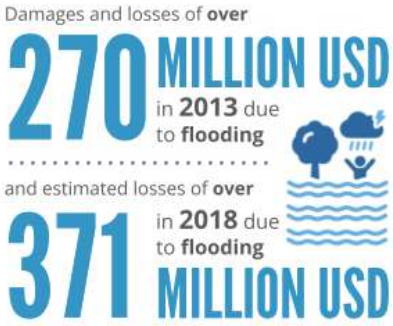
This report outlines the development and implementation of the Hospital Safety Index (HSI) in Lao PDR, focusing on enhancing the resilience of healthcare facilities against climate-related and other hazards. The HSI was adapted from the WHO's version and tailored to Lao PDR's specific needs, incorporating a WASH (Water, Sanitation, and Hygiene) module to address critical safety gaps.

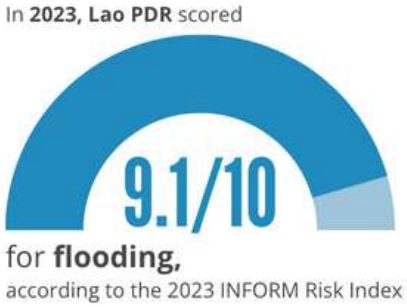
01 Introduction

The HSI initiative in Lao PDR, undertaken by UN-Habitat in partnership with the Ministry of Health (MOH) and the World Bank, represents a significant advancement in strengthening healthcare infrastructure against climate and disaster risks. The project aims to enhance the safety and resilience of healthcare facilities across the country through meticulous development, pilot testing, training, and a comprehensive national rollout plan. This initiative ensures better protection for patients and healthcare workers, contributing to improved public health security and healthcare infrastructure in Lao PDR.

1.1. Background

Lao PDR is highly exposed to climate and disaster risks. For example, the readiness ranking (136) is lower than the vulnerability ranking (117) indicating a need to build resilience in institutions, systems, processes, infrastructure, and the environment. Major flooding events in recent years have caused significant fatalities and economic losses, emphasizing the need for resilient health infrastructure.





1.2. Scope of Hospital Safety Index

The HSI update in Lao PDR involved UN-Habitat working closely with relevant government departments and stakeholders to adapt the WHO's hospital safety index to the Lao PDR context. This included developing survey instruments, data management strategies, and site inspection procedures tailored to the specific needs of Lao PDR.

Image 1 to the left shows the impact of floods.
Image 2 to the right shows the health facilities.

02 Methodology

2.1. Development of Hospital Safety Index

2.1.1. HSI Structure

The HSI questionnaire was structured to assess three main components: Structural, Non-Structural, and Functional aspects of healthcare facilities. These components were further subdivided into detailed subsections, covering various aspects of hospital safety.

STRUCTURAL COMPONENT	Security Level		
Architectural Aspects	LOW	MEDIUM	HIGH
Security due to history of the health facility			
Has the establishment suffered prior structural damage? Check if there is a structural opinion indicating that the degree of security has been compromised and at what level. If there is not, find out if after an event, there were cracks or settlements in the building, or if there was evidence of alteration in its structure or if there was no damage. ***Low, major damage; Medium, moderate damage; High , minor damage.***			
NON-STRUCTURAL COMPONENT			
Systems in the Building			
Electrical Systems			
Does the facility have a functional and well-maintained source of electricity (e.g., electricity grid, solar, or other)? In remote inpatient settings (such as rural hospitals) as a minimum, a safe type of kerosene or gas lantern and powerful hand torches should be available. ***Low, No electricity supply; Medium, There is a source of electricity but it is not currently functioning; High there is a well-maintained and functioning source of electricity.***			
FUNCTIONAL COMPONENT			
Disaster Management Committee			
Disaster Prevention Committee in Health Services			
Does the establishment have a committee for emergencies and disasters? Verify that there is a formal constitution document and that the committee is multidisciplinary. ***Low, there is no committee or they do not have a document that proves it; Medium, there is a committee with three or fewer disciplines represented, but it is not operational; High, a committee with more than four disciplines represented exists and is operational.***			

Table 1. *Sample Hospital Safety Index questionnaire*

2.1.2. Translation and Validation

The transformation of the HSI questionnaire into the Lao language was a comprehensive cultural adaptation. This process ensured that each question was linguistically precise and culturally relevant for local healthcare practitioners. The preliminary questionnaire was reviewed by various departments within the MOH, resulting in a polished instrument reflecting the health safety priorities in Lao PDR.

2.2. Data Management and Analysis

2.2.1. Data Collection

Data collection for the project involved using paper questionnaires at the district level, which were later digitalized using the Kobo Toolbox at the provincial level, coordinated by the MOH with support from UN-Habitat. Monitoring was facilitated through a Power BI dashboard linked to Kobo Toolbox, allowing a national focal point to track progress and assist provinces and districts in real-time, ensuring timely project completion. After data collection, the consolidated dataset underwent analysis using software like Excel and GIS to calculate the HSI for each hospital, providing insights into safety standards and preparedness nationwide.

2.2.2. Data Analysis

Data collected was synchronized with a centralized database, ensuring data integrity and consistency. This centralized approach facilitated the amalgamation of data from diverse sources into a singular repository, enhancing data retrieval and management. The integration with Excel allowed for enhanced analysis, generating scores for each health facility based on structural safety, non-structural safety, and emergency and disaster management.

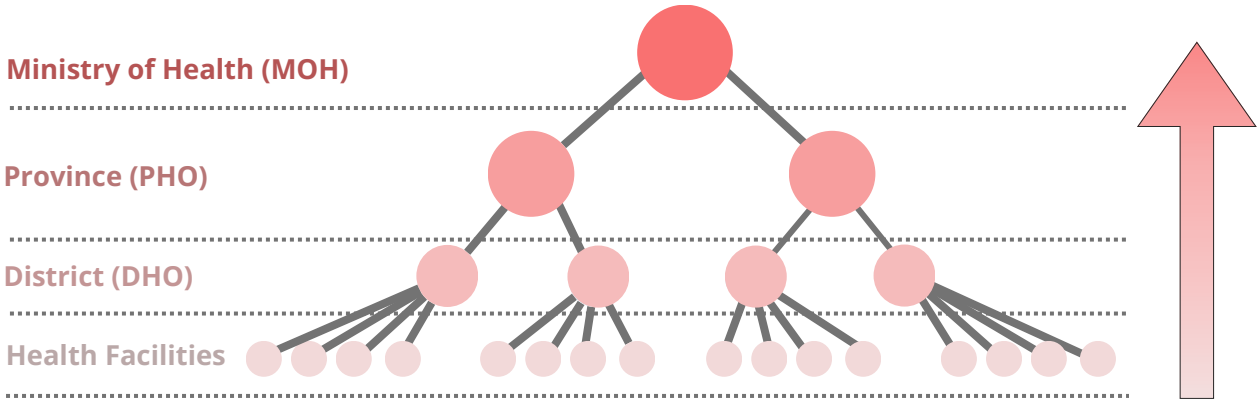


Figure 1: *Data collection and aggregation pathway from health centres to national level.*

DISTRICT LEVEL

Health center staff at the District Health Office (DHO) complete a **paper questionnaire** for each health center.
In districts with few health centers, a single focal person handles this; in larger districts, a team is required.

Real-time data submissions and **error reduction expedite** the data compilation process.

PROVINCIAL LEVEL

Provincial Health Offices (PHOs**) digitalize data collected at the district level** using **Kobo Toolbox**.
Kobo Toolbox, an open-source platform by the Harvard Humanitarian Initiative, enables efficient data collection, aggregation, validation, and quality control.

NATIONAL LEVEL

Data is collected at the district level, aggregated at the provincial level, and then **centralized at the national level** for **final analysis** and **HSI generation**
Allows for greater accessibility, management, and security of data

Figure 2: *Roles of health centres to national level on data collection and aggregation pathway*

03 Pilot Testing

Pilot testing involved a multidisciplinary data collection team assessing eight facilities in Vientiane Capital and three southern provinces. Interviews and on-site inspections were conducted to gather information on safety management practices. The data collected was digitalized, and safety ratings were generated for each facility.

3.1. Key Results

Hospital Safety Index

Mahosot Hospital

Province:	Vientiane Capital
District:	Sisattanak
Health Facility:	Mahosot Hospital

Overall Safety and Unsafety Index

Safety Index: 0.91

Unsafety Index: 0.09

Responses by category

The following table displays the percentages of responses related to structural, non-structural, and functional aspects considered in the Hospital Safety Index.

Category	Low	Medium	High
Structural	0%	0%	100%
Non-structural	4%	7%	88%
Functional	8%	33%	58%

Table 2. HSI results of Mahosot Hospital by catrgory

Health Facility Category: A

Safety index	Category	What should be done?
0.66 – 1	A	It is likely that the hospital will function in case of a disaster. It is recommended, however, to continue with measures to improve response capacity and to carry out preventive measures in the medium- and long-term to improve the safety level in case of disaster.
0.36 – 0.65	B	Intervention measures are needed in the short-term. The hospital's current safety levels are such that patients, hospital staff, and its abilityto function during and after a disaster are potentially at risk.
0 – 0.35	C	Urgent intervention measures are needed. The hospital's current safety levels are inadequate to protect the lives of patients and hospital staff during and after a disaster.

Table 3*. Explaination of safety index and category*

1 Structural aspect	
1.1 Architectural section	
1.1.1 Security due to history of the health facility	High
1.1.2. Degree of security related to the structural system and the type of material.	High
2 Non-structural aspects	
2.1 Systems in the building	
2.1.1 Electrical system	High
2.1.2 Telecommunications system	High
2.1.3 Architectural elements	High
2.2 Water, sanitation, hygiene and waste management	
2.2.1 Water supply system	High
2.2.2 Sanitation	High
2.2.3 Solid Waste Management	High
2.2.4 Hand Washing	High
2.3 Medical Logistics	
2.3.1 Fuel tanks (Gas, gasoline, diesel)	High
2.3.2 Medical gases (Oxygen)	High
3. Aspects related to safety based on the functional capacity of the health facility	
3.1 Disaster Management Commettee	
3.1.1 Disaster Prevention Committee in Health Services	High
3.1.2 Operational plan for internal and external disasters	High
3.1.3 Contingency plans for medical care in disasters	Medium
3.2 Medicine provision	Medium

Table 4. *HSI results of Mahosot Hospital by sub-category*

Health Facility	Province	District	Safety Index	Category
Attapeu Provincial Hospital	Attapeu	Samakhixai	0.57	B
Bokeo Provincial Hospital	Bokeo	Houayxay	0.81	A
Borikhamxay Provincial Hospital	Borikhamxay	Pakxan	0.67	A
Champasak Provincial Hospital	Champasak	Pakxye	0.62	B
Huaphanh Provincial Hospital	Huaphanh	Xamnua	0.42	B
Khammuane Provincial Hospital	Khammuane	Thakhek	0.49	B
Luangnamtha Provincial Hospital	Luangnamtha	Namtha	0.60	B
Luangprabang Provincial Hospital	Luangprabang	Luangprabang	0.73	A
Oudomxay Provincial Hospital	Oudomxay	Xai	0.75	A
Phongsaly Provincial Hospital	Phongsaly	Bounnua	0.40	B
Saravane Provincial Hospital	Saravane	Saravane	0.44	B
Savannakhet Provincial Hospital	Savannakhet	Kaysone Phomvihane	0.57	B
Vientiane Provincial Hospital	Vientiane	Viangkham	0.69	A
Mahosot Provincial Hospital	Mahosot	Sasattanak	0.91	A
Xayaboury Provincial Hospital	Xayaboury	Xayaboury	0.49	B
Xayasomboun Provincial Hospital	Xayasomboun	Anouvong	0.29	C
Sekong Provincial Hospital	Sekong	Lamam	0.75	A
Xiengkhuang Provincial Hospital	Xiengkhuang	Pek	0.83	A

Table 5. *Provincial hospitals and their HSI Ranking*

04 Training on the Use of HSI

The training program, designed as a 'Training of Trainers,' equipped provincial focal points with the skills and knowledge to train district focal points in their respective provinces. These provincial focal points then conducted one-day intensive training sessions in their provincial capitals, focusing on the practical application of conducting HSI assessments using paper-based questionnaires.

4.1. Results of Training

By the end of the training, 74% of participants felt confident using the HSI questionnaire independently, and an additional 24% felt they could use it after reviewing materials or requesting support. These trained participants will act as provincial focal points, ensuring the HSI index is completed across all districts in their provinces.

74% of participants felt **confident**

using the **HSI Questionnaire**

05 National Rollout

Figure 3: *Central and Provincial Hospitals in Lao PDR.*

Following the successful development and piloting of the adapted Lao HSI, which generated safety ratings for 22 hospitals and health centers, the project has now shifted focus to a nationwide rollout. This rollout is essential to assess every hospital and health center in Lao PDR so actions to reduce risks and improve emergency management can be prioritized.

06 Summary of the Study

The development and adaptation of the Hospital Safety Index (HSI) in Lao PDR are set to significantly enhance the country's healthcare safety and resilience. By integrating a WASH (Water, Sanitation, and Hygiene) module, the HSI addresses critical gaps specific to Lao PDR, which is highly vulnerable to climate and disaster risks.

The comprehensive data collection methodology, using both paper-based and digital tools like Kobo Toolbox, categorizes health facilities based on structural and functional aspects. Pilot tests in 22 hospitals and health centers have identified key areas for improvement.

Training initiatives across all 18 provinces will ensure health workers are proficient in using the HSI. A detailed national roadmap outlines the plan for scaling up HSI implementation, including training, assessments, and data management with advanced tools like Power BI. This roadmap is essential for a coordinated and effective rollout, ensuring consistency and comprehensive coverage across the country.

HSI implementation will enhance the preparedness and resilience of Lao PDR's healthcare facilities, ensuring better protection for patients and healthcare workers during disasters. Effective data management will be crucial, with digital tools ensuring accurate data collection and comprehensive analysis

Image 3 Sekong Provincial Hospital
Image 4 Handwash basin with hand sanitizer commonly found in the provincial and district hospitals in Laos

Annex 1: Context in Lao PDR

Lao PDR is highly exposed to climate and disaster risks such as floods and droughts, emphasizing the critical need for resilient health infrastructure. Flooding disrupts health facilities through direct damage and indirect channels, such as damage to critical infrastructure including electricity, water, sanitation, roads, and waste management systems. In addition to deaths and injuries caused by drowning, electrocution, and building collapses, these hazards introduce water and vector-borne diseases, infections, and mental health issues. Cascading risks from these disasters worsen during pandemics like COVID-19, underscoring the need for robust health emergency preparedness.

The Lao PDR COVID-19 Response Project, with US$33 million in financial support from the World Bank's International Development Association (IDA) and the Health Emergency Preparedness and Response (HEPR)-Trust Fund, aims to enhance the preparedness and resilience of healthcare facilities. As part of this initiative, UN-Habitat developed and pilot-tested the Hospital Safety Index (HSI) under the HEPR-Trust Fund project "Strengthening Health Facility and Lifeline Infrastructure for Health Emergency Preparedness in Lao PDR." The HSI is crucial for ensuring health facility safety and functionality during climate disasters.

Image 5 flag of Laos

Annex 2: Design of HSI Questionnaire

The HSI was designed to account for the infrastructure, operational capacity, and emergency preparedness in countries with medium-sized and small hospitals and health centres such as those in Lao PDR, preserving the core structure of the original index and providing a thorough assessment of **structural, nonstructural, and functional** aspects of health facilities.

STRUCTURAL COMPONENT

Critical for **safeguarding** patients and healthcare staff

Examination evaluates the **physical integrity** and **robustness** of healthcare buildings

Analyzes architectural and engineering aspects of construction quality, materials utilized, and the design's capacity to withstand environmental stressors

Questionnaire uses responses about building foundations and load-bearing capabilities to determine whether the health facility's physical structure is equipped to endure adverse events such as floods, droughts, storms, or other climate related disasters

NON-STRUCTURAL COMPONENT

Assesses safety measures in place for elements not integral to the building's structural frame but crucial to its functionality

Questionnaire evaluates the accessibility of essential medical equipment, utilities, furnishings, and other items that may pose hazards if not properly secured during a disaster

FUNCTIONAL COMPONENT

Focuses on operational aspects of preparedness, response capabilities, and the continuity of critical healthcare services during and after disaster

Evaluates the effectiveness of emergency plans, staff training, and communication systems questionnaire delves into emergency protocols, staff readiness, and resource availability, ensuring that the facility is not only physically resilient but also operationally robust

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