

**Study of the Quality Systems
including Equipment and Infrastructure
at the District Laboratories in Lao PDR**

Greater Mekong Subregion Health Security Project
Lao PDR

Report prepared by:

Ruben David
(International Laboratory Expert/Consultant, ADB Health Security Project, Lao PDR)

Vimatha Nick Xaysitthideth
(National Laboratory Expert/Consultant, ADB Health Security Project, Lao PDR)

1st November 2019

1. INTRODUCTION

The Greater Mekong Health Security Project was designed with 3 main outputs:

1. To improve regional cooperation and communicable disease control in the border areas;
2. To strengthen systems for national disease surveillance and outbreak responses; and
3. To improve laboratory services and prevention and control of hospital infections.

An objective of Output 3 is to improve the quality of the laboratory services at the district hospitals in Laos.

Laboratory strengthening in most developing countries, including Laos have usually been provided to Central/National level laboratories and in some instances the programs have been extended to the Provincial level's laboratories. There have been no structured programs towards strengthening district level laboratories.

To achieve Output 3 objectives, a plan had to be developed towards laboratory quality improvement for the district level laboratories. This would require a different approach due to limited range of tests performed, limited human resources, the staff's experience, their access to continuing education and training, the level of instrumentation its maintenance support and issues with their reagent and consumable supplies and their storage facilities.

2. OBJECTIVES

The objective of the study was to obtain baseline data prior to developing a tailored program for improvement of the Laboratory Quality Improvement activities to the district level laboratories.

The assessment tool to ascertain the baseline data included:

Quality systems
Equipment
Infrastructure

The framework for the assessment were the guiding documents from the Ministry of Health as detailed in the 'Standards for health laboratories in Lao PDR, 2015'

3. METHODOLOGY

The assessment was undertaken over the following phases

1. Formal approval processes
 - NCLE wrote to MOH seeking approvals to undertake the evaluation and to seek approval for the visit to the Provincial and District laboratories, and
 - Notifications to Provinces was done.
2. Coordination
 - The assessment was coordinated with the staff's time available so as to minimize staff time, cost, and logistical requirements;
 - Selection of assessment teams; and
 - Administration-ADB budget, transport/logistics, and team allocation
3. Training of assessment teams

- Training was delivered to all the Laboratory assessors by the ADB International Laboratory Quality Improvement Expert and these activities were coordinated and delivered with the support of NCLE
- The training that used the tools developed were based on the testing services, equipment and quality expectations as defined within the 'Standards for health laboratories in Lao PDR, 2015
- At the training session, the questions which formed the assessment were reviewed and adapted to Laos laboratories and clarity for Lao language. It was then translated to Laos for use during the assessment.

4. Assessments conducted

The assessments were conducted as follows:

3 June 2018	Champasack and Attapu
13 June 2018	Bolikhamxay and Khammouane
18 June 2018	Phongsaly and Oudomxay
25 June 2018	Bokeo and Luangnamtha
30 June 2018	Xiengkhouang and Houaphanh
10 July 2018	Salavanh and Sekong province

The main activities conducted at the time of assessments were:

a) Introduction

- Introduce the assessment team to the Head of the Province and District and the Laboratory
- Assessment team obtain relevant information from the management team on the services offered and the workload of the hospital/laboratory and also their problems/shortcomings within their services

b) Interviews

- The laboratory quality assessment was conducted in the laboratory with interview with key person in the laboratory, followed by a visual inspection of the laboratory facilities and its documentation

5. Data Analysis

The data were collated by the assessors and handed to NCLE. The data entry into Excel was undertaken by the ADB National Laboratory Expert and the data analysis was completed by the ADB International Laboratory Expert/Consultant. The GIS plots were drawn by ADB National M&E Expert/Consultant.

4. RESULTS

The evaluation results were recorded as Yes, Partial or No.

'Yes' indicating that there was compliance to the question and obtained a score of 1.0

'Partial' score was given where there was partial compliance to the question being asked and was given a score of 0.5.

'No' was given where there was no compliance to the question being asked in the assessment and was given a score of 0.

4.1 Quality

The results were grouped under the 9 quality areas defined within ISO 15189

1	(A) General information	0.53
2	(B) Quality management system (QMS)	0.46
3	(C) Human resources	0.49
4	(D) Laboratory testing Management	0.47
5	(E) Testing Phases	0.53
6	(i) Pre-analytical phase	0.47
7	(ii) Analytical phase	0.51
8	(iii) Post-analytical phase	0.59
9	(F) Accommodation and environmental conditions	0.41
10	(G) Laboratory safety	0.48
11	(H) Laboratory equipment	0.43
12	(I) Procurement and supplies management	0.37

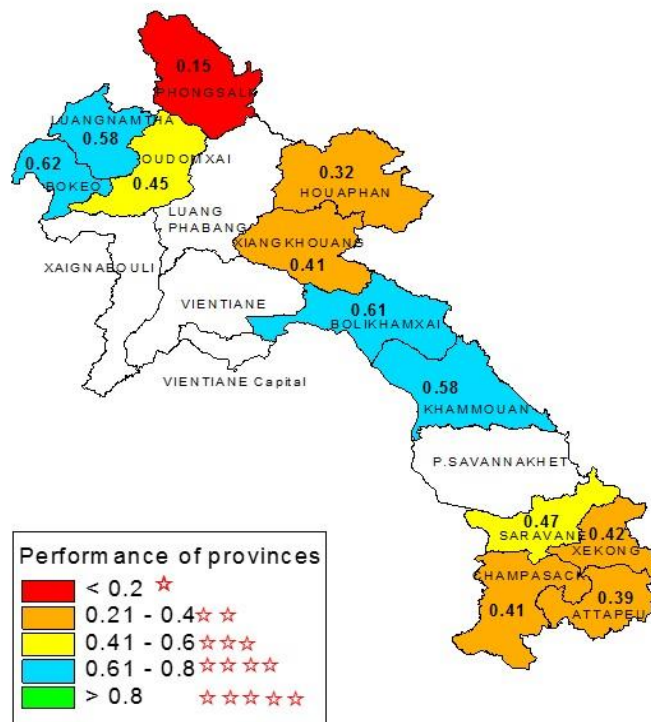
The performances of the provinces are grouped as below:

	Performance of Provinces	Score
1	Phongsaly	0.15
2	Luangnamtha	0.58
3	Borkeo	0.62
4	Udomxay	0.45
5	Xienkhaung	0.41
6	Huaphan	0.32
7	Khammouan	0.58
8	Bolikhamxay	0.61
9	Salavan	0.47
10	Champasak	0.41
11	Sekong	0.42
12	Attapue	0.39

The performances of the district laboratories under the ADB-HS project are grouped below:

	Assessed Laboratories (Districts)	Score
Phongsaly	Phongsaly Province	0.24
	Gnot-Ou	0.01
	Samphan (Bountai)	0.13
	Khua	0.19
Luangnamtha	Nalae (viengphouka)	0.64
	Sing	0.52
Borkeo	Tonpueng	0.42
	Mueng (Paktha)	0.82
Udomxay	Udomxay Province	0.64
	Pakbeng	0.41
	Houn	0.36
	La	0.38
Xienkhaung	Xienkhaung Province	0.58
	Kham	0.41
	Nonghet	0.34
	Mok may (Phoukut)	0.32
Huaphan	Huaphan Province	0.61
	Xiengkhor	0.28
	Khuan (Hiam)	0.32
	Add	0.15
	Sopboa	0.22
	Vienxay	0.32
Khammouan	Khammouan Province	0.83
	Nakay	0.58
	Yommalat	0.50
	Bualapha	0.43
Bolikhamxay	Bolikhamxay Province	0.68
	Xiay champon (Bolikan)	0.54
	Viangthong	0.53
	Khamkert	0.68
Salavan	Ta Oiy	0.48
	Khongxadong	0.44
	Toumlan	0.25
Champasak	Champasak District	0.51
	Pathoumphon	0.34
	Mounlapamouk	0.29
	Khong	0.50
Sekong	Sekong Province	0.53
	Tahteng	0.33
	Dakchuong	0.40
Attapue	Sanamsay (Saysettha)	0.46
	Xangsai	0.33
	Phouvong	0.40

The GIS plot of the provinces and their laboratory quality performance are presented below:



Source by NCLE

4.2 Infrastructure and laboratory environment assessment

During the assessment, the laboratory working environment was also reviewed by visual inspection as well as discussions with the senior staff in the laboratory and hospital. Laboratories were assessed for capacity to operate as a laboratory and perform its routine testing and produce quality results.

These included:

- Power supply - adequate power points, continuity of regulated power;
- Water – clean water, continuous supply of water and functioning taps;
- Air conditioning – adequate and functioning air conditioning units to control the temperature to operate equipment, perform tests and store reagents/consumables; and
- Renovations – adequate space for the laboratory to perform its testing, workflow consistent with MOH standards for laboratories.

	Laboratory	Power supply	Water	Air Conditioning	Renovations
Phongsaly	Phonsaly Province	✓	✓	x	x
	Gnot-Ou	✓	✓	x	✓
	Phongsali D	✓	✓	x	✓
	Samphan (Bountai)				✓
	Khua	✓	✓	✓	x
Luangnamtha	Luangnamtha Province	✓	✓	✓	✓
	Nalae (Viengphouka)	✓	✓	✓	✓
	Sing	✓	✓	✓	✓
Borkeo	Borkeo Province	✓	✓	✓	✓
	Tonpueng	✓	✓	✓	✓
	Pha Oudom				
	Mueng (Paktha)	✓	✓	✓	✓
Udomxay	Udomxay P	✓	✓	✓	x
	Pakbeng	✓	✓	✓	✓
	Houn	✓	✓	✓	✓
Xienkhaung	Xienkhaung Province	✓	✓	✓	✓
	Kham	✓	✓	x	x
	Nonghet	x	✓	✓	x
	Mok may (Phoukut)	x	✓	x	x
Huaphan	Huaphan Province	✓	✓	✓	✓
	Xiengkhor	✓	✓	x	✓
	Khuan (Hiam)	x	✓	x	✓
	Add	x	✓	✓	✓
	Sopboa	✓	✓	✓	x
	Vienxay	x	✓	x	x
Khammouane	Khammouan Province	✓	✓	✓	x
	Nakay	✓	✓	✓	x
	Yommalat	✓	✓	✓	✓
	Bualapha	x	x	x	x
Bolikhamsay	Bolikhamsay Province	✓	✓	✓	✓
	Xiay champon(Bolikan)	x	x	✓	x
	Viangthong	✓	✓	✓	x
	Khamkert	✓	✓	✓	✓
Salavan	Salavan Province	✓	✓	✓	x
	Ta Oiy	✓	x	✓	✓
	Khongxadong	✓	x	✓	✓
	Toumlan	✓	✓	✓	x

Champasak	Champasak Province	✓	✓	✓	✓
	Champasak District	✓	✓	✓	✓
	Pathoumphon	✓	✓	x	x
	Mounlapamouk	✓	✓	✓	✓
	Khong	✓	✓	✓	✓
Sekong	Sekong Province	✓	✓	✓	x
	Tahteng	✓	✓	✓	x
	Dakchuong	✓	✓	x	x
Attapue	Attapue P	✓	✓	✓	✓
	Sanamsay (Saysettha)	✓	✓	✓	✓
	Xangsai	✓	✓	✓	✓
	Phouvong	✓	✓	✓	✓
Key	Totals				
Needs work	x	7	4	11	19
Complete	✓	40	43	36	29
	% Requiring works	14.9	8.5	23.4	39.6

The infrastructure and laboratory environment assessment highlighted the biggest area of need (39.6 %) was renovations of the laboratories. This was mainly of limited laboratory space for its testing, the lack of space to separate wet (handling infectious material) and dry areas of laboratory activities and space for storage.

The environment, especially air conditioning was not sufficient in 23.4% of laboratories to enable controlled environment for laboratory testing i.e. of regulated temperature and humidity of the testing space.

The issue with power supply was that there was insufficient power supplies in those laboratories that needed more work.

The main issue in laboratories that required work, was with water and this was the low flow rate and water pressure in these laboratories

4.3 Laboratory Biosafety

The laboratory biosafety was assessed under section G of the quality audit questions and the overall result was 48% were addressing the quality standards.

5. CONCLUSIONS

The results of this study provided a strong baseline as well as the critical focus areas where the quality improvement strategies should be developed towards a district-based laboratory quality improvement program model.

As Phongsaly was the poorest performing district, a separate and more detailed analysis was to be undertaken to consider further factors into the Laboratory Quality. Improvement plan for delivery over the remaining period of the ADB Greater Mekong Sub region Health Security Project.