Focus Group Discussions on Enhancing Laboratory-based Surveillance Capabilities for Emerging Infectious Disease Response: Project for Strengthening the Philippine National Health Laboratory Network for Infectious Diseases (PHeLNIDs)

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ABSTRACT

The COVID-19 pandemic highlighted critical gaps in the Philippine health laboratory system, including limited testing capacities, insufficient trained personnel, and inadequate resource distribution. To address these issues, the Philippine government established the Office for Health Laboratories (OHL) and sought technical assistance from the Japan International Cooperation Agency (JICA) through the Project for Strengthening the Philippine National Health Laboratory Network for Infectious Diseases (PHeLNIDs). This project aims to enhance the National Health Laboratory Network's (NHLN) capacity for infectious disease surveillance and response. Phase 1 of the PHeLNIDs project included focus group discussions (FGDs) conducted across 17 regions to assess challenges and develop recommendations for a tier-based laboratory network. Key findings revealed logistical, workforce, transportation, and data management challenges that hinder the effectiveness of specimen referral workflows. Recommendations emphasized decentralizing diagnostic capabilities through subnational reference laboratories, strengthening logistics, and implementing an Integrated Laboratory Information Management System (ILIMS). This article underscores the importance of laboratory decentralization, capacity building, and improved resource management to enhance laboratory-based surveillance and response to emerging infectious diseases. The proposed interventions aim to bolster the Philippine laboratory network, reduce turnaround times, and improve public health outcomes.

Key words: health laboratory, laboratory-based surveillance, laboratory network, emerging infectious disease

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INTRODUCTION

The COVID-19 pandemic has severely affected the Philippine health sector as well as its economy. Although the Philippine government has taken strong countermeasures against COVID-19 including the expansion of molecular testing for the people, some challenges have been observed, such as the limited number of accredited molecular laboratories, the low capacities of testing centers, the lack of trained personnel, and the inadequate supply and distribution of resources across the country. To address these issues, the government has considered a centrally governing body focusing on the standards, policies, and operations of the laboratory network, stand-alone National Reference Laboratories without being lodged under hospital operations, and the clear delineation between clinical laboratory and public health services. As a result, the government established the Office for Health Laboratories (OHL) under the Health Facilities and Infrastructure Development Team in 2021.[1] The Philippine government has been exerting efforts to strengthen the National Health Laboratory Network (NHLN) through establishing the National Framework of NHLN by virtue of Administrative Order 2012-0021,[2] and drafting a "National Action Plan on Health Security in

2020" to bolster the capacity of NHL and expand NHLN in alignment with the International Health Regulation thematic areas.

The PHeLNIDs project

Under this background, the Department of Health Philippines (DOH) requested technical support from the Japanese government to enhance the capacity of NHLN for infectious diseases. As a result, the Project for Strengthening the Philippine National Health Laboratory Network for Infectious Diseases (PHeLNIDs) was initiated to prepare for a future pandemic through a functional network of health laboratories and improved public health response. PHeLNIDs was formulated with a two-step planning method, which means that Project activities immediately started as phase 1 once a basic plan was formulated, and then its detailed plan for phase 2 was to be prepared based on baseline survey results. The Japan International Cooperation Agency (JICA) and the DOH signed the Record of Discussions in May 2022 and Japanese experts were subsequently dispatched in July 2022.

The Project for Strengthening the Philippine National Health Laboratory Network for Infectious Diseases (PHeLNIDs) was initiated to prepare for a future pandemic through a functional network of health laboratories and improved public health response. PHeLNIDs was formulated with a two-step planning method, meaning that Project activities immediately started as phase 1 once a basic plan was formulated, and then its detailed plan for phase 2 was to be prepared based on baseline survey results.

Initiation of PHeLNIDs Phase 1

Phase 1 involved a baseline survey across various testing facilities to evaluate their capacity to detect infectious agents at national, regional, and local levels. Additionally, focus group discussions (FGDs) were conducted with Disease Reporting Units (DRUs) across 17 regions to identify challenges and develop recommendations for a tier-based laboratory network system.

Objectives of the focus group discussions

The FGDs aimed to:

- Assess practices for specimen referral from DRUs to National Reference Laboratories.
- Identify on-the-ground challenges faced by DRUs.
- Inform the development of tier-based laboratory networks at national, sub-national, and regional levels.

METHODOLOGY

Key personnel from selected DRUs, including RESU (Regional Epidemiology and Surveillance Unit), PESU (Provincial Epidemiology and Surveillance Unit), MESU (Municipal Epidemiology and Surveillance Unit), CESU (City Epidemiology and Surveillance Unit), and HESU (Hospital Epidemiology and Surveillance Unit), participated in FGDs from October to December 2022. Discussions were conducted via online platforms such as Zoom and Webex using semi-structured interviews (sample screenshots of Zoom meetings conducted for two [2] regions, Figures 1 and 2).

The topics raised and discussed during the FGD mostly revolved around the most vital functions and processes of the specimen referral system in the Philippines (Table 1).

Figure 1. Screenshot of FGD (Davao Region).

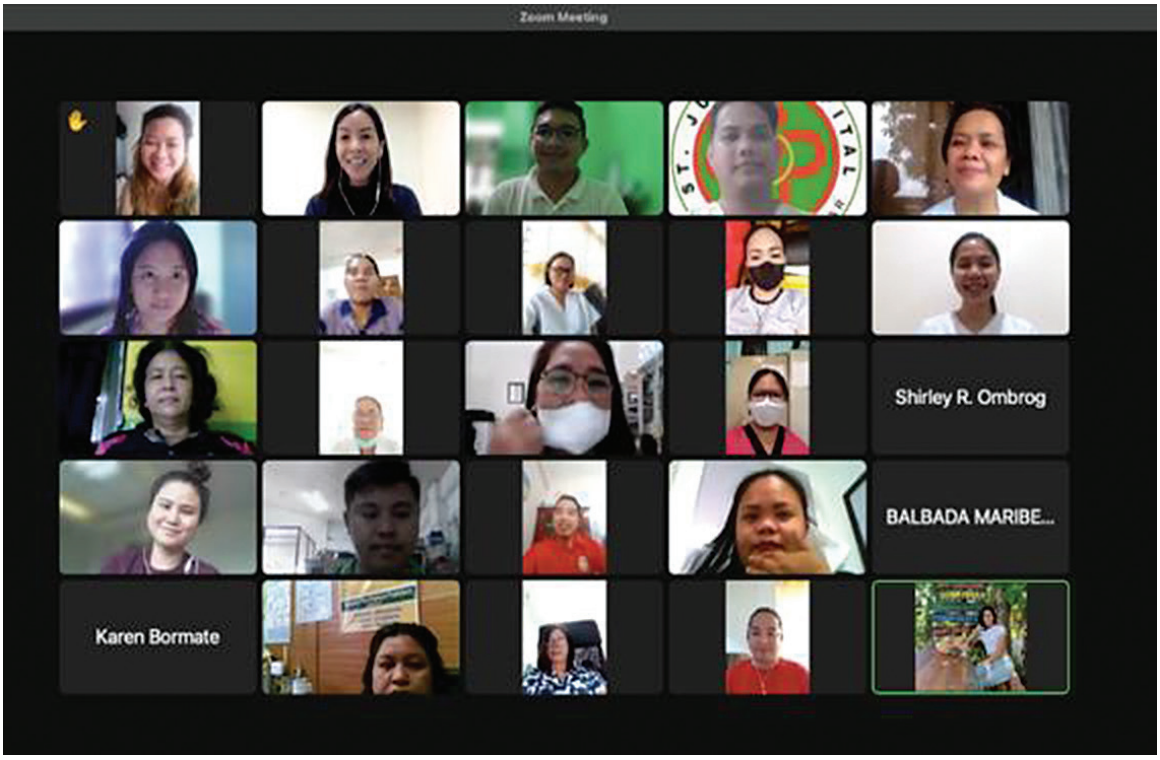


Figure 2. Screenshot of FGD (Eastern Visayas Region).

Table 1. Discussion topics and FGD questions

Discussion topic	FGD questions
Specimen referral workflow	*"What are the DOH referral laboratories in your region?"* *"Discuss the specimen referral form and workflow* *-From where;* *-For what purpose (Clinical or Public Health Surveillance);* *-To which laboratory;* *-For what specimen;* *-How often;* *-Mode of transportation; and* *-Referral budget"*
Guidelines implemented in the laboratories or testing facility	*"What are your existing guidelines in the handling and transport of specimens?"* *"Do you follow the triple packaging model?"*
Data management or the information system used related to specimen referral	*"What are your current practices for information management of infectious diseases?"*
Challenges in the specimen referral system	*"What challenges are you facing during specimen referral?"*
Recommendations for the improvement of the laboratories or testing facility, to include what tests are suggested to be performed if a subnational reference laboratory will be established in the region	*"What kind of laboratory examinations should be included or performed if a sub-NRL is to be established in your region?"*
Prevalent diseases in the region or locality pre- and/or post-pandemic	*"What are the most prevalent diseases in your area?"*

RESULTS

The specimen referral workflow

Specimen referral workflows varied depending on the DRU's capacity and location. Proximity to Epidemiology and Surveillance Units (ESUs) and reference laboratories/testing facilities significantly influenced these workflows (Figure 3). Tables 2a to 2c elaborate the specific steps in the specimen referral workflow relevant to the DRU's proximity to the ESU and testing facility.

To further analyze and determine the current capacity or effectiveness in specimen referral, other specific points were discussed with the FGD participants (Table 3).

Guidelines implemented in the laboratories or testing facility

Most participants adhered to guidelines issued by the Research Institute for Tropical Medicine (RITM) and the DOH. Island provinces also often relied on IATA guidelines due to air transport requirements. However, logistical challenges, such as high costs, insufficient funds, and unavailable local suppliers, necessitated modifications, and use of alternative materials:

- Secondary container: Resealable plastic bags (e.g., Ziplock™ bags)
- Specimen Transport Box: Styrofoam boxes/containers
- Parafilm: Packaging tape
- Cold packs: Frozen bottled water

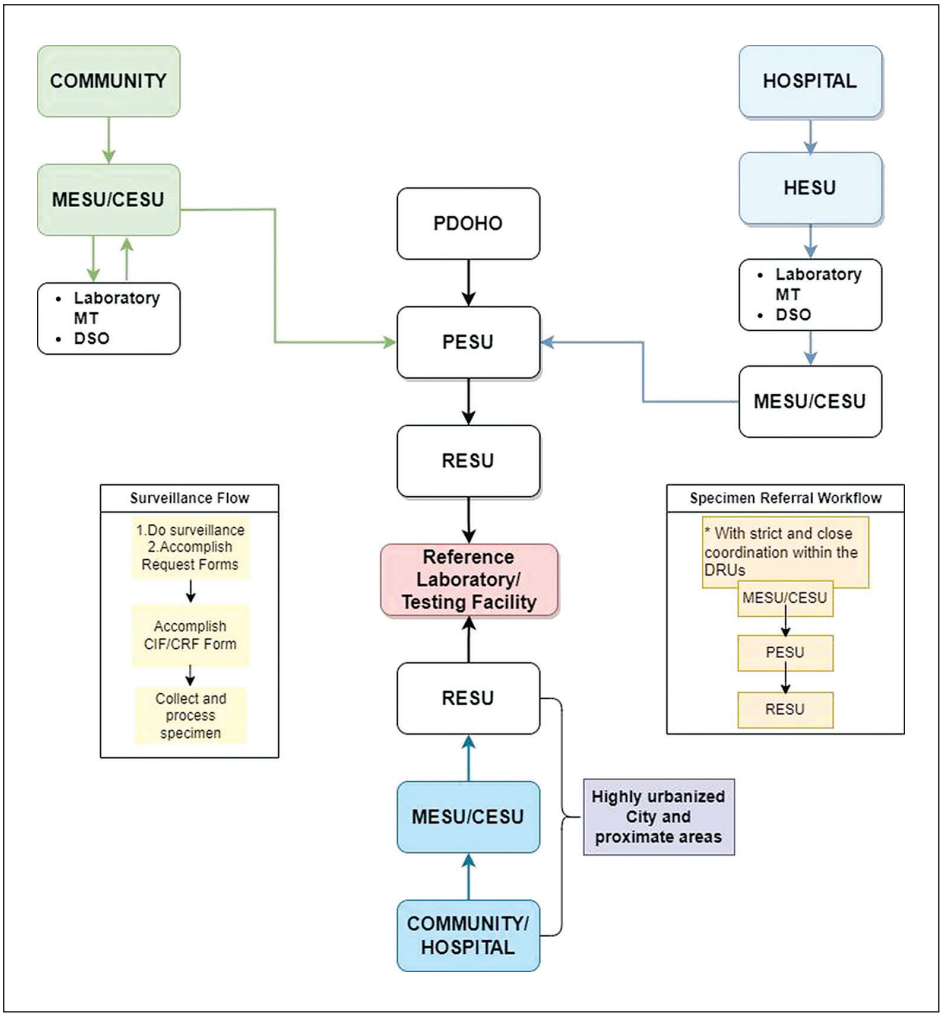
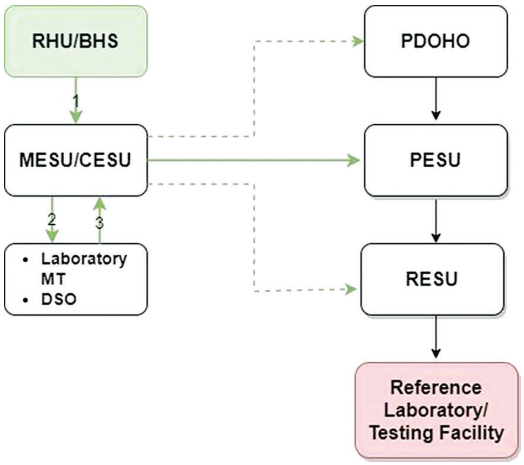


Figure 3. General workflow of referral from collection to receipt at the testing laboratory. There are multiple starting points for the DRUs (Hospital ESUs and City or Municipal ESUs), as illustrated on the swim lane, but their destination is their respective Regional ESUs before they are sent to the relevant recognized testing facility or laboratory.

(HESU – hospital epidemiology and surveillance unit; CESU – city epidemiology and surveillance unit; MESU – municipal epidemiology and surveillance unit; RESU – regional epidemiology and surveillance unit; PDOHO – provincial DOH office; CIF – case investigation form; CRF – case report form; MT – medical technologist; DSO – disease surveillance officer)

Table 2a. Specimen referral workflows depending on DRU (RHU/BHS in remote areas)

Specimen referral workflow	Flow diagram
RHU/BHS in remote areas All cases under investigation by the RHU (Rural Health Unit) or BHS (Barangay Health Stations) will be reported to their respective Municipal ESUs or City ESUs. ↓ The MESUs or CESUs will then be in charge of filling out the corresponding LRF (laboratory request form), CRF (case report form), and CIF (case investigation form), whichever is necessary and required. This will then be coordinated with their corresponding laboratory or DSO (Disease Surveillance Officer) for collection of specimens. ↓ All collected specimens will be processed, including the packaging of specimens by the laboratory or DSO in charge. Laboratory staff or the DSO-in-charge will send back the packed specimen with its corresponding pertinent forms to their respective MESUs or CESUs. ↓ The MESUs or CESUs will send the packed specimen with its corresponding pertinent forms to their respective Provincial ESUs. ↓ The Regional ESU will do the final processing of the specimens submitted to them, including quality assessment and necessary packaging reinforcement if needed. The RESU will also be responsible for the coordination and transport of specimens to each respective and corresponding testing facility. ↓ Reference laboratory/testing facility	

Data management

The PIDSR (Philippine Integrated Disease Surveillance and Response) system was the most used information system, supplemented by tools such as EDCS (Epidemic-prone Disease Case Surveillance) and ESR (Event-Based Surveillance and Response). For COVID-19, platforms like COVIDKaya and Tanod Kontra COVID were widely employed.

Challenges in the specimen referral system

For the fourth item, challenges were categorized into four most common subjects: logistics, manpower, transportation, and data management (Table 3).

Recommendations for the improvement of the laboratories or testing facility

Participants suggested establishing sub-national reference laboratories to enhance diagnostic capacity and reduce reliance on centralized facilities. They also recommended performing tests for locally prevalent diseases and improving logistical support (Figure 4).

Local prevalent diseases

The last item discussed in the focused group discussion was about the most prevalent disease in their locality. Almost all 17 regions and participating DRUs have similar prevalent disease occurrence in their localities pre pandemic and post pandemic (Figure 5).

Table 2b. Specimen referral workflows depending on DRU (RHU/BHS in highly urbanized settings or proximate to the ESUs and reference laboratory/testing facility)

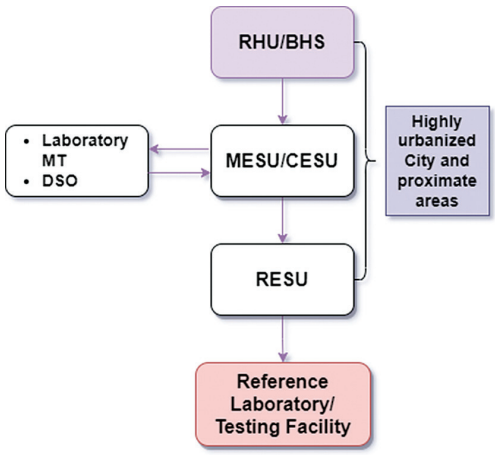
Specimen referral workflow	Flow diagram
RHU/BHS in highly urbanized settings or proximate to the ESUs All cases under investigation by the RHU (Rural Health Unit) or BHS (Barangay Health Stations) will be reported to their respective Municipal ESUs or City ESUs. ↓ The MESUs or CESUs will then be in charge of filling out the corresponding LRF (laboratory request form), CRF (case report form), and CIF (case investigation form), whichever is necessary and required. This will then be coordinated with their corresponding laboratory or DSO (Disease Surveillance Officer) for collection of specimens. ↓ All collected specimens will be processed, including the packaging of specimens by the laboratory or DSO in charge. ↓ Laboratory staff or the DSO-in-charge will send back the packed specimen with its corresponding pertinent forms to their respective MESUs or CESUs. ↓ The MESU or CESU will be responsible for coordinating and submitting specimens directly to the RESU. ↓ The Regional ESU will do the final processing of the specimens submitted to them, including quality assessment and necessary packaging reinforcement if needed. The RESU will also be responsible for the coordination and transport of specimens to each respective and corresponding testing facility. ↓ Reference laboratory/testing facility	

Table 2c. Specimen referral workflows depending on DRU (Hospital or in-patient specimen referral)

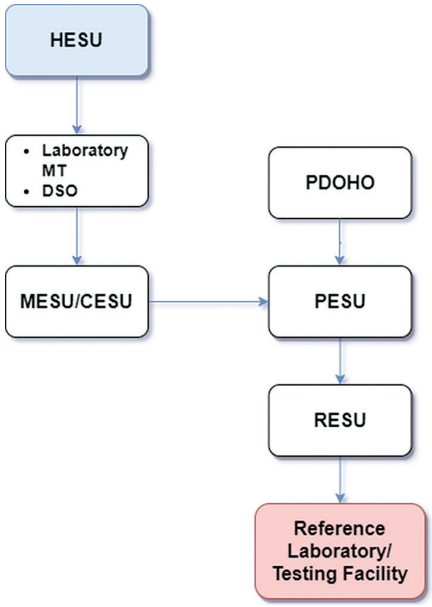
Specimen referral workflow	Flow diagram
Hospital or in-patient specimen referral In patient cases under investigation identified by the attending physician will be reported to the Hospital ESU. ↓ The HESU will then be in charge of filling out the corresponding LRF (laboratory request form), CRF (case report form), and CIF (case investigation form), whichever is necessary and required. This will also then be coordinated with attending physician or hospital laboratory or DSO (Disease Surveillance Officer) for collection of specimens. ↓ All collected specimens will be processed, including the packaging of specimens by the hospital laboratory or DSO in charge. ↓ Laboratory staff or the DSO-in-charge will send the packed specimen with its corresponding pertinent forms to their respective MESUs or CESUs. ↓ The MESU or CESU are the ones responsible in coordinating and submission of specimens to the PESU and PESU will then be the one to consolidate all collected specimen from the Hospital and are the ones to coordinate and transport it to the RESU. ↓ The Regional ESU will do the final processing of the specimens submitted to them, including quality assessment and necessary packaging reinforcement if needed. The RESU will also be responsible for the coordination and transport of specimens to each respective and corresponding testing facility. ↓ Reference laboratory/testing facility	

Table 3. Other points of discussion on specimen referral workflow

Other points of discussion	Responses from FGD participants
Origin of specimen	• DRUs; RESU; CESU; HESU; MESU; BHS; RHU
Purpose of referral	• Public health surveillance • Clinical diagnostics
Referral Laboratory	• Molecular laboratory • Subnational reference laboratory • National Reference laboratory (e.g., RITM) • Philippine Genome Center (PGC) • Sentinel hospitals or facilities (e.g., UP-PGH, SLH) • DOST and FDA
Type of Specimen	• Sputum • Blood • Stool
Frequency of Referral	• Case-to-case basis or as needed based on the specimen to be referred • Once a week/weekly • Some are based on the number of specimens for referral
Mode of Transportation	• CHD or LGU vehicle • Public utility vehicles (PUVs) • Public transportation (vans, bus, boat, airfreight)
Referral budget (if available)	• CHD/RESU • LGU Work and financial plans

CONCLUSIONS

The FGDs provided critical insights into the challenges and opportunities for strengthening the Philippine laboratory network system. Key findings include the need to address logistical constraints, workforce shortages, transportation issues, and data management inefficiencies.

Decentralizing testing capabilities to sub-national levels emerged as a significant recommendation. This approach would alleviate the burden on RITM, improve turnaround times, and enhance surveillance and response to emerging infectious diseases. Additionally, prevalent disease data collected during FGDs will inform the development of tier-based laboratory networks.

Despite resource constraints, DRUs have shown resilience and commitment to fulfill their responsibilities. Addressing the identified challenges and implementing the proposed recommendations will not only improve operational efficiency, but more importantly, strengthen laboratory-based surveillance, leading to faster response times and improved public health outcomes.

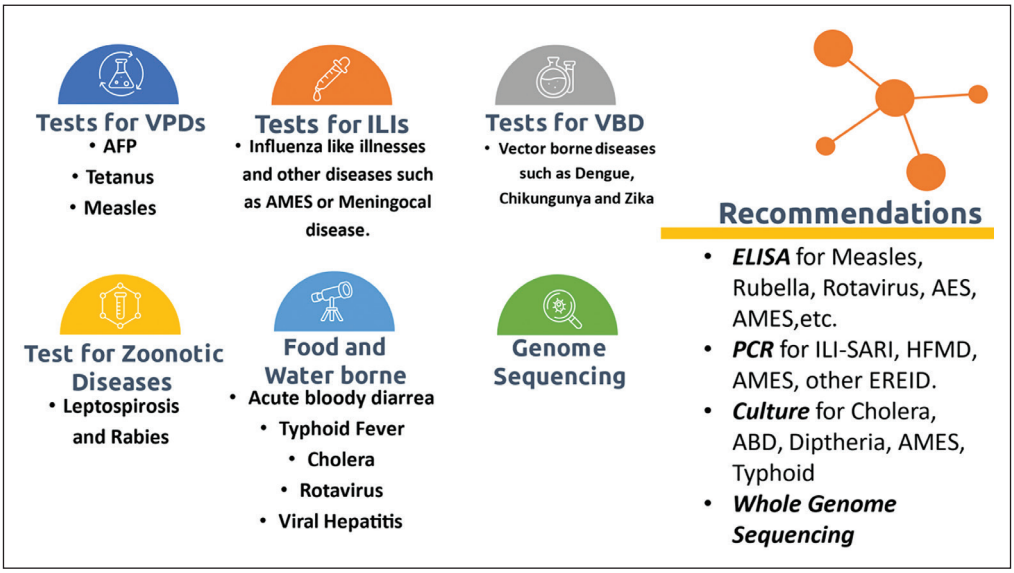


Figure 4. Tests perceived as needed or suggested to be included in a subnational reference laboratory.

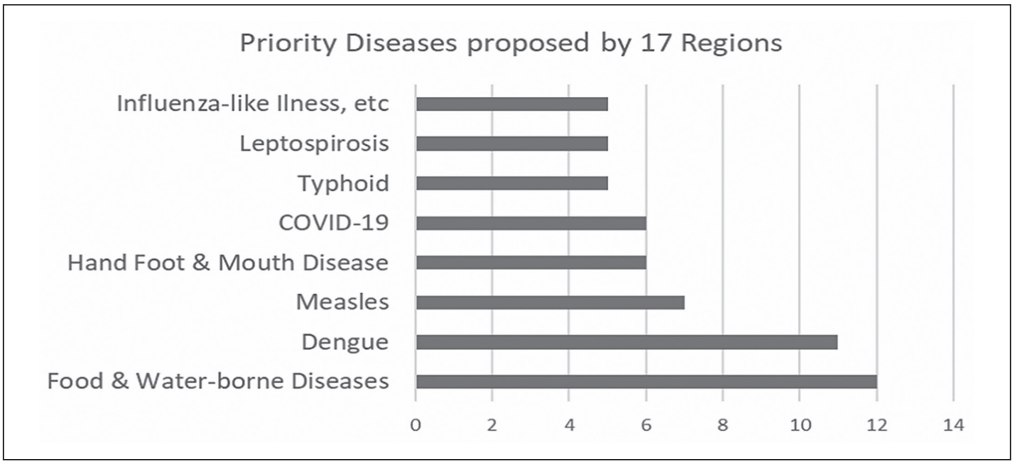


Figure 5. Top 8 prevalent diseases based on the FGD.

RECOMMENDATIONS

Based on the FGD findings and discussions, the following recommendations were made:

1. The establishment of subnational reference laboratories is a critical issue to consider when examining the roles and responsibilities between central and regional or subnational levels in various countries. Subnational reference laboratories can play a crucial role in enhancing public health, disease surveillance, and response capabilities at the local level. Establishing subnational reference laboratories that ensure diagnostic services are accessible will also help reduce the need for samples to be transported long distances, thereby reducing turnaround times for test results. This accessibility is crucial for timely diagnosis, surveillance, and response to infectious diseases and other health emergencies.
2. Decentralizing specific testing functions from RITM to subnational levels can have various advantages. As the National Reference Laboratory (NRL), this approach allows RITM to focus on its core roles, such as detecting emerging and re-emerging infectious diseases (ERIDs), performing advanced technologies, and providing recommendations for disease control measures to the Department of Health (DOH). At the same time, it enables the staff at the Regional Epidemiology and Surveillance Units (RESUs) and Epidemiology and Surveillance Units (ESUs) to strengthen their primary duties, including preventive measures and contact investigations.
3. Essential consumables for specimen referral, such as transport media, swabs, and other necessary supplies, should be centrally ensured through a well-managed procurement and distribution system. A well-managed centralized procurement and distribution system for essential consumables ensures standardization, cost-effectiveness, quality control, efficient distribution, and optimal resource utilization. By centrally ensuring the availability of these supplies, the healthcare system can support the smooth functioning of specimen referrals and maintain the integrity of diagnostic testing processes.
4. Implementing ILIMS (Integrated Laboratory Information Management System) with specimen tracking systems is critical for providing a timely and appropriate response to disease outbreaks on the ground. It improves specimen tracking, enables timely outbreak response, data integration and analysis, communication and collaboration, quality assurance and compliance, and data security. Using ILIMS, laboratories and public health authorities can better manage and respond to disease outbreaks, resulting in more effective public health interventions and control measures.

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The authors certified fulfillment of ICMJE authorship criteria.

AUTHOR DISCLOSURES

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