



Laboratory Network

Summary

- The establishment and strengthening of the laboratory network is an important issue in the International Health Regulations (IHR) and Global Health Security Agenda (GHSA).
- JICA has been working toward strengthening the global laboratory network required to stop infectious diseases spreading across regions and countries, while countries have been enhancing their own laboratory network.
- In addition, JICA will support national-level laboratories to implement training for human resource development and testing capacity as core laboratories of the regions, and also will promote efforts to strengthen capacity so that the laboratory at the national level can fulfill the functions of the regional and core laboratory in the surveillance network.

Overview

Strengthening the laboratory network means establishing laboratory test systems by closely collaborating with the upper and lower laboratories in order to prevent the spread of infectious diseases beyond areas. In general, the laboratory is set up in 3 to 4 levels of the country/nation (central): prefecture/provincial level, district level, and primary level. The division of roles at each level is stipulated, and preparing a referral system is necessary (Figure 1). For infectious disease control, the establishment of a “Public Health Laboratory,” which is responsible for the diagnosis of pathogens, surveillance, environmental hygiene and food hygiene inspection, is important at each level. In addition, when dealing with pathogens with high risks and when a national level laboratory can not conduct laboratory tests requiring advanced technology, laboratory networks/collaboration with several countries are established e.g., transporting samples to other countries for testing and designating a reference laboratory for quality control. Both IHR and GHSA cite the laboratory capacity enhancement as an important issue, and support through a cross-sectional approach is necessary. The following four points strengthen laboratory capacity.

(1) Strengthening of testing and diagnostic ability

With regard to pathogens with high priority for laboratory diagnosis, diagnostic test methods are specified in detail, and it is required that all these tests can be carried out at least at one laboratory.

(2) Establishment of laboratory collaboration system (network)

How to establish an efficient laboratory collaboration system within the limited budgets, human resources and fragile infrastructure, is important in the perspective of the UHC, which guarantees equitable access to diagnosis, and of infectious diseases control, which promotes rapid diagnosis and surveillance.

(3) Establishment of Biosafety

Biosafety is “a measure to prevent unintentional exposure to pathogens and accidental release of them” in the laboratory. Pathogens are classified into four levels depending on their risk level and appropriate handling in each country is essential. In many cases, the practice of biosafety is insufficient because of the substandard laboratory environments. For this reason, support is required to deepen the understanding of measures necessary for risk management of biosafety and for the effective regulatory and supervisory mechanism of bio security.

(4) Preparation of data management and reporting system

Information on laboratory diagnostics and pathogens is extremely important for surveillance. This information is also necessary when reporting to WHO in IHR, and it is necessary to report the details of cases and the number of patients as early as possible when outbreaks occur.

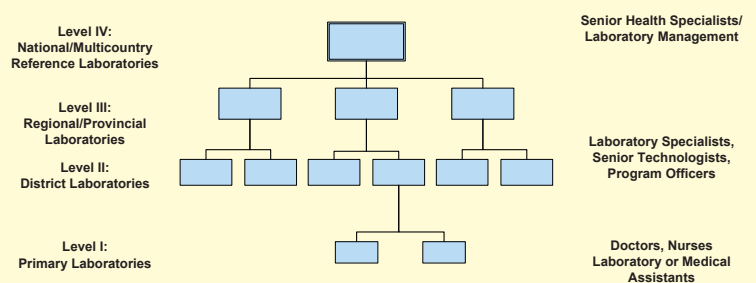


Figure 1: Level of Laboratory Network¹

1: Consultation on Technical and Operational Recommendations for Clinical Laboratory Testing, Harmonization and Standardization (Maputo, 22–24 January 2008).

Cooperation Policy

JICA has worked to strengthen laboratory networks mainly through technical cooperation including SATREPS² and grant aid, focusing on setting up the facilities and equipment at laboratories that are the bases of the country and region, strengthening testing techniques, and establishing a network between laboratories within the country and regions. In strengthening the function of the national-level top referral laboratories, we equip laboratories with BSL-3³ for laboratory diagnosis and research on highly hazardous pathogens. Regarding establishing a laboratory network in a country, support has been provided with consideration for the mid and long-term plan since it is not easy to cover a whole country from the viewpoint of resources at the same time. In the future, JICA will support national-level laboratories to implement activities such as training for strengthening human resources and testing capacity as a core laboratory in the region, and to fulfill the functions of the regional laboratory and of the core laboratory in surveillance network.

Cases

[Establishment of Laboratory Network in Vietnam]

Capacity development for NIHE to control emerging and re-emerging infectious diseases in Vietnam (2006 - 2009)

2006
2009

The project aimed at strengthening capacity to examine highly hazardous transmissible pathogens for controlling emerging and re-emerging diseases. In particular, it focused on establishment of biosafety regulations and systems in the National Institute of Hygiene and Epidemiology (NIHE), and on capacity development of NIHE to operate and maintain the BSL-3 laboratories, which were the first to be introduced in Vietnam, and to conduct laboratory testing.

The project for improvement of safety laboratory for NIHE (2006)

2006

With the above technical cooperation, four BSL-3 laboratories and related facilities were set up at NIHE in order to enhance detection speed to carry out a large amount of tests rapidly in accordance with international standards. In addition, since the laboratory equipment has been improved, it became possible to confirm the avian influenza virus in NIHE, so that the total number of days until test results are received was considerably shortened.

Project for capacity development for laboratory network in Vietnam of biosafety and examination of highly hazardous infectious pathogens (2011 - 2016)

2011
2016

Following the operation of the above preceding project, capacity on biosafety and diagnostic techniques at Pasteur Institute of Ho Chi Minh City (PIHCMC), Tay Nguyen Institute of Hygiene and Epidemiology (TIHE), Pasteur Institute of Nha Trang (PINT) and the Provincial Centers for Preventive Medicine (PCPMs) have been strengthened. The project also established a laboratory network with NIHE as the core institution.

The project for capacity development for a medical laboratory network on biosafety and examination of highly hazardous infectious pathogens in Vietnam, Laos and Cambodia (2017 - 2022)

2017
2022

The Project selected model provinces to strengthen the laboratory capacities for infectious diseases diagnosis by training course, and support to set up BSL-3 laboratories and a laboratory network.

Five provinces among the northern 26 provinces that are under the jurisdiction of NIHE are set as model provinces, with the main target being Quang Ninh province. In the southern area, five provinces among the 21 provinces overseen by PIHCMC are targeted, with the focus province being Ben Tre province. To the Ministry to be strengthened, we provide laboratory equipment, such as PCR, and training at the site, and strengthened testing capacity and the network between domestic laboratories.

After setting up the laboratory network in Vietnam, the project will collaborate with the Pasteur Institute in Laos and Cambodia to develop human resources.



- Main laboratory network
- Network with provincial level laboratories
- Network beyond the borders



2: SATREPS. Technical Cooperation of JICA in collaboration with AMED/JST to promote international joint research by both Japanese research institutions and those of recipient countries with a view to resolving global issues such as infectious diseases.
 3: BSL levels range from the lowest at 1 to the highest at 4. BSL-3 is applicable to facilities where work is performed with microorganisms classified as Risk Group 3 (high individual risk and low community risk) that have a potential risk of severe infection.