

A representative of Eiken Chemical gives instruction in the LAMP method to participants in the Tuberculosis Laboratory Management for Achievement of MDGs Targets program at the Research Institute of Tuberculosis in Kiyose City, Tokyo.



THE JAPAN JOURNAL

# The Fight Against Infectious Diseases: Japan's Experts Reach Out

AIDS, malaria, tuberculosis and other infectious diseases have taken a heavy toll on many communities around the world, not least in developing countries. What is Japan doing by way of technical support and medical relief? *The Japan Journal* reports, with a focus on the activities of the Japan International Cooperation Agency (JICA).

**W**earing white coats and rubber gloves, the six participants on JICA's Tuberculosis Laboratory Management for Achievement of MDGs Targets program listen carefully as the instructor talks them through the procedure for loading a pipette. Hailing from Afghanistan, Bangladesh, Cambodia, the Democratic Republic of the Congo,

Kenya, and the Philippines, the participants have been studying at the Research Institute of Tuberculosis in Kiyose City, Tokyo, for nearly two months now, in which time they have learned techniques to test for and counter tuberculosis through a series of seminars, lectures and other activities.

The correct use of a pipette is crucial to the correct diagnosis of tubercu-

losis using the LAMP (Loop-Mediated Isothermal Amplification) method, developed by the Tokyo-based company Eiken Chemical. Preventing a tuberculosis epidemic requires early detection in patients, but early detection is difficult because the sputum of a patient with less advanced symptoms contains only a small quantity of tuberculosis bacteria. Despite this, and even with

Program participants practice sample collection using a biosafety cabinet.

sputum containing a small quantity of tuberculosis bacteria, the LAMP method, with amplification of TB bacterial genes, is capable of diagnosing tuberculosis more quickly, easily, and accurately than conventional tuberculosis diagnosis procedures do. Eiken Chemical has marketed tuberculosis diagnosis kits in Japan since 2011 and is currently working to disseminate them overseas. Four staff members of Eiken Chemical and one person in charge of training at the Research Institute of Tuberculosis supervised instruction in the LAMP method in the procedure mentioned above using a real sample of sputum containing tuberculosis bacteria.

“The LAMP method is really good. It does not require a lot of equipment, and we are able to get quick diagnosis of TB,” says Peter Maloba, one of the participants and the deputy head of the Directorate of Preventive and Promotive Health Services at the National Tuberculosis Reference Laboratory in Kenya. “It is really impressive that in Japan there are many quick and easy methods that you can use for diagnoses of tuberculosis that are not in our standard operating procedure.”

From the Meiji period (1868–1912), tuberculosis had been feared as an incurable disease in Japan. Even in 1950, shortly after the end of World War II, tuberculosis killed 120,000 people and was the most common cause of death. Subsequently, however, the numbers of patients and deaths have rapidly decreased because of the popularization of vaccinations and treatments and improvement in the standard of living. (The number of deaths attributed to tuberculosis in 2014 was about 2,000 people.)

Worldwide, the numbers of tuberculosis patients and deaths from the disease are also decreasing. One of the MDGs (the UN’s Millennium Development Goals), reducing the death rate to half of the 1990 level by 2015, is estimated to have been achieved. Today, however, tuberculosis remains one of the top three infections along with



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AIDS and malaria, and continues to plague people around the world. According to the 2015 Global Tuberculosis Report published by the World Health Organization (WHO) in October 2015, nearly 9.6 million people were infected with tuberculosis (new TB cases) in 2014 and nearly 1.5 million of the affected people died. Patients in Southwestern Asia and the Western Pacific Region account for 58% of all new TB cases whereas Africa accounts for 28%. All of the twenty-two countries classified by WHO as high-burden countries are developing countries. The estimated number of TB patients in these countries accounts for nearly 80% of the estimated number of TB patients worldwide.

For many years, Japan has supported anti-tuberculosis measures for developing countries in many different forms. Since its foundation in 1939, the Research Institute of Tuberculosis has played a central role in tuberculosis research in Japan. Since 1963, the Institute has cooperated with JICA in providing doctors from developing countries with training. In 1975, the Group Training Course in Laboratory Works for Tuberculosis Control, the forerunner of the Tuberculosis Laboratory Management for Achievement of MDGs Targets, was initiated for technicians engaged in TB bacterial testing in developing countries. And by 2015, nearly 2,300 people from ninety-seven countries have received training at the Research Institute of Tuberculosis.

Graduates include health ministers and many leaders and instructors who are active around the world in anti-tuberculosis measures and tuberculosis treatment, diagnosis, and testing.

“The training is really great for me as a laboratory technician. I can learn everything all at once; the technical, practical and theoretical aspects,” says Rocelle Marie Agero, one of the participants and a science research specialist at the National Tuberculosis Reference Laboratory in the Philippines. “The Japanese lecturers worked very hard to share their knowledge. I was really encouraged and motivated by their passion.”

In addition to organizing training programs in Japan, JICA supports tuberculosis-endemic developing countries by, for example, sending Japanese experts, building facilities such as TB centers, and providing medical supplies and test devices. The G8 Kyushu-Okinawa Summit, hosted by Japan in 2000, chose anti-infection measures as one of the important agendas for the first time in the Summit’s history. This led to the establishment of the Global Fund to Fight AIDS, Tuberculosis, and Malaria in 2002 with the objective of providing financial assistance needed to prevent and treat these three major infections and to provide patients with care and support. Japan played a leadership role in setting up the Fund and has since become a Board Member and played important roles in the Fund’s operation and management. Japan has



These cooler boxes have been specially designed to keep the polio vaccine at a constant low temperature.

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been a major donor too, contributing approximately 2.16 billion dollars from 2002 to 2014.

In 2014, the Japanese Ministry of Foreign Affairs, the Ministry of Health, Labour and Welfare, JICA, the Japan Anti-Tuberculosis Association, and the Stop TB Partnership revised the Stop TB Japan Action Plan first formulated in 2008. The revised action plan sets forth a goal of reducing TB-related deaths especially in Asia and Africa so that the goal of WHO's world strategy, which was formulated in 2014 with the aim of putting an end to the epidemic of tuberculosis, can be achieved. The goal may indeed be achieved through Japanese public-private partnerships for facilitating cooperation with international organizations and implementing actions such as the utilization of innovative technologies and organizing JICA's training programs for anti-tuberculosis measures.

### Eradicating Polio

Poliomyelitis, often referred as Polio, is an infectious disease. The poliovirus enters the human body orally before multiplying in the intestines to induce the disease. Even if infected with the poliovirus, many often do not experience any symptoms of the disease and unknowingly develop immunity. In some people, however, the poliovirus enters part of the spinal cord after entering the intestines. This paralyzes the

level where Japan has been polio-free since 1980.

The epidemic of polio, however, continued to persist in developing countries. As a country that overcame the battle against polio, Japan has supported these countries in their polio eradication efforts. For example, JICA ran a project in China from 1991 to 2011 for technical cooperation in actions against infectious diseases including polio, measles, Japanese encephalitis, and other vaccine-preventable infectious diseases. JICA provided extensive support such as strengthening surveillance, building a national network of laboratory diagnosis, and improving the vaccination rate, among many other measures, as it significantly contributed to a decrease in polio patients in China.

With the international solidarity to fight against polio, the incidence of people affected by polio has dropped from 350,000 cases in 125 countries in 1998 to 70 in two countries as of 23 December 2015.

hands and legs and may cause movement disorders that will persist for the rest of a person's life. In Japan, polio became a pandemic in 1960 and affected more than 5,000 people. The introduction of a polio vaccine quelled the pandemic to

WHO officially removed Nigeria from the list of polio-endemic countries in September 2015 and currently, two countries are regarded as polio-endemic: Afghanistan and Pakistan. Smallpox was successfully eradicated in 1980; polio is considered to be the next eradicable infection and we are only one step away from eradicating the disease.

Japan supports polio-endemic countries in their efforts to eradicate polio. Until September 2015, Nigeria had remained the only polio-endemic country in Africa. JICA provided grant aid of approx. 8.1 billion yen from FY2000 to FY2012 to Nigeria in cooperation with UNICEF. Specifically, the objective of the grant aid includes provision of the polio vaccine and solar-powered refrigerators for vaccine storage, among other details.

In 2014, JICA signed an agreement with the Nigerian government for an ODA loan of approximately 8.2 billion yen with a goal of eradicating polio. Used as a polio vaccine fund procured by UNICEF, the ODA loan



A child in Nigeria receives the oral polio vaccine.

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