This report should be submitted within 2 weeks after you return to Japan.

（Abroad・Domestic）Internship report form（Student） 17/12/22

(Year/Month/Day)

Name	Nan Aye Thida Oo
Laboratory	Division of Bioresources, Research Center for Zoonosis Control
Year (Grade)	D4
Internship institution	Department of Mycobacterium reference and research (DMMR) Research Institute of Tuberculosis, Japan Anti-Tuberculosis Association (RIT/JATA, Tokyo)
Internship period	Internship period: 11/06/2017 - 12/08/2017 (Departure Date from Sapporo: MM/DD/YYYY, Arrival Date in Sapporo: MM/DD/YYYY)
Purpose	- To have practical skills of handling of *Mycobacterium tuberculosis* (MTB) at the national level. - To learn the innovative research activities on the development of rapid diagnostic test for drug-resistant tuberculosis. - To obtain the chance for future collaborative research with RIT and our Institute (Department of Medical Research, Myanmar).

- The reason why you chose this institute

RIT is appointed as “World Health Organization (WHO) Supra National Reference Laboratory” and it has been involved in nationwide TB control program via basic and applied research, training and education, and international cooperation. Dr. Satosi Mitarai is the head of Department of Mycobacterium Reference and Research (DMRR) which has two divisions, namely, bacteriology and molecular epidemiology divisions. The bacteriology division is conducting mycobacteriology studies with different research expertise background including phenotypic and genotypic diagnostic of mycobacterial diseases from clinical isolates that I wanted to learn as this has a positive impact in my future career as a researcher in Myanmar. Currently, the division’s main focus is on the development of new, rapid and easy accessible diagnostic tools for drug resistant MTB and this research highly matched with the research that I performed recently. The Molecular Epidemiology Division is studying the development and improvement of genotyping methods for mycobacteria and pathogenicity analysis of Non-tuberculosis mycobacteria. It has a team of expert in MTB work and are performing quality assurance of newly developed rapid

diagnostic tests to the clinical isolates.

- Result of the activity （about 800 words、provide photos, tables and figures that clearly show the activities during the period）

I stayed for five weeks at DMRR. The first day, I was trained the safety management of BSL-3 laboratory to handle highly communicable MTB strains. After that, every day I entered BSL-3 laboratory and perform experiments with DMRR members. I observed and performed research activities of the host institution's current work that are similar to my current research work. I got a lot of experience from this internship such as, hands on training of anti-TB DST by solid and liquid culture, safety extraction of DNA from MTB samples, and getting knowledge about target mission and challenges in controlling TB and the emergence of DR-TB in international concern.

I also had a chance to perform qualification test of newly found anti-TB drugs, Bedaquiline and Delamanid, for MDR treatment regimen and validating their efficiency with reference strains and clinical strains. These activities are done in co-operation with WHO as well as other organizations such as the Japanese Society for Tuberculosis and the Japanese Association of Medical Technologists. In addition to joining the current research work in DMRR, I also attended the international training course for laboratory management of tuberculosis hosted by RIT. I had learned a lot in rapid diagnosis, effective controlling, and preventive measure of tuberculosis.

I joined the research related activities of phenotypic and genotypic characterization of pyrazinamide (PZA) resistant MTB from the MTB clinical isolates and reference strains. *In vitro* susceptibility testing for PZA have not been routinely performed in Myanmar. Therefore, this was a big advantage to join such activities through my internship and we could completely perform and interpret the PZA DST results. However, tests which is highly specific for detection of PZA resistance in clinical isolates have not been established yet and they are trying to establish the best method. Therefore, it was the good opportunity to observe all the rapid methods to characterize PZA resistance.

The table showed the detailed activities during my stay at RIT (Nov 6th -Dec 8th)

The total stayed is 31 days

Date	Monday	Tuesday	Wednesday	Thursday	Friday
(Nov 6th – 10 th)	Introduction	Attended level 3 Biosafety measure (theoretical lecture and in laboratory practice	Performed PZase activity test by MGIT to detect PZA resistance	Prepared 7H9 agar plate for determining minimal inhibitory concentration (MIC) of anti-TB drug	Performed the DST for determining MIC of Clarithromycin for *M. abscessus*
(Nov 13th - 17 th)	❖ Joined the GeneX pert training course (Lectures and practices) In this training course, I have learned the following topics 1.Cepheid HBDC (High Burden Developing countries) program 2. Basic of Molecular Biology 3. Technology of GeneX pert system 4. GeneXpert Assay Control Strategy 5. GeneXpert installation-software setup and module replacement (hand on training) 6. Launch test on GeneXpert by using sputum samples (hand on training) 7. Assay(s) result interpretation and Assay(s) related trouble shooting 8. Xpert check (hand on training) ❖ Measured of MIC for first and second line drugs for MTB (at BSL-3) ❖ Made preparation of MGIT PZA tube, 7H11 Agar tube for Wayne test ❖ Observed and performed sputum processing and smear microscopy by fluorescence microscope (Z.N stain and Auramine O stain of clinical sputum samples)				
(Nov 20th - 24th)	❖Attended the laboratory management lecture and practical by Prof: Kai-Man Kam (Hong Kong). He gave the lecture and practice that cover the following topics 1. Biology, Immunology and chemotherapy of MTB 2. Laboratory Procedure for National TB program 3. Reliable Laboratory Services For NTP (National TB program) ❖Performed COBAS® TaqMan® MTB Test from sputum samples ❖Learned how to make analysis of COBAS® TaqMan® MTB Test			❖ Attended the second meeting for Mycobacteriology Research (NIID, Tokyo) ❖ Performed Wayne test (PZase activity test) on H37Rv reference strain and BCG strains ❖ Prepared for microscopy slide with Acid fast bacilli artificial sputum	

(Nov 27th-Dec 1th)	Learned Genome data analysis procedure (Lecture and practice)	Attended training course for Line Probe Assay for rapid detection of MTB and drug resistant strains (lecture and practice) *Supported by NIPRO Diagnostic, Japan	❖ Performed MGIT PZase activity test and Wayne test to detect PZA resistant MTB ❖ Panel preparation of the plates containing 7H11medium for MIC test of newly developed drugs of Betaquiline and Delamanid	
(Dec 4th-8th)	Observed and prepared the specimen for Scanning (SEM) and Transmission electron microscopy (TEM) to make the structure analysis of virulent MTB		Performed MIC test by agar proportion method from clinical isolates of MTB	Prepared for going back to Sapporo

Fig1.The laboratory members of DMRR

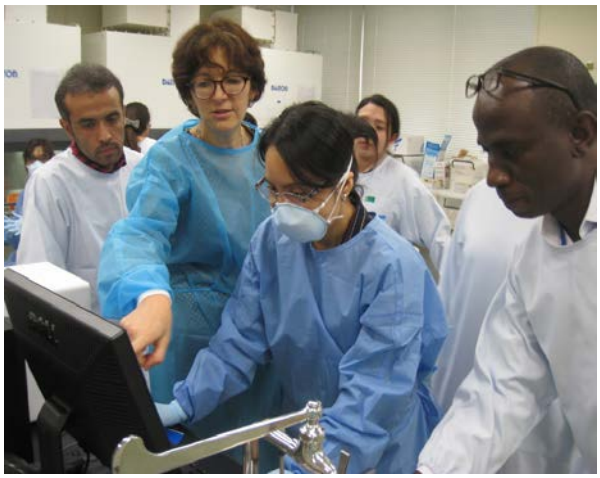

Fig2. GeneXpert/RIF traning course

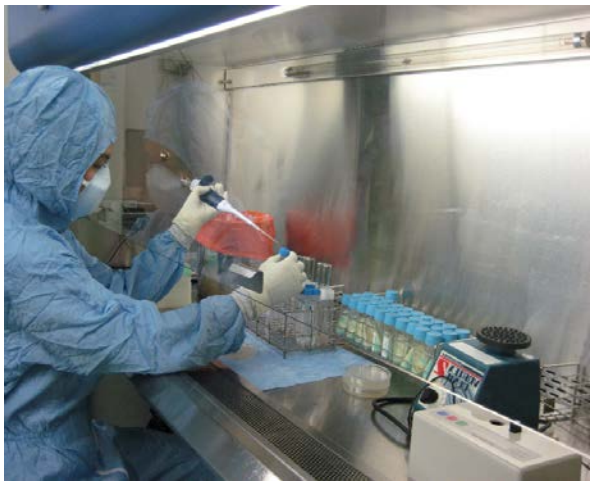

Fig3. Performing drug susceptibility test

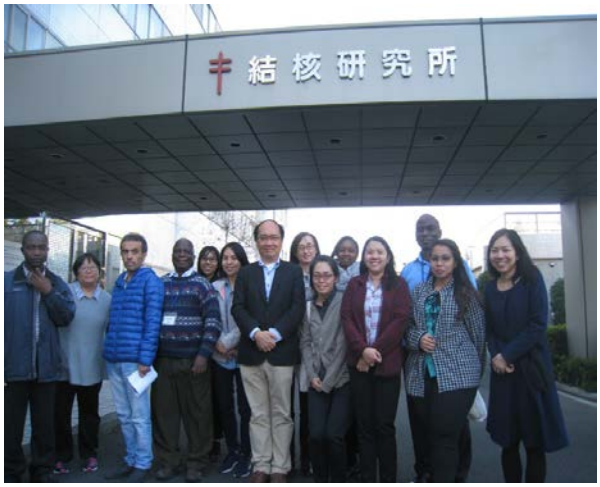

Fig4. Laboratory Management Course

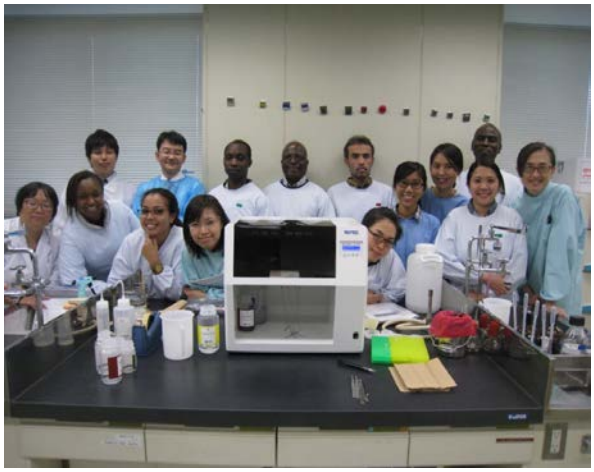

Fig5.Line Probe Assay training course

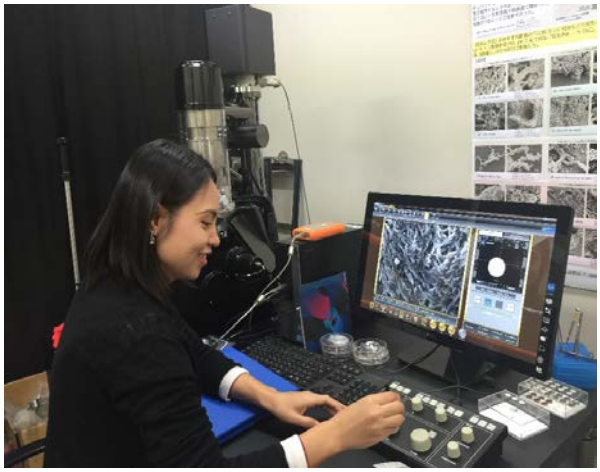

Fig6. Performing the electron miscopy for MTB

- What do you think the positive impact of the activity will have on your further career path?

Concerning my current research work, most of the specimens are DNA samples. However, reliable and advanced bacteriological examinations such as sputum processing and antibiotic susceptibility testing of *Mycobacterium* species are not often performed. During this internship I performed the diagnostic tests of TB and DR-TB from varieties of clinical specimens. Rapid diagnostic tests for drug resistant MTB are based on the direct clinical specimens especially sputum, lymph node biopsy and blood samples. From this internship, I had the opportunity to join the Intensive Laboratory Training course for tuberculosis and I learned how to safely handle and diagnose clinical samples with biosafety capability and I believe that the internship was a great opportunity where I got wide academic perspective in tuberculosis sample handling. Additionally, I learned advanced technologies for rapid detection of DR-TB (GeneX pert /RIF, Line Probe Assay and COBAS® TaqMan® MTB) as well as the routine research activities from direct clinical specimens and could contribute to current research work or ongoing activities of controlling of tuberculosis in my country, Myanmar.

After going back to my country, I will continue my work as a researcher at Department of Medical Research, Ministry of Health and Sports and make the strong collaboration with members of National TB program, Myanmar. I will share the experiences that I learned from the internship and I will take part in the development of rapid diagnostic tools and treatment strategies for tuberculosis in Myanmar. Furthermore, as our department always provides technical guidance to the postgraduate or master candidates from various academic institutes within the

country, I will apply my experience in the collaborative research works of different disciplines. I want to do everything to improve and develop my institution by contributing the knowledge that I got from the Hokkaido University and the internship program.

- Advice for your junior fellows

Please check your time schedule thoroughly before submitting the application.
You need to consider whether the host institute's work is strongly correlated with your research plan and your future career path. Sometimes, it is difficult to get the visa for some nationality, and early applying for visa is important point and you may need to clarify the visa type. There are some advantages between international and domestic internship. If you want to find the job or to further study abroad, you should better choose international internship to build the strong connection with the international institutes. If you do not have the time, the domestic internship is convenient.

Approval of supervisor	Institution・Official title・Name Division of Bioresources, Professor Yasuhiko Suzuki

※1 Send the electronic file to the Leading School section, International Affairs Office
※2 Attach a copy certificate of the content of internship activity that is prepared by the counterpart at the internship institution (any form with a signature of the counterpart).
※3 The Steering Committee of the Leading Program will first confirm the content of this report and report will be forwarded to the Educational Affairs Committee for credits evaluation.

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