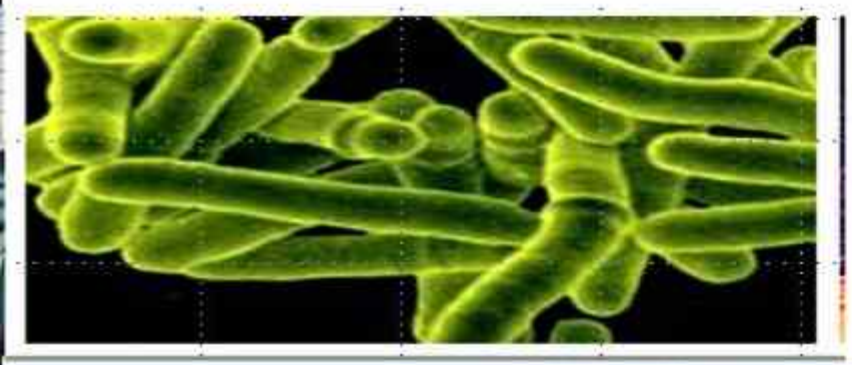
ЭРҮҮЛ МЭНДИЙН ЯАМ

БОЛОВСРОЛ, ШИНЖЛЭХ УХААНЫ ЯАМ

САНГИЙН ЯАМ

Hokkaido University
Research Center for Zoonosis Control

NATIONAL CENTER
FOR COMMUNICABLE DISEASES



"CONTROL OF TUBERCULOSIS AND GLANDERS" SATREPS PROJECT

The progress report of the SATREPS project implementation in NCCD

Period: 2022 Q1-3

NCCD the research team of the project

Operational plan revised in Nov 2021 by JCC decision of the SATREPS project

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“СҮРЬЭ БОЛОН ЯМ ӨВЧНИЙ ХЯНАЛТ” ТӨСӨЛ

ХАМТАРСАН ЗОХИЦУУЛАХ ХОРООНЫ АНХДУГААР ХУРАЛ

2021.11.17

Цахим уулзалт (ZOOM)

MINUTES OF MEETINGS
ON
THE FIRST JOINT COORDINATING COMMITTEE MEETING
FOR
THE PROJECT FOR THE CONTROL OF TUBERCULOSISAND GLANDERS

The Joint Coordinating Committee (hereinafter referred to as "JCC") was organized on 17 November, 2021 by the JCC members stipulated on the Record of Discussions for the Project for the Control of Tuberculosis and Glanders (hereinafter referred to as "the Project").

JCC confirmed their mutual understanding and matters agreed to in the discussions attached hereto.

Ulaanbaatar, 09th, December, 2021

Eriko TAMURA
Chief Representative
JICA Mongolia Office
Japan International Cooperation Agency

Dr. Dangaa Bayarbold, Project Director, Director of the Public Health Department, Ministry of Health
Mongolia

D. Batorgakh, Project Co-directors, Director of the Department of Science and Technology Policy, Ministry of Education and Science

T. Tungalag, Project Co-director, Director of the Department of Livestock Health, General Authorities for Veterinary Services (GAVS)

I.Batkhuu
Director General
Development Financing Department
Ministry of Finance
Mongolia

The project's core plan outlines 54 activities with 4 outcomes. Of them, 26 (48.2%) activities were postponed for more than one quarter. Therefore, we need to work intensively to fulfill the plan.

Content

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- NCCD implemented activities and achievements
- Technical support from RIT, Japan
- Technical support from JICA and AMED and Hokkaido University
- Collaboration between NCCD and IVM
- Issues and challenges
- In future activities

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NCCD implemented the activities and achievements 2022 Q1-3

Implementation of revised OP of the project

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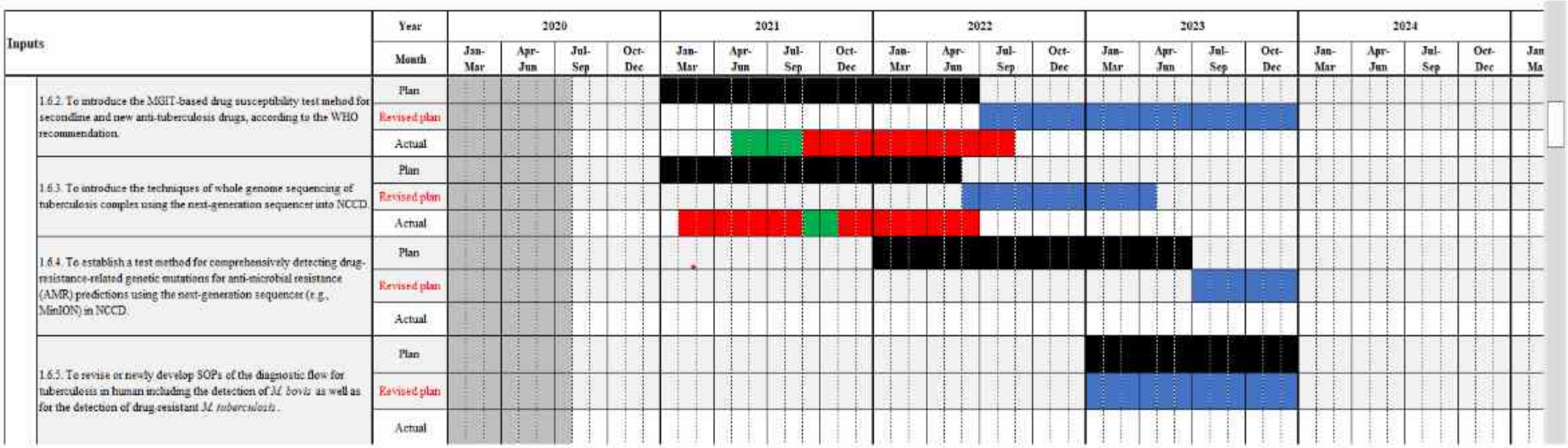

Implementation of the OP for the project: 1.6.3

- As part of the work of introducing the next-generation technology of complete genome sequencing (NGS) to the NCCD, a laboratory doctor attended NGS training in RIT, Japan and we ordered MiniON・GridION kits and necessary reagents.

Operational plan implementation, 2022

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:tivities	Year	2020		2021				2022			
Sub-Activities	Month	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
1.6.1.To introduce the methods for isolating tuberculosis complex from human sputum specimens by culturing them with liquid medium (MGIT) as well as solid (L-J) media for M. tuberculosis and M. bovis in NCCD, in conformity to the WHO-recommended methods.	Plan										
	Revised plan										
	Actual										

Achievement: We conducted training ourselves for solid culture medium with pyruvate.

Implementation: L-J with pyruvate medium we are using at July 2022 routinely. We tested 375 extrapulmonary samples the result was available for 187 people, a total positive 16 (5.6%) positive L-Jg and L-J p positive -13 (MTBC) and L-Jg(-) and L-J pyruvate positive -3 (need to the identification of *M. bovis*)

OP 2.1.1

M. tuberculosis complex, including *M. bovis*, from clinical specimens in solid medium containing pyruvate in accordance with the method recommended by WHO as part of the work to update the diagnostic flow of methods for the detection of *Mycobacterium tuberculosis* including *M. tuberculosis* var. *bovis* and detection of drug-resistant tuberculosis has begun to use.

1.6.1 MGIT isolation and identification MTBC

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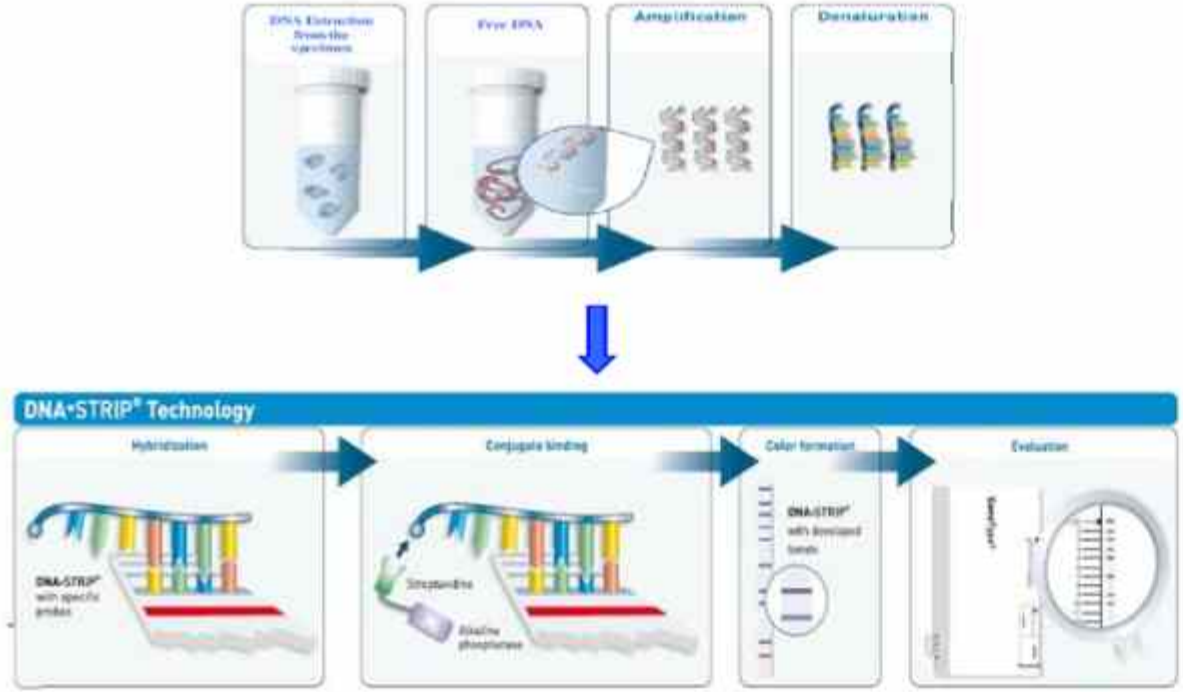
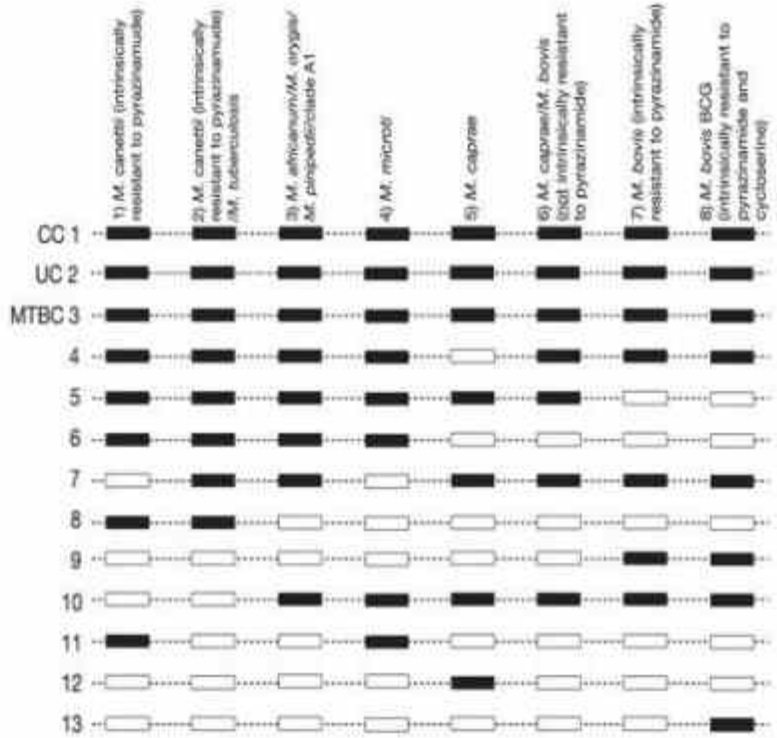
Genotype MTBC differentiation was performed in isolations of liquid culture medium at the TB reference laboratory.





Genotype MTBC

1.6.1 MGIT culture isolation and identification of MTBC

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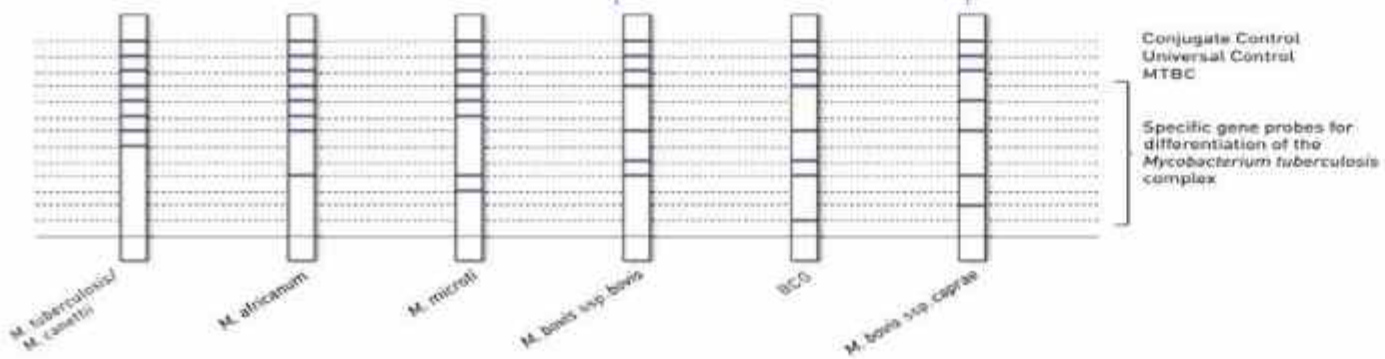
We tested 200 isolated strains of *M. tuberculosis* complex in 2022 by Genotype MTBC.

Results of Genotype MTBC	Isolated strains	
	n=	%
M. tuberculosis/M. canetti	181	90.5
Indeterminate	19	9.5
Total	200	100

M. bovis not detected



#	Specimen referral unit	Isolated strains	
		n	%
1.	Selenge	12	6.6
2.	Tuv	7	3.9
3.	Arkhangai	5	2.8
4.	Darkhanuul	5	2.8
5.	Khentii	5	2.8
6.	Bulgan	4	2.2
7.	Bayankhongor	4	2.2
8.	Zavkhan	4	2.2
9.	Dornogobi	4	2.2
10.	Bulgan	4	2.2
11.	Uvurkhangai	4	2.2
12.	Bayanulgii	3	1.7
13.	Dornod	3	1.7
14.	Uvs	3	1.7
15.	Khuvsgul	3	1.7
16.	Gobi Altai	2	1.1
17.	Umnugobi	2	1.1
18.	Orkhon	2	1.1
19.	Dundgobi	1	0.6
20.	Khovd	2	1.1
21.	**Aimag subtotal**	**78**	**43.1**
22.	**Ulaanbaatar city districts**	**103**	**56.9**

Implementation of the revised OP of the project

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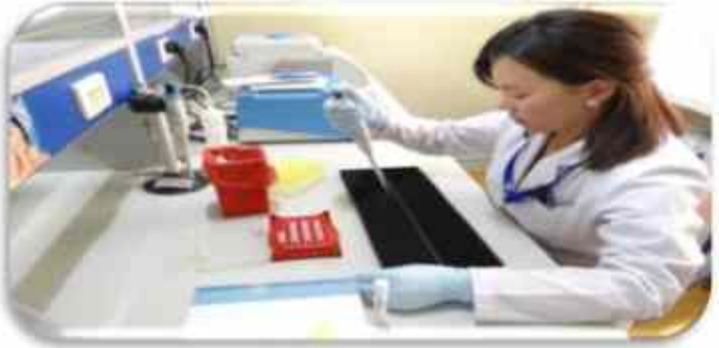
OP 2.2.1

- As of the first 9 months of 2022, 187 (25.1%) people were found to be drug-resistant in the Drug susceptibility testing among 745 isolated strains from patents samples in the National Reference TB laboratory of NCCD. There are detected:
  - Rifampicin resistant TB 69
  - MDR-TB 34
  - Mono resistant 67
  - Poly-resistant 6
  - XDR-TB 7
  - Pre XDR-TB 6



Drug resistant pattern

Tx history	MDR				Mono			Poly				XDR	Inj	Total
	R	HR	HRS	HRES	H	E	S	HE	HS	ES	HES			
New	56	11	1	5	33	1	5		2			2	3	**119**
Retreatment	10	8	1	2	6		1				3	1	2	**34**
Follow-up	1	4		2	21				1			4	1	**34**
Total	**67**	**23**	**2**	**9**	**60**	**1**	**6**	**0**	**3**	**0**	**3**	**7**	**6**	**187**

Achievement: Introduction of new technologies

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The study methodology has been developed

- The Study on "Evaluation of the performance of new introducing methods and technologies to improve the laboratory diagnosis of tuberculosis" **methodology was approved by the Academic Council** of the National Center for Communicable Diseases.
- The methodology of this study was approved by the Ethics Review Committee of the Ministry of Health and we received **MOH Ethical permission.**
- MOH Ethical committee supervised SATREPS project progress in NCCD

Achievements: Methodology of Risk assessment of *Mycobacterium bovis* infection (4.2.1)

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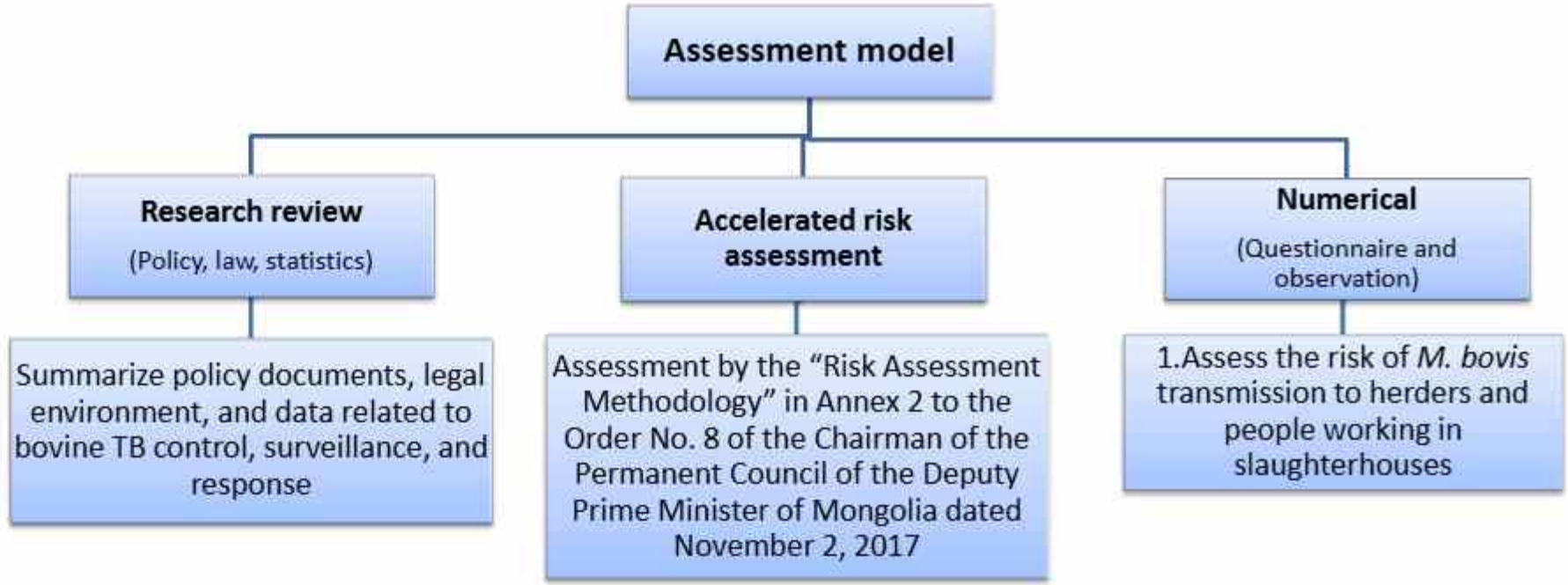

Objectives :

- To assess the prevalence, registration and surveillance of TB in livestock
- To assess the risk of TB transmission through *M. bovis* species in the population at risk
- To assess the risk of *M. bovis* infection among the workers of the slaughterhouses

This assessment will be implemented within the framework of the "Control of Tuberculosis and Glanders" project in cooperation with the Veterinary Institute carried out by the National Center for Communicable Diseases, the General Authority of Veterinary Service, the City Mayor Ulaanbaatar Veterinary Office, the National Center for Zoonotic Diseases.

Achievements: Published materials

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1. Western Pacific Regional conference, 2022 Poster presentation

- The Results of Assessment of the GeneXpert MTB/RIF Assay in Mongolia Dr Oyuntuya[1] Tumenbayar[1], Dr Borolzoi Tsetsegtuya[1], Dr Erdenegerel Narmandakh[1], Dr Baasansuren Erkhembayar[1],Dr Narantsetseg Choijil[1], Dr Oyunchimeg Ganbold1, Dr Gundsuren Sharkhuu1, Ms Amarjargal Norovdorj1, Dr Naranzul Dambaa[1], Dr Oyunchimeg Erdenee[1], Dr Buyankhishig Burneebaatar[1], Prof Sarantuya Jav[2], e-mail:toyuntuya@gmail.com *1National Centre for Communicable Diseases, Ulaanbaatar, Mongolia, [2]Mongolian National University of Medical Sciences, Ulaanbaatar, Mongolia*

2. Published in Mongolian Infectious Disease International Journal

- Монголд ялгасан *M. tuberculosis–ын mpt64* генийн мутаци -Т.Оюунтуяа[1], Н.Эрдэнэгэрэл[1], Б.Цэцэгтуяа[1], Э.Баасансүрэн[1], Б.Баясгалан[1], Ч.Цэвэлмаа[1], Д.Наранзул[1], Б.Цолмон[1], Э.Оюунчимэг[1], Б.Буянхишиг[1], Ж.Сарантуяа[2], С.Митарай[3] *[1]Халдварт Өвчин Судлалын Үндэсний Төв [2]Анагаахын Шинжлэх Ухааны Үндэсний Их Сургууль [3] Япон улсын Сүрьеэ судлалын хүрээлэн, Имэйл: toyuntuya@gmail.com*
- Сүрьеэг оношлох Xpert MTB/RIF. Т.Оюунтуяа[1], Б.Цэцэгтуяа[1], Н.Эрдэнэгэрэл[1], , Э.Баасансүрэн[1], Б.Баясгалан[1], Ч.Цэвэлмаа[1], Д.Наранзул[1], Б.Цолмон[1], Э.Оюунчимэг[1], Б.Буянхишиг[1], Ж.Сарантуяа[2], С.Митарай[3], *[1]Халдварт Өвчин Судлалын Үндэсний Төв [2]2Анагаахын Шинжлэх Ухааны Үндэсний Их Сургууль [3] Япон улсын Сүрьеэ судлалын хүрээлэн Имэйл: toyuntuya@gmail.com*

Technical support from RIT, Japan

1. MGIT DST online training of NRTL staff

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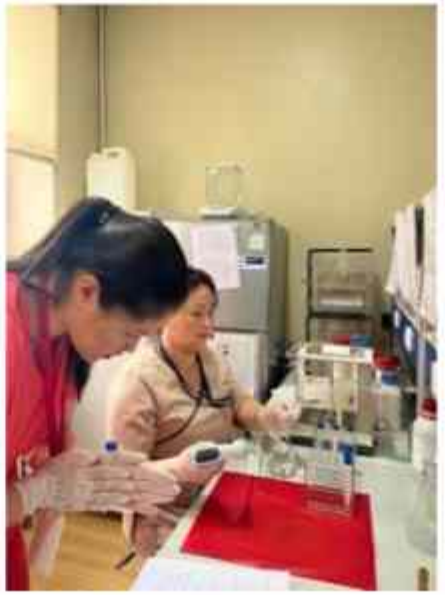

How to perform DST with MGIT system including new drugs

Satoshi Mitarai
Professor/Head,
Department of Mycobacterium Reference and Research,
Research Institute of Tuberculosis, Japan Anti-Tuberculosis Association

2. Training for Next generation sequencing in RIT

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- Learn the theory and practice of genome extraction of tuberculosis
- Library preparation of genome sample of tuberculosis
- Genome analysis after library preparation
- Analysis of obtained genomic data

3. On Job training on IGRA test

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QIAreach test training

4. Scientific meetings

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Monitoring visit in NRTL,NCCD – once

Online meeting of Prof. Mitarai S. with NRTL staff

- 2022.02.10
- 2022.03.09
- 2022.05.02
- 2022.08.25 conducted 4 times.

Technical support from JICA and AMED and Hokkaido university

Operational plan (OP) implementation, 2022

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TO STARTED and currently CONTINIUES
un-performed yet, due to COVID19 fandemic and others
Revised plan

Inputs	Year	2020		2021				2022			
	Month	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Expert											
Chief Advisor/Pathology (as a short-term expert)	Plan										
	Revised plan										
	Actual										
Project Coordinator(s) (as long-term expert(s))	Plan										
	Revised plan										
	Actual										
Other Experts with necessary expertise.	Plan										
	Revised plan										
	Actual										
Equipment											
Necessary experimental instruments and equipment for research activities in the Project	Plan										
	Revised plan										
	Actual										
Necessary equipment and/or materials for educational activities in the Project	Plan										
	Actual										

General points of OP of the project:

- Chief advisor Prof. Takashi Kimura visited twice and worked in the IVM of Mongolia
- Prof. Yasuhiko Suzuki visited once in IVM and NCCD
- The project coordinator T. Sato has been appointed, which creates conditions for the sustainable implementation of the project from March of 2022.

Meeting of technical working group

- On January 27, 2022, Mr. Nishiyama (JICA HQ) organized a Zoom meeting to review the work process, and we were presented.
- The presentation of the progress report of the project.
- The monitoring sheet report was prepared again and submitted to JICA through Prof. T. Kimura.

Technical support from Hokkaido university

Ink-Jet printer

- We are glad for the great technical assistance with which Hokkaido University has developed the LAMP kit. We have already received the Ink Jet printer.

Meeting with the Project coordinator and Prof. Suzuki

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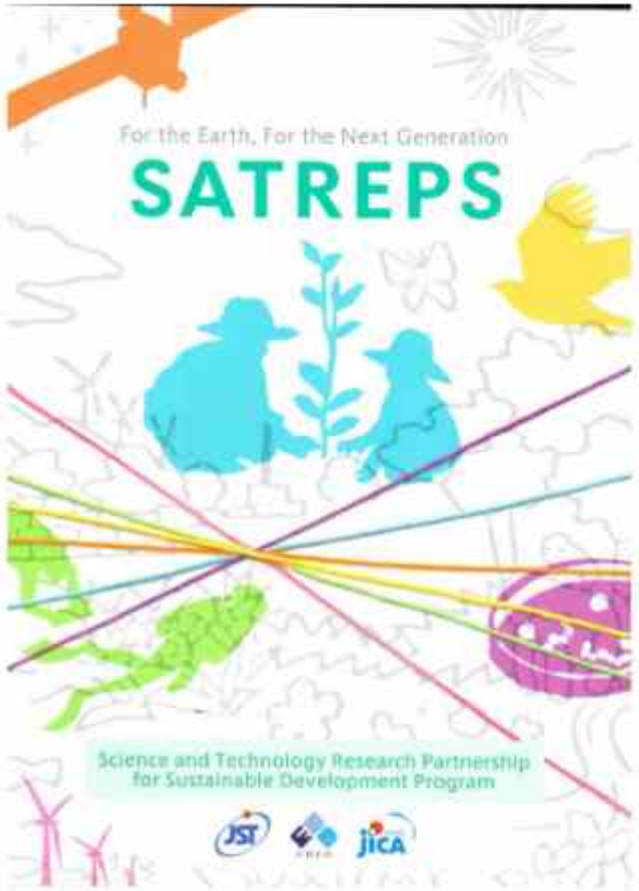
- Meeting of NCCD directors and research team with Toshiro Sato, project coordinator on 20th Apr. 2022
- We discussed the progress report of the project and the challenges of the project.

Meeting of Prof. Ya. Suzuki

2022.06.22

We discussed the progress of the Project

Technical support from AMED



Received the reagents and device in frame work SATREPS project

Name of reagents and device	Quantity	Amount (by ₮)
Sodium pyruvate 100rp	4	2.7 mln
Glycerol 1L	2	0.64 mln
Ink Jet printer	1	270 mln
QIAreach eHub and QuantiFERON	1	31.947
Total		**305.3 mln ₮**

Order of laboratory reagents and devices from the JICA representative office in Mongolia

1. MGIT Supplement kit 100 test pack 12
2. MGIT SIRE test supplement kit 40 test rack package 4
3. SD bioline TB antigen MPT64 , reagent to detect *M. tuberculosis complex*, 25 tests per pack 50 pack
4. The Qubit Flex NGS (Next-Generation Sequencing) Starter Kit (Cat. No. Q45893) includes: Qubit Flex Fluorometer , Tubes Strips and others
5. Multichannel pipette 8-Channel (0.5-10 µl) 2 each
6. PCR tube individual, PP, with cap 0.2ml, cap DNAase-/RNAase, DNA free 1000 piece/ pack 4 packages
7. GridiON device including 10 packages kits from Japan
8. GenoType MTBC, for identification for *M.tuberculosis complex* 96 tests per kit
9. GenoType Mycobacterium CM VER 2.0 for MOTT identification 96 tests per kit
10. GenoType Mycobacterium AS VER 2.0 for MOTT identification 96 tests per kit
11. Malachite green oxalate
12. Rifampicin (C43H58N4O12)
13. Plastic Forceps and Pipette aid

*April– Dec of 2022

Institute of Veterinary Medicine

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- The research team meeting
  - was organized 5 times (2022.02.24, 2022.04.15, 2022.04.20, 2022.04.26, and 2022.10.21)
- On Job training
  - Culture methods for MTBC including *M. bovis* among IVM doctors for 14 days in May 2022.
  - During this period, one case of *B. mallei* disease was treated at the National Center for Communicable Diseases, and the diagnosis of *B. mallei* was made based on the National Zoonotic Center and the IVM laboratory.
- Development of risk assessment methodology
  - Joint discussion aspects with NCCD academic counsel and MOH ethical committee

Operational plan implementation, 2022

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Inputs	Year	2020		2021				2022				2023			
	Month	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
Training in Japan															
Bacteriology, Immunology, Epidemiology, Pathology, Molecular Biology, Bioinformatics and other necessary specialized areas	Plan														
	Revised plan														
	Actual														

Issues and Challenges: Overseas training delayed

Training request

№	Name of training objectives	Occupation	Number of person	Duration	Planning year	Institution
1.	Bioinformatic The molecular analysis of the project study	Epidemiologist Laboratory specialist	2	1 month	Beginning 2023	RIT, Japan
2.	Immunology To obtain IGRA-related experience	Laboratory Doctor	1	14 days	2023	RIT, Japan
3.	*M.bovis* detection technique LAMP and serology diagnostic	Laboratory and clinician doctor	2	21 days	2023	RIT, Japan Hokkaido Zoonotic center
4.	NGS GridiON technique	Laboratory Specialist	1	1 month	2023	RIT, Japan
5.	Detection of *B.Mallei* in human	A zoonotic doctor or epidemiologist	1	14 days	2023	Hokkaido university, Japan Zoonotic center
6.	Meta genome technology New technology	Laboratory Specialist	1	1 month	2024	RIT, Japan
7.	Study tour of the SATREPS project on the control Tuberculosis and glanders	PD, PM, PI, Researchers	10/10	10 days	2023 ,2024	Hokkaido university, Japan Zoonotic center8 RIT, AMED

Equipment supply and logistics

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Equipment supply and logistic issue

- ELISA system for standard QFT GIT test
- High-power PC and data server for genome sequencing
- Other general laboratory equipments (centrifuge, autoclave, etc.)

Request to PI/Funding agent/Advisors

- Although it was prepared at Hokkaido University 2 years ago, it has not yet come to Mongolia. We would like to get the latest version of these devices which are constantly evolving. Because the results of our research are useful.

To intensify project implementation in future

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- To attend researchers in overseas and study tour of the project implementers
- To conduct assessment and research through the improvement of inter-institutional cooperation
- To increase the effectiveness of the project supported by the government and JICA and AMED

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Thank you for your attention