“SEEKING WAYS TO ELIMINATE TUBERCULOSIS IN ASIA”
Fifth international scientific conference

Date: 15th~16th of September, 2022
All times are in Ulaanbaatar, Mongolia (UTC+8) 09:00-17:30
### Session III: Treatment and clinical management of TB

**Chairs:** Naranbat Nyamdawaa, TB Experts’ Committee of the Ministry of Health, Mongolia  
Nelly Solomonova, National Center for Tuberculosis and Lung Diseases, Tbilisi, Georgia

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:20~09:40</td>
<td>Cost and cost-effectiveness dynamics of a tuberculosis active case finding intervention in Cambodia during the COVID-19 pandemic</td>
<td>Hojoon Sohn, Seoul National University, School of Medicine, Republic of Korea</td>
</tr>
<tr>
<td>09:40~10:00</td>
<td>The demographic characteristics of patients treated with the video–observed anti-tuberculosis treatment</td>
<td>Evelina Lesnic, Nicolae Testemitanu State University of Medicine and Pharmacy, Republic of Moldova</td>
</tr>
<tr>
<td>10:00~10:20</td>
<td>A situation update for rifampicin-resistant TB since the last DRS in Mongolia</td>
<td>Tsolomon B, TB Surveillance and Research Department, NCCD, Mongolia</td>
</tr>
<tr>
<td>10:20~10:40</td>
<td>Medical, organizational and legal aspects of the activity of national committee on management of drug-resistant tuberculosis</td>
<td>Irina Voloschuc, Institute of Phtisiopneumology &quot;Chirl Draganiuc&quot;, Chisinau, Republic of Moldova</td>
</tr>
<tr>
<td>10:40~11:00</td>
<td>Radiological screening with high-performance technologies for the respiratory health of the rural population from risk groups in the Republic of Moldova</td>
<td>Nicolae Nalivaco, Institute of Phtisiopneumology &quot;Chirl Draganiuc&quot;, Chisinau, Republic of Moldova</td>
</tr>
<tr>
<td>11:00~11:20</td>
<td>Break</td>
<td></td>
</tr>
<tr>
<td>11:20~11:40</td>
<td>The trend of children TB in Mongolia: Exponential regression analysis</td>
<td>Oyunchimeg E, TB Surveillance and Research Department, NCCD, Mongolia</td>
</tr>
<tr>
<td>11:40~12:00</td>
<td>Children tuberculosis in the presence of primary immunodeficiency criteria</td>
<td>Stela Kulitikai, State University of Medicine and Pharmacy &quot;Nicolae Testemitanu&quot;, Department of Pneumonhiology, Chisinau, Republic of Moldova</td>
</tr>
<tr>
<td>12:00~12:20</td>
<td>Study of anti-tuberculosis treatment outcome of XDR-TB in Mongolia</td>
<td>Bolyska B, Pulmonary TB Department, Tuberculosis Clinic, NCCD, Mongolia</td>
</tr>
<tr>
<td>12:20~12:40</td>
<td>The valve bronchial blockage in a complex treatment of pulmonary tuberculosis</td>
<td>Andrey Batomunkievdch Dorji, Republican Clinical Tuberculosis Dispensary named after Dugarova G.D, Republic of Buryatiya, Russian Federation</td>
</tr>
<tr>
<td>12:40~13:00</td>
<td>Discussion</td>
<td></td>
</tr>
<tr>
<td>13:00~14:00</td>
<td>Lunch Break</td>
<td></td>
</tr>
</tbody>
</table>

### Session IV: Management of risk factors and comorbidities of TB

### Session V: Protection and promotion of human rights, ethics and equity

**Chairs:** Bumdelger B, Head of Comprehensive Laboratory Department, NCCD, Mongolia  
Elena Tudor, Interim Deputy Director on Science and Innovation Institute of Phtisiopneumology "Chirl Draganiuc", Republic of Moldova

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>14:00~14:20</td>
<td>&quot;Syndemic&quot; challenge of tuberculosis, smoking and household air pollution in Mongolia</td>
<td>Munkhjargal D, Department of Hygiene and Public Health, Kansa Medical University, Japan</td>
</tr>
<tr>
<td>14:20~14:40</td>
<td>New challenges in the management of Rifampicin Resistant Tuberculosis (RR-TB)</td>
<td>N. Kiria, National Center for Tuberculosis and Lung Diseases, Tbilisi, Georgia</td>
</tr>
<tr>
<td>14:40~15:00</td>
<td>Current situation of surgical treatment of spinal TB in Mongolia</td>
<td>Batbayar D, Tuberculosis Clinic, NCCD, Mongolia</td>
</tr>
<tr>
<td>15:00~15:20</td>
<td>Tuberculosis related stigma among multi-drug resistant tuberculosis in Mongolia</td>
<td>Dorjinaa D, TB Surveillance and Research Department, NCCD, Mongolia</td>
</tr>
<tr>
<td>15:20~15:40</td>
<td>The evaluation of the “Tuberculosis curriculum” of Medical Universities of Mongolia</td>
<td>Gantuya D, Department of Epidemiology and Biostatistics, School of Public Health, MNJMS, Mongolia</td>
</tr>
<tr>
<td>15:40~16:00</td>
<td>Discussion</td>
<td></td>
</tr>
<tr>
<td>16:00~16:05</td>
<td>Review of the second day session</td>
<td>Bazzarrgchaa Ts, STREAM clinical trial site lead, NCCD/Mongolian TB Coalition</td>
</tr>
<tr>
<td>16:05~16:10</td>
<td>Closing remarks</td>
<td>Bilgeulsaihan Ts, General Director, NCCD, Mongolia</td>
</tr>
</tbody>
</table>
ABSTRACTS

SESSION III: TREATMENT AND CLINICAL MANAGEMENT OF TB

COST AND COST-EFFECTIVENESS DYNAMICS OF A TUBERCULOSIS ACTIVE CASE FINDING INTERVENTION IN CAMBODIA DURING THE COVID-19 PANDEMIC

Gum-Ryeong Park¹, Jungsil Lee², Jae Hyoung Lee³, Heejin Kim⁴, Hyejung Han⁴, Kanghee Kim⁴, Hongjo Choi⁵, Hojoon Sohn⁶

¹Department of Health, Aging & Society, McMaster University, Hamilton, ON, Canada
²London School of Hygiene & Tropical Medicine, London, the United Kingdom
³Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, United States
⁴Korea National Tuberculosis Association
⁵Department of Preventive Medicine, Konyang University College of Medicine, Daejeon, Republic of Korea
⁶Department of Preventive Medicine, Seoul National University College of Medicine, Seoul, Republic of Korea

Background: Systematic screening for TB, including active case finding (ACF) programs, have an important role in closing this gap. However, many of the ACF programs were suspended, operated with limited reach, and went through major strategic restricting in response to government’s COVID-19 Pandemic mitigation efforts. In this study, we examined the costs and cost-effectiveness dynamics of an ACF intervention operated during the COVID-19 Pandemic in Cambodia.

Methods: We reviewed 1) finance reports, 2) project operational logs, 3) participant data of the CURE-TB ACF project implemented by the Korean National Tuberculosis Association (KNTA) in partnership with the Cambodia National Centre for Tuberculosis and Leprosy Control in Siem Reap province over the 12-month period between 2020 and 2021. Costs of the overall project and major service components – initial screening, chest X-ray reading using Computer Aided Detection (CAD) system, and mobile Xpert MTB/RIF testing – were assessed based on activity-base costing approach and reported as 2020 United States Dollars (USD). To assess cost and cost-effectiveness dynamics between the two distinctive phases – defined based on a transitional point at which the project operations restructured as a facility-based from community-based approach – we performed univariate and ordinary least-squares segmented (interrupted time series, ITS) linear regression analyses factoring aggregate participant profiles characterized for each unit of ACF operation matched to daily screening costs and cost per TB case detected estimate assessed over 3-day period.

Results: Overall cost of the CURE-TB project was US$ 215,544 with the cost to screen one participant and detect one TB patient at $34 and $1850 respectively. A Shift from a community-based to facility-
based approach reduced the ACF project’s reach and resulted in significant increase in cost to screen ($56-74 vs. $18-25) and diagnose TB ($3060-4061 vs. $1047-1411). Screening costs, an indicator for operational efficiency, were sensitive to participant characteristics, where costs decreased with increasing age, proportion of symptomatic patients, smokers, and alcohol drinkers. ITS analysis results indicate that costs to screen and detect TB patients increased by two-fold on average, but in both instances these costs decreased at a similar rate over time (e.g., screening costs decreased at $0.6 per day of operation).

Conclusions: Our study offers an important insight to cost and cost-effectiveness dynamics of the ACF intervention that underwent major reorientation of screening strategy and operations during the COVID-19 Pandemic. Our findings suggest that the cost and cost-effectiveness dynamics of ACF project were very different in the two operational phases during the COVID-19 and these were attributable to strategic restructuring and differences in participant characteristics.

THE DEMOGRAPHIC CHARACTERISTICS OF PATIENTS TREATED WITH THE VIDEO-OBSERVED ANTI-TUBERCULOSIS TREATMENT

Evelina Lesnic, Tatiana Osipov, Alina Malic
Nicolae Testemitanu State University of Medicine and Pharmacy, Republic of Moldova

E-mail: evelina.lesnic@usmf.md

Introduction. The video-observed treatment (VOT) is based on the principle that the medical staff involved in the administration of the anti-TB treatment can observe the swallowing of the anti-TB drugs by the patients using electronic devices.

Objective: to conduct a study of the demographic characteristics of TB patients treated with VOT.

Material and methods: A prospective, series of cases study was realized in which 78 patients with pulmonary TB were treated remotely.

Results: distribution by gender established: male/female rate=1.4/1, age: between 18- 24 years old – 17(22%), 25-34 y.o.– 21(27%), 35-44 y.o. 22(28%), 45-54 y.o. 12(15%) and 55-64 y.o. 6 (8%) patients; place of living: urban residence had 72(92%) and rural 6 (8%); economical state: employed 40(51%), unemployed 24(31%), were students 11(14%) and retired 16(8%); by civil state: 57(73%) were married and 21(27%) single; education state: low level 19 (24%), secondary level 42 (54%) and superior 17 (21%); living conditions: poverty 10 (16%) and were returned from abroad 7(11%).

Conclusions. Demographic characteristics of TB patients treated with VOT were: a similar distribution by sex, every second case was younger than 34 y.o., most of the patients lived in urban areas, a stable economical state and optimal educational level were established in every
second patient. A limited number were living in poverty or had migratory history. VOT can be used in young patients, and urban residents, with optimal economical and educational levels.

**Keywords:** tuberculosis, demographics, VOT.

**MEDICAL, ORGANIZATIONAL AND LEGAL ASPECTS OF THE ACTIVITY OF NATIONAL COMMITTEE ON MANAGEMENT OF DRUG-RESISTANT TUBERCULOSIS**

Pisarenco S.V.¹, David A.V.¹, Manea M.L.¹, Stanceva M.V.², Cula E.N.¹, Volosciuc I.V.¹, Pisarenco C.S.³

E-mail: volosciuc15@gmail.com

¹Institute of Phthisiopneumology “Chiril Draganiuc“, Chisinau, Republic of Moldova
²Municipal Hospital of Phthisiopneumology, Chisinau, Republic of Moldova
³Free International University of Moldova, Chisinau, Republic of Moldova

**Background.** DR-TB remains a problem for many national healthcare services. In 2021 in Republic of Moldova (RM), DR-TB represented 29.2% from new cases, 56.1% – retreatment.

**Objective:** highlight medical, legal, organizational aspects of activity of Committee on Management (CM) of DR-TB.

**Materials and methods.** Reports from Coordination Department of the National TB Control Program and legislation in providing antituberculous healthcare.

**Results.** In 2021, according to CM, 576 patients (23 children) were included in DR-TB treatment. New cases predominated – 292 (50.7%). Ratio between them, TB recurrence, TB treatment failure, lost to follow-up was 5:1.5:1:1. Most of DR-TB was MDR-TB (43.2%). Ratio between MDR-TB and XDR-TB – 7.3:1. Decisions about place and type of chemotherapy, monitoring, assessment of treatment effectiveness were taken according to the National Clinical Protocol and WHO Consolidated Guidelines on DR-TB Treatment. A special attention was given to microbial status of the patient and source of infection. On average, cases were discussed 5.5 times, every 3 months or more often. Complex monitoring, compliance, drug-induced reactions and others were evaluated. Using informational system of TB monitoring and evaluation, telemedicine technologies, increased patient’s care control and continuity. As a result, an increase in DR-TB treatment effectiveness, patient`s safety was noted.

**Conclusion.** CM is an important element in the management of DR-TB in RM. CM uses modern medical and informational technologies. Its activity is regulated by current legislation. Improvement of CM, in particular, by adoption of telemedicine law, will contribute to respect patient’s rights and legal interests.

**Key words:** DR-TB, management, committee, medical law.
RADIOLOGICAL SCREENING WITH HIGH-PERFORMANCE TECHNOLOGIES FOR THE
RESPIRATORY HEALTH OF THE RURAL POPULATION FROM RISK GROUPS IN THE REPUBLIC OF
MOLDOVA

Alexandru S.M., Nalivaico N.N, Vîlc V. V.
Institute of Phthisiopneumology "Chiril Draganiuc", Chisinau, Republic of Moldova
e-mail: nalivaico@yahoo.com

Background: The prophylactic radiological examinations were performed on the population of
54,893 people from risk groups and increased vigilance for tuberculosis (TB) in different
administrative territories of the Republic of Moldova. The organization of the detection was
aimed at identifying the sources of infection in the community.
Aim. Determining the medical and social criteria for the formation of risk groups and increased
vigilance for TB, optimizing the detection of TB in an integrated medical system, which will help
reduce the burden of TB in the Republic of Moldova.
Methods. The prophylactic radiological examinations were performed on the population of
54,893 persons from the risk groups and increased vigilance of TB in different administrative
Results. In the examined territories, the routes of detection in 357 patients with evolutionary
TB were analyzed, including 294 new cases (82.4%) and 63 (17.6%) recurrences, of which 181 or
50.7% were detected by addressing, for prophylactic purposes - 176 or 49.3% patients.
Conclusion. The main objective of the screening was to ensure the early detection of digital
radiology "targeted" from groups at risk and increased vigilance of pulmonary TB in certain
territories and communities with increased epidemiological potential of TB. The integration of
antituberculosis actions in the activity of the entire medical network determines the priorities
for preventing and combating TB in certain territories with high epidemiological potential.

CHILDREN TUBERCULOSIS IN THE PRESENCE OF PRIMARY IMMUNODEFICIENCY CRITERIA.

Kulchitskaya S.
State University of Medicine and Pharmacy “Nicolae Testemitanu”, Department of
Pneumophthisiology, Chisinau, Republic of Moldova
stela.kulcitkaia@usmf.md

Background. Children tuberculosis (TB) is of primary genesis - represents the response of the
macro-organism to the first contact with the source of infection. Latent TB Infection (ITBL)
develops frequently in children, and under certain conditions progresses to TB disease, the
decisive factor being the presence of primary immunodeficiency (PID). Genetic correlations of
TB susceptibility derive from the functionality of TB protection mechanisms: innate and acquired immune response. The identification of children at high risk of developing TB is essential and can be achieved by assessing the presence of criteria for PID.

**Design.** Studying of the clinical evolution, diagnostic and treatment characteristics of TB in children with PID criteria. 40 new cases of TB in children were analyzed between January 2020 and December 2021, selected based on a result of the IDR score ≥6 (Immunodeficiency disease related score), considered as a significant threshold value for the suspicion of a PID condition.

**Results.** The average age of the analyzed cases was 6.9 years. The TB screening method was active in 20(50.0%) cases, passive – 17(42.5%), active with suggestive symptoms-3(7.5%). Symptomatic cases-20(50.0%) were manifested by the following TB "masks": pneumonia - 15(75.0%) bronchitis-2(10.0%), neurological - 2(10.0%), influenza-like - 1(5.0%). Contact with other TB patients was in 30(75.0%) cases. The frequency of the PID criteria based on the IDR score were: lymphadenopathy in 31(77.5%) cases, neutropenia - 26(65.0%), bacterial pneumonia - 24(60.0%), acute bronchitis - 22(55.0%), failure to thrive - 20(50.0%), lymphopenia - 5(12.5%), acute otitis media -4(10.0%), malabsorption - 3(7.5%), septicemia - 2(5.0%), osteomyelitis - 2(5.0%), splenomegaly - 2(5.0%), chronic bronchitis - 2(5.0%), fever of unknown origin - 2(5.0%), lymphadenitis - 2(5.0%), abnormal weight loss - 2(5.0%), other abcess - 1(2.5%), giardiasis- 1(2.5%), gastroenteritis - 1(2.5%). BCG immunization was recorded in 39(97.5%) cases. Identified clinical forms: TB of intrathoracic lymph nodes - 20 (50.0%) cases, Infiltrative pulmonary TB - 8(20.0%), Primary TB complex - 6(15.0%), TB pleurisy - 2(5.0%), Bone TB - 2(5.0%), TB of peripheral lymph nodes - 1(2.5%), Generalized TB (with meningitis) - 1(2.5%). In all the studied cases, the TB process was in evolution phase. Complications had 5(12.5%) cases, manifested by: pleurisy - 2(40.0%), atelectasis - 2(40.0%), respiratory failure - 1(20.0%). Microbiologically confirmation - 12(30%) cases, and histologically - 3(7.5%). The result of the Mantoux test was negative in 25(62.5%) cases. Treatment for sensitive TB received 29(72.5%) of cases, and for resistant TB - 11(27.5%).The treatment results were: completed in 28 (70.0%) cases and cured in 12(30.0%).

**Conclusion.** Tuberculosis in children in the presence of PID criteria is diagnosed more frequently at an early age, with the development of pulmonary forms and complications.

**Keywords:** tuberculosis, children, immunodeficiency.

**STUDY OF ANTI-TUBERCULOSIS TREATMENT OUTCOME OF EXTENSIVELY RESISTANT TUBERCULOSIS (XDR-TB) IN MONGOLIA**

R.Bolor, A.Oyunchimeg, B.Bolyskhan
National Center for Communicable Disease, Mongolia
E-mail: bolor0308@yahoo.com
Background: TB is the leading cause of death among infectious diseases, and it is staying high burden in developing countries has not decreased, and the proportion of drug-resistant TB is increasing every year. The prevalence of drug resistance is a major challenge to TB control, and extensively drug-resistant TB (XDR-TB) forms are high mortality, high costly to treat, and most likely to disability, but there is a lack of research on the results in our country.

Goal: Evaluate the treatment successes of XDR-TB cases treatment in Mongolia

Method: Data on the treatment results and histories of extensively drug-resistant TB cases diagnosed and monitored in 2016-2019 were analyzed from the NCCD's TB Surveillance department database and analyzed.

Result: A total of 24 cases were reported in the sample, and the majority of patients were men (18/75%), all of working age. Of these, 21 (79.9%) were previously treated and 5 (12.5%) cases were primary resistance. Treatment results: 7 (29.2%) cases were cured, 1 (4.2%) follow-up lost, 2 (8.3%) treatment was completed, 5 (20.8%) cases were failed, and 9 (37.5%) cases died.

Conclusion: The 19 cases (79.17%) surveyed were unsuccessful in multidrug-resistant TB treatment, indicating the need to improve treatment control and expand treatment options. Bedaquiline including regimens have been more successful than other groups in the treatment of XDR-TB cases. Of the total cases, 9 (37.5%) survived and 9 (37.5%) died at the same rate.

Keywords: Extensively drug-resistant TB, treatment regimen outcome, Bedaquiline.

THE VALVE BRONCHIAL BLOCKIAGE IN A COMPLEX TREATMENT OF PULMONARY TUBERCULOSIS

Andrey Dorjiyev
Clinical Antituberculosis Dispensary, named after Dugarova G.D., Republic of Buryatia, Russian Federation

The use of an endobronchial valvular bronchodilator in patients with destructive pulmonary tuberculosis contributes to the creation of hypoventilation and atelectasis in the affected areas of the lung, stabilization and regression of the tuberculosis process. The severity of local artificial collapse of the lung is different and radiologically manifested itself from minimal displacement of the lung structures relative to the ribs to complete atelectasis of the lung area.

The use of valvular bronchoplasty in the complex treatment of patients with destructive pulmonary tuberculosis improves the results of treatment, reduces the number of patients requiring surgical treatment due to better stabilization of the tuberculosis process and reduces the number, volume and trauma of surgical interventions.
Diseases associated with tuberculosis, such as type 1 and type 2 diabetes mellitus, hepatitis, HIV infection, are not a contraindication for the use of this method of treatment.

SESSION IV: MANAGEMENT OF RISK FACTORS AND COMORBIDITIES OF TB

“SYNDEMIC” CHALLENGE OF TUBERCULOSIS, SMOKING AND HOUSEHOLD AIR POLLUTION IN MONGOLIA

Dorjraavdan Munkhjargal¹², Kouda Katsuyasu¹, Nishiyama Toshimasa¹,
¹ Department of Public Health and Hygiene, Kansai Medical University, Japan
² Tuberculosis Surveillance and Research department, National Center for Communicable Disease, Mongolia

The term syndemic refers to a synergistic interaction of two or more diseases and biological and environmental factors that negatively influence the consequences of those diseases among population. According to the Global TB report 2020, Mongolia is one of the high tuberculosis (TB) burden countries with a TB incidence rate of 428 per 100,000 population. Moreover, smoking prevalence is 43.7% among men which is higher than global average of 32.6% among men, and 5% of female were smokers in Mongolia in 2020. In addition, air pollution is one of the public health problems in Mongolia. Ulaanbaatar (UB) the capital city of Mongolia is transformed into the one of the most polluted cities in the world during the winter. Household’s use solid fuel for heating and cooking is a cause of the high concentration of pollutants indoor and the exposure to such pollutants impairs the immune system against the causative agent of TB. Household air pollution (HAP) due to solid fuel use was associated with bacteriologically confirmed TB and exposure to smoke from tobacco were also associated with TB in Mongolia. Given that hypothesis of syndemic of TB, smoking, and HAP, we want to emphasize the important contribution of smoking and HAP in reducing the TB burden and to appeal to policymakers, researchers, and practitioners so that they recognize tobacco cessation and reduce HAP as an important part to ending the TB epidemic in Mongolia.

NEW CHALLENGES IN THE MANAGEMENT OF RIFAMPICIN RESISTANT TUBERCULOSIS (RR-TB)

N.Kiria, T.Avaliani, M.Chincharauli
National Center for Tuberculosis and Lung Diseases, Tbilisi, Georgia
E-mail: nini.kiria15@gmail.com
**Background:** Worldwide, the country of Georgia is one of the first countries where the treatment of rifampicin-resistant tuberculosis with new and repurposed anti-TB drug regimen (occasionally, since 2010, as part of “compassionate use" and programmatically since 2015) is implemented, thus improving treatment outcomes significantly.

**Design:** The study investigated development of resistance to new and repurposed anti-TB drugs in pulmonary RR-TB cases in 2019-2021 in the country of Georgia.

**Results:** Susceptibility testing of new and repurposed anti-TB drugs in Georgia has been carried out since 2019. From 2019 to 2021, resistance to Bedaquiline (Bdq), Linezolid (Lzd), and Clofazimine (Clz) alone appeared to be increasing and ranged from 1.5% to 10.4% among patients with pulmonary RR-TB tested for the drug. It should be noted that no resistance to Delamanid was observed in 2019-2020. Resistance to Delamanid was first identified in the 2021 cohort and showed 8.5% of the total tested cases for the drug. In 2020, 28% of fluoroquinolone-resistant tuberculosis (pre-XDR-TB) cases (50 cases) showed resistance to one of the most effective “group A” drugs: Bdq (24%) or Lzd (4%). In 2021, 37 cases of pre-XDR-TB were recorded, among which 10 (27.0%) patients were confirmed to have XDR-TB. Among XDR-TB cases, resistance to Bdq alone was observed in 61.0% of patients, and Lzd alone in 20.0%. In 2021, for the first time, 2 patients (20% of XDR-TB patients) were resistant to all drugs of “group A” [fluoroquinolone (Levofloxacin, Moxifloxacin), Bdq, Lzd].

**Conclusion:** In 2019-2021, the growing dynamics of the development of resistance to new and repurposed anti-TB drugs in one country (Georgia) shows that in the upcoming years, we may face a drug-resistant TB crisis again. To prevent the process, it is necessary to expand and update the drug base for the treatment of resistant tuberculosis constantly, which can be carried out both through the synthesis of new anti-tuberculosis drugs and restoring anti-TB efficacy of priority drugs using stability inhibitors.

**Keywords:** RR-TB; pre-XDR-TB, XDR-TB, Bedaquiline, Linezolid, Delamanid, Clofazimine.

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**STUDY OF ANTI-TUBERCULOSIS TREATMENT OUTCOME OF EXTENSIVELY RESISTANT TUBERCULOSIS (XDR-TB) IN MONGOLIA**

R.Bolor¹, A.Oyunchimeg¹, B.Bolyskhan²,
¹Drug-Resistant-TB ward of Tuberculosis Clinic,
²Second department of Pulmonary TB,
National Center for Communicable Disease
E-mail: bolor0308@yahoo.com

**Background:** TB is the leading cause of death among infectious diseases, and it is staying high burden in developing countries has not decreased, and the proportion of drug-resistant TB is increasing every year. The prevalence of drug resistance is a major challenge to TB control, and
extensively drug-resistant TB (XDR-TB) forms are high mortality, high costly to treat, and most likely to disability, but there is a lack of research on the results in our country.

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**Key words:** Extensively drug-resistant TB, treatment regimen outcome, Bedaquiline

**SESSION V: PROTECTION AND PROMOTION OF HUMAN RIGHTS, ETHICS AND EQUITY**

**TUBERCULOSIS RELATED STIGMA AMONG MULTI DRUG RESISTANT TUBERCULOSIS IN MONGOLIA**

D.Dorjmaa,1,2 Ts.Davaasuren,2 P.Nasanjargal,2 Ch.Khandsuren,3 Ch.Enkhchimeg,3 J.Ermek,4 Ts.Ariunaa,4 D.Naranzul2, O.Baatarkhuu,1 Z.Khishigsuren1

1Mongolian National University of medical science
2National Center for Communicable Diseases, Mongolia
3Health union of Chingeltei district
4Health union of Sukhbaatar district
d.dorjmaad@gmail.com

**Background:** Discrimination is the act of distinguishing an individual from others on the basis of race, opinion, religion, belief, knowledge and education, and restricting or denying their rights and tuberculosis related stigma is common among general population.
Tuberculosis related stigma negatively affects the mental health, treatment adherence, treatment outcome of tuberculosis patient. It is necessary to study stigma among tuberculosis patients in order to optimally implement activities against stigma.

**Goal:** To study tuberculosis related stigma among multi drug resistant tuberculosis patients

**Materials and Methodology:** This study used a randomly assigned case control study. A total of 73 MDR-TB patients who enrolled treatment between 2020 and 2021 in Mongolia participated in this study. We used Zung Self-Rating depression Scale, Zung Self-rating anxiety scale, Van Rie tuberculosis stigma scale and assessed scale reliability by calculating Cronbach’s alpha.

**Results:** A total of 73 MDR-TB patients were participated in our study and 52% were males, the mean age of patients an age was 39.98 ± 1.6, 63% have secondary education, 37% were unemployed, and 70% have no previous TB history.

Of all participants, 23% and 6% of patients were classified as mild depression and moderate to major depression (Cronbach’s alpha=0.805), 15% and 1% of patients were classified as mild to severe anxiety and marked to severe anxiety (Cronbach’s alpha=0.843) respectively.

82% of all participants felt tuberculosis related social stigma (Cronbach’s alpha=0.848) and majority (96%) of participants self-stigma (Cronbach’s alpha=0.767).

Bivariate analysis shows that patient, who is male, unemployed, in control group, with depression and anxiety, faced higher tuberculosis social stigma and self-stigma. These were not significantly associated. But patient, who faced social stigma, had more self-stigma (p=0.001).

**Conclusions:** In this study, MDR-TB patients perceived high tuberculosis related social stigma and self-stigma. MDR-TB patients faced self-stigma due to tuberculosis related social stigma.

**Key words:** MDR-TB, stigma, social stigma, self-stigma
Background: In 2021, WHO declared Mongolia as one of the 30 countries with a high burden of tuberculosis, the number of tuberculosis cases per 100,000 population is 428. According to a study conducted in 2009, the duration and content of tuberculosis courses were different both in public and private medical schools, and tuberculosis contents are omitted from the curriculum of some medical classes. There is a need to evaluate the “Curriculum of Tuberculosis” including the content, teaching capacity, availability, and accessibility of training materials.

Methodology: We evaluated the 18 Tuberculosis curriculums of the state and private Medical Universities of Mongolia, using a cross-sectional study. The curriculum evaluation checklist was developed and it has 23 questions with specific criteria.

Results: The curriculum’s contents, training duration, teaching methodology, and the courses taught were totally different. In the contents of the tuberculosis curriculum the introduction part, the skills to be acquired by the graduate are relatively well defined, whereas the communication and cooperation parts are defined as unsatisfactory. There is a lack number of teachers in private medical universities. The availability of classrooms, laboratories, and textbooks is poor. The practices are often contacted in classrooms, and face-to-face discussions and physical examinations with patients are limited.

Conclusion: Due to the difference in the Tuberculosis curriculum, medical students obtain different knowledge and abilities. It is an urgent need to develop and implement a unified standard Tuberculosis curriculum both for State and private Medical Universities to eliminate the gap.

Keywords: Tuberculosis, curriculum, evaluation, medical university, Mongolia
Cost and Cost–Effectiveness Dynamics of
TB Active Case Finding Intervention during the COVID–19 Pandemic

Hojoon Sohn, PhD, MPH
Associate Professor
Department of Preventive Medicine
Seoul National University College of Medicine

5th International Scientific Conference on TB in Asia
Session III: Treatment and clinical management of TB
September 16, 2022

Background

• Objectives of the CURE (Capacity Upgrades on Reaching Elimination of) TB project
  • Cambodia is a medium TB burden country (TB Incidence: 274/100K) with relatively high case detection gaps (1/3 prevalent cases missing)
  • TB REACH Wv. 7 project: KNTA, CENAT/NTP, and Siem Reap Provincial Health Department collaborated to implement community-based Active Case Finding (ACF) intervention in 20–33 target areas (HC or villages) with considerable physical barriers for care-seeking
  • The project operated during the COVID–19 Pandemic → considerable changes were made to the operations, project components

• A need assess cost and cost–effectiveness of the ACF Intervention
  • ACF interventions are generally resource-intensive
  • Costs and cost–effectiveness are determined based 1) intervention components (e.g. use of CXR, Xpert, screening strategy), 2) target population characteristics, 3) external factors (e.g., COVID–19 Pandemic and related social distancing measures)
  • Assessed cost and cost–effectiveness dynamics of the CURE–TB ACF project, comparing pre and post COVID–19 restriction periods
Population is 428. According to a report, the number of participants per workforce varies. In the contents of the tuberculosis curriculum, different knowledge and abilities are taught. It is an urgent need to develop and implement a unified curriculum for State and private medical universities.

### Methodology

- **Content**: Curricula of some medical classes were developed and it has 23 questions with specific criteria.
- **Teaching Capacity**: The availability of classrooms, laboratories, and textbooks is poor. The practices are often contacted in classrooms, and face-to-face discussions are minimal.
- **Availability and Accessibility of Training Materials**: In 2021, WHO declared Mongolia as one of the 30 countries with a high burden of tuberculosis, the number of tuberculosis cases per 100,000 population is 428.

### Conclusion

- Despite the difference in the Tuberculosis curriculum, medical students obtain various practical practices. The number of tuberculosis case-screening per workforce is limited.
- In the study conducted in 2009, the duration and content of tuberculosis courses were different both in-state and private medical universities. The availability of classrooms, laboratories, and textbooks is poor. The practices are often contacted in classrooms, and face-to-face discussions are minimal.

### Keywords

- Tuberculosis, curriculum, evaluation, medical university, Mongolia

---

**Cost analysis framework**

- **Regional Direct Costs**
  - Operation
  - Workshop/meeting
  - HR
  - Communications
  - Car rentals
- **Regional Indirect Costs**
  - Meeting/workshop for projects
  - Human Resources
  - Communications
  - Consumable Countable Goods
  - Office equipment/Appliances/etc.
  - TB Testing
  - Gene X-pert
  - X-ray
  - Others
- **Pre-implementation**
  - Costs were annualized cost and redistributed as monthly and daily costs based on several apportionment criteria.
- **Capital Asset**
  - Meeting & workshop for village workers
  - Physicians
  - Communications/Rentals
  - Consumables (e.g., X-pert Cartledge)
- **Operation**
  - Meeting & workshop for village workers
  - Physicians
  - Communications/Rentals
  - Consumables (e.g., X-pert Cartledge)
- **Post-implementation**
  - Network & meeting
  - Human Resources
  - Communications/Rentals

---

**Pre-implementation**

- (-2020.11)
  - TB Active Case Finding projects started
  - Number of participants: 1,782
  - Per initial screening: 16.96
  - Per X-ray: 60.79
  - Per X-pert: 178.01
  - Per Gene X-pert: 277.41
  - Per TB identified: 330.41
  - Per TB presumptive: 330.41

**Suspension of Projects**

- (2020.11-2021.03)
  - TB Active Case Finding projects due to the outbreak
  - Number of participants: 1,782
  - Per initial screening: 16.96
  - Per X-ray: 60.79
  - Per X-pert: 178.01
  - Per Gene X-pert: 277.41
  - Per TB identified: 330.41
  - Per TB presumptive: 330.41

**TB Passive Case Finding projects resumed**

- (2021.06-2021.09)
  - Number of participants: 1,782
  - Per initial screening: 16.96
  - Per X-ray: 60.79
  - Per X-pert: 178.01
  - Per Gene X-pert: 277.41
  - Per TB identified: 330.41
  - Per TB presumptive: 330.41

**Projects completed**

- (2021.09-)
  - Number of participants: 1,782
  - Per initial screening: 16.96
  - Per X-ray: 60.79
  - Per X-pert: 178.01
  - Per Gene X-pert: 277.41
  - Per TB identified: 330.41
  - Per TB presumptive: 330.41

**Total Costs**

- **Unit Cost**
  - Per initial screening: 16.96
  - Per X-ray: 60.79
  - Per Gene X-pert: 277.41
  - Per TB identified: 330.41
  - Per TB presumptive: 330.41

**Days of operation**

- **TB Active Case Finding**
  - Per initial screening: 16.96
  - Per X-ray: 60.79
  - Per X-pert: 178.01
  - Per Gene X-pert: 277.41
  - Per TB identified: 330.41
  - Per TB presumptive: 330.41

- **TB Passive Case Finding**
  - Per initial screening: 16.96
  - Per X-ray: 60.79
  - Per X-pert: 178.01
  - Per Gene X-pert: 277.41
  - Per TB identified: 330.41
  - Per TB presumptive: 330.41

**Per X-ray**

- Per X-ray: 60.79
- Per Gene X-pert: 277.41
- Per TB identified: 330.41
- Per TB presumptive: 330.41

---

**Overhead costs (e.g., administrative costs, employees salaries, rents, utility costs, travel costs)**

- **Office and medical supplies**
  - Labor costs for outreach team
    - Total: 88 out of 3981
    - Kok Dong (13 out of 364)
    - Lyca Kran (16 out of 499)
    - Srae Nouy (31 out of 1748)
    - Svay Sa (15 out of 723)
    - Varin (13 out of 647)

- **COVID-19 Personal Protective Equipment**
  - Labor costs for outreach team
    - Total: 32 out of 1602
    - Hospital (8 out of 366)
    - Char Churk (6 out of 413)
    - Nokor Phaus (9 out of 403)
    - Prey Chruk (9 out of 420)

**Apportion Criteria by region**

1. Number of participants
2. Days of operation
3. Daily participants per workforce

**Main analysis**

- 1. Service Delivery Unit Cost
  - Per initial screening
  - Per X-ray
  - Per Gene X-pert
  - Per TB identified

- 2. Total Costs per Cases
  - Per screened
  - Per presumptive
  - Per TB identified
Key definitions used for activity-based costing

<table>
<thead>
<tr>
<th>Phases/period of program &amp; key activities</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Pre-implementation</strong></td>
<td></td>
</tr>
<tr>
<td>1.1 Meeting or workshop</td>
<td>Activities aimed to (a) discuss the progress of the projects among stakeholders (b) train staffs/village workers/government staffs who are temporarily or permanently hired for the implementation program (c) expenses for travel costs, staff per diem, and others (e.g., opening ceremony)</td>
</tr>
<tr>
<td>1.2. Human resources</td>
<td>Labour costs for staff members, clinicians, government staffs, volunteers, and village workers</td>
</tr>
<tr>
<td>1.3. Office and medical supplies</td>
<td>Costs that occurred once to purchase office and medical supplies. All costs are annuitized and does not recur through the operation of program</td>
</tr>
<tr>
<td>1.4. Others</td>
<td>Activities aimed to maintain projects (e.g., office rent, consumable office supplies)</td>
</tr>
<tr>
<td><strong>2. Operation</strong></td>
<td></td>
</tr>
<tr>
<td>2.1. Screening</td>
<td>Activities aimed to target participants of screening and screen TB cases (e.g., participant enrollment, symptom screening)</td>
</tr>
<tr>
<td>2.2. Diagnosis</td>
<td>Activities aimed to identify presumptive TB and diagnosis TB cases (e.g., X-ray, X-pert or other clinical tests). Also includes indirect costs to diagnose cases (e.g., fuel, gas, water, electricity, etc).</td>
</tr>
<tr>
<td>2.3. Monitoring</td>
<td>Activities aimed to monitor screening and diagnosis in community/ or healthcare facilities</td>
</tr>
<tr>
<td><strong>3. Post implementation</strong></td>
<td></td>
</tr>
<tr>
<td>3.1. Transfer</td>
<td>Activities aimed to transfer the programs to the government/or communities (e.g., meeting and staff per diem to discuss transfer)</td>
</tr>
<tr>
<td>3.2. Others</td>
<td>Activities aimed to complete the program (e.g., closing ceremony, etc).</td>
</tr>
</tbody>
</table>

Breakdown of costs by resource category and activities

<table>
<thead>
<tr>
<th>Subgroup analysis</th>
<th>Total</th>
<th>Pre COVID-19</th>
<th>Post COVID-19</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>USD</td>
<td>(%)</td>
<td>USD</td>
</tr>
<tr>
<td><strong>1. Regional direct costs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-1 Pre-implementation</td>
<td>3557 (0.6)</td>
<td>1676 (0.7)</td>
<td>1881 (0.6)</td>
</tr>
<tr>
<td>1-2 Operation</td>
<td>16122 (2.6)</td>
<td>11037 (4.8)</td>
<td>5085 (1.7)</td>
</tr>
<tr>
<td><strong>2. Capital asset</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-1 Medical supplies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-1-1 X-pert</td>
<td>74467 (11.8)</td>
<td>18399 (8.0)</td>
<td>20034 (6.6)</td>
</tr>
<tr>
<td>2-1-2 X-Ray</td>
<td>55868 (8.9)</td>
<td>14588 (6.3)</td>
<td>15885 (5.2)</td>
</tr>
<tr>
<td>2-1-3 Others</td>
<td>14269 (2.3)</td>
<td>3726 (1.6)</td>
<td>4057 (1.3)</td>
</tr>
<tr>
<td>2-2 Office supplies</td>
<td>8386 (1.3)</td>
<td>2190 (1.0)</td>
<td>2384 (0.8)</td>
</tr>
<tr>
<td><strong>3. Other costs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-1 Medical consumable costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X-pert cartridge</td>
<td>19172 (3.0)</td>
<td>13962 (6.1)</td>
<td>5211 (1.7)</td>
</tr>
<tr>
<td>Others (e.g., kits)</td>
<td>3682 (0.6)</td>
<td>1765 (0.8)</td>
<td>1919 (0.6)</td>
</tr>
<tr>
<td>Pre-implementation</td>
<td>134556 (21.4)</td>
<td>64415 (28.0)</td>
<td>70141 (23.1)</td>
</tr>
<tr>
<td>3-2 Pre-COVID</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td>69466 (11.0)</td>
<td>33255 (14.5)</td>
<td>36211 (11.9)</td>
</tr>
<tr>
<td>Consumables</td>
<td>7586 (1.2)</td>
<td>3652 (1.6)</td>
<td>3955 (1.3)</td>
</tr>
<tr>
<td>Pre-implementation</td>
<td>55134 (8.8)</td>
<td>0 (0.0)</td>
<td>30073 (9.9)</td>
</tr>
<tr>
<td>3-3 Post-COVID</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation</td>
<td>37072 (5.9)</td>
<td>0 (0.0)</td>
<td>37072 (12.2)</td>
</tr>
<tr>
<td>Consumables</td>
<td>2872 (0.5)</td>
<td>0 (0.0)</td>
<td>2872 (0.9)</td>
</tr>
<tr>
<td>3-4 Post implementation</td>
<td>127624 (20.3)</td>
<td>61097 (26.6)</td>
<td>66527 (21.9)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>629834 (100.0)</td>
<td>229739 (100.0)</td>
<td>303307 (100.0)</td>
</tr>
</tbody>
</table>

*For cost analysis... Fixed and common costs were annuitized to calculate time-based costs (e.g., cost per/year)

*costs that identify where it is spent (e.g., workshop for village workers)
An overview of the program outputs, service unit costs, and cost-effectiveness ratios

- Screened 5,583 and detected 120 TB patients
- A total of 94 field operational days (45 days pre COVID-19 restrictions)
- Duration of screening days: Longest at 20.5 days (Srae Nouy), shortest at 5 days (Lvea Krang)
- Costs are annualized and assessed as 2020 USD

<table>
<thead>
<tr>
<th></th>
<th>Pre-COVID 19</th>
<th>Post-COVID 19</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation days (A)</td>
<td>45</td>
<td>49</td>
<td>94</td>
</tr>
<tr>
<td>Number of participants (B)</td>
<td>3981</td>
<td>1602</td>
<td>5583</td>
</tr>
<tr>
<td>Number of TB identified (C)</td>
<td>88</td>
<td>32</td>
<td>120</td>
</tr>
<tr>
<td>TB incidence proportion a</td>
<td>45.2</td>
<td>50.1</td>
<td>48.2</td>
</tr>
<tr>
<td>The number needed to screen*</td>
<td>2210.5</td>
<td>1997.5</td>
<td>2149.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Per initial screening</th>
<th>TB detected</th>
<th>Per presumptive TB</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>78.0</td>
<td>77.8</td>
<td>77.0</td>
</tr>
<tr>
<td>B</td>
<td>88.0</td>
<td>88.0</td>
<td>88.0</td>
</tr>
<tr>
<td>C</td>
<td>98.0</td>
<td>98.0</td>
<td>98.0</td>
</tr>
</tbody>
</table>

1. TB incidence proportion (C/B) = new TB cases / screened population X 100,000
2. Number needed to screen (B/C) = total number of screened people / number of TB cases identified

Adjustment to calculate 3-day CERs (Cost per TB case detected)

COST

(Ex) Locality-based ACF operational costs

<table>
<thead>
<tr>
<th></th>
<th>Char Churk</th>
<th>Nkok Pheas</th>
<th>Hospital</th>
<th>Nokor Pheas</th>
<th>Prey Chruk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>1452.8</td>
<td>2185.8</td>
<td>2233.3</td>
<td>7500.0</td>
<td>120</td>
</tr>
<tr>
<td>X-per</td>
<td>1452.8</td>
<td>2185.8</td>
<td>2233.3</td>
<td>7500.0</td>
<td>120</td>
</tr>
<tr>
<td>X-ray</td>
<td>1452.8</td>
<td>2185.8</td>
<td>2233.3</td>
<td>7500.0</td>
<td>120</td>
</tr>
<tr>
<td>Post-implementation</td>
<td>1452.8</td>
<td>2185.8</td>
<td>2233.3</td>
<td>7500.0</td>
<td>120</td>
</tr>
</tbody>
</table>

EFFECTIVENESS

(Ex) Locality-based screening dates

Char Churk
20210714
20210715
20210716
20210719
20210720
20210721
20210722
20210723
20210726
20210727
20210728
20210729

A total of 33 “sets” of 3-day screening and TB case detection data created

Assessment of total 3-day ACF operational costs (annuitized)

3-day CER = Char Churk 1: 3-day screening cohort characteristics
Char Churk 2: 3-day screening cohort characteristics
Char Churk 3: 3-day screening cohort characteristics
Char Churk 4: 3-day screening cohort characteristics
**Volume-based Cost-effectiveness outputs of the CURE–TB ACF**

*Pre vs. Post COVID-19 restrictions*

<table>
<thead>
<tr>
<th>(1) Pre-COVID 19</th>
<th>(2) Post COVID-19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost per NNS</td>
<td>B (95% CI)</td>
</tr>
<tr>
<td></td>
<td>29.767***</td>
</tr>
<tr>
<td></td>
<td>(25.551, 33.984)</td>
</tr>
<tr>
<td></td>
<td>62.967***</td>
</tr>
<tr>
<td></td>
<td>(40.874, 85.060)</td>
</tr>
</tbody>
</table>

***p<0.001, **p<0.01, *p<0.05

Operational adjustment post-COVID-19 restrictions resulted in ~ 3x cost to find one TB patient vs. pre-COVID-19 restriction period.
Cost per TB case detected

Changes in operations due to COVID-19 restrictions resulted in an incremental cost of $59 per screening and $3769 per TB case detected

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control variables adjusted?</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>B (95% CI)</td>
<td>59.8***</td>
<td>59.2***</td>
<td>4036.8***</td>
<td>3769.8*</td>
</tr>
<tr>
<td>(44.0, 75.6)</td>
<td>(36.8, 81.5)</td>
<td>(2312.8, 5760.7)</td>
<td>(852.6, 6687.0)</td>
<td></td>
</tr>
</tbody>
</table>

Note. The results of Column 2 and Column 4 controlled for daily participants' characteristics, including mean age, % of female, and % of TB-related symptoms. ***p<0.001, **p<0.01, *p<0.05

Discussion

- High service unit cost for Xpert testing ($36 per test overall, but as high as $78 per test) was attributable to:
  - Low testing volumes (much lower in post–COVID-19 operations)
  - Use of a total of GX4 machines (excess capacity)
- An assessment of operational efficiency gains (using interrupted times series analysis) pre and post COVID-19 restriction periods did not show difference, rules out operational in-efficiencies as a contributing factor of significant increases in costs and CERs during post–COVID-19 period
Discussion

- Multiple data sources (operations, participant, finance and budget data) to assess costs and cost-effectiveness of the CURE-TB ACF project

- Overall cost to detect ONE TB patient was ~ $1800, but costs and CERs varied considerably by region and day-to-day operations, the characteristics of the screened participants (age, % females, % participants with TB related symptoms), and pre vs. post COVID-19 operations

- An operational shift/change to facility-based case finding strategy (from community-based) resulted in at least 3 times increase in costs to screen (incremental cost of $59) and detect TB patients (incremental cost of $3769), after adjusting for participant level factors

Thank you!
Background:

- In 2000 the R. of Moldova was approved the first National Program for Control and Prophylaxis of Tuberculosis, which led to the national implementation of the Directly Observed Treatment Short Course Chemotherapy (DOTS) also known as directly observed treatment (DOT).
- According to the updated national policy, the patients may benefit from the following treatment options:
  1. community or home-based DOT when the treatment is delivered in the community close to the patient’s home or work.
  2. DOT is administered by specialized healthcare providers in hospitals or specialized services.
  3. video-observed treatment (VOT) synchronous & asynchronous, based on the principle that the staff involved in its performing can observe the administration of the anti-tuberculosis drugs using electronic devices (personal computer, notebook, smartphone with Android system) through a web camera.
- The technology required for VOT is a broadband Internet, availability of an electronic device connected to a specialized VOT platform.
Background

Advantages of VOT:

- can replace the DOT when video communication technology is available and the healthcare providers and the patients are well trained.
- allows evaluation the adherence from distance, avoiding the direct contact of the patient with the healthcare worker.
- VOT is more flexible for patients & health care workers, achieves a higher level of interaction between patients and medical staff, and probably has a lower cost than DOT.

Aim: was to assess the demographic features of patients with pulmonary TB underwent the VOT

Objective 1
Assessment of social-economical, demographic, epidemiologic characteristics of patients with PTB underwent VOT vs DOT

Objective 2
Establishing the main barriers and issues, which characterised patients undewent VOT vs DOT

Identification of the treatment outcome of patients underwent VOT vs DOT

Establishing the recommendations for including patients in VOT
Background:
In 2021, WHO declared Mongolia as one of the 30 countries with a high burden of tuberculosis, the number of tuberculosis cases per 100,000 population is 428. According to a study conducted in 2009, the duration and content of tuberculosis courses were different both in public and private medical schools, and tuberculosis contents are omitted from the curriculum of some medical classes. There is a need to evaluate the "Curriculum of Tuberculosis" including the content, teaching capacity, availability, and accessibility of training materials.

Methodology:
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Results:
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Conclusion:
Due to the difference in the Tuberculosis curriculum, medical students obtain different knowledge and abilities. It is an urgent need to develop and implement a unified standard Tuberculosis curriculum both for State and private Medical Universities to eliminate the gap.

Keywords: Tuberculosis, curriculum, evaluation, medical university, Mongolia
**Distribution of patients according to the residence**

<table>
<thead>
<tr>
<th>Indicators</th>
<th>DOT n=198</th>
<th>VOT n=78</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>urban</td>
<td>112 (56,6)</td>
<td>72 (92,3)</td>
<td>&lt;0,001</td>
</tr>
<tr>
<td>rural</td>
<td>86 (44,5)</td>
<td>6 (7,7)</td>
<td>&lt;0,001</td>
</tr>
<tr>
<td>Lack of the stable place of residence</td>
<td>25 (12,6)</td>
<td>0</td>
<td>&lt;0,05</td>
</tr>
</tbody>
</table>

**Distribution of the patients according to the demographic features**

<table>
<thead>
<tr>
<th>Indicators</th>
<th>DOT n=198</th>
<th>VOT n=78</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low economic state</td>
<td>117 (59,1)</td>
<td>24 (30,8)</td>
<td>&lt;0,001</td>
</tr>
<tr>
<td>Lack of insurance</td>
<td>116 (58,5)</td>
<td>24 (30,8)</td>
<td>&lt;0,001</td>
</tr>
<tr>
<td>Low educational level</td>
<td>118 (59,6)</td>
<td>19 (24,4)</td>
<td>&lt;0,001</td>
</tr>
<tr>
<td>Single matrimonial state</td>
<td>97 (48,5)</td>
<td>67 (33,8)</td>
<td>&gt;0,05</td>
</tr>
<tr>
<td>Poor living conditions</td>
<td>58 (29,3)</td>
<td>20 (11,3)</td>
<td>&lt;0,01</td>
</tr>
<tr>
<td>Homelessness</td>
<td>26 (13,3)</td>
<td>0</td>
<td>&lt;0,05</td>
</tr>
<tr>
<td>Lack of stable residence</td>
<td>25 (12,6)</td>
<td>0</td>
<td>&lt;0,05</td>
</tr>
<tr>
<td>Recent history of migration</td>
<td>21 (10,7)</td>
<td>16 (20,5)</td>
<td>&gt;0,05</td>
</tr>
</tbody>
</table>
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Distribution of the patients according to the barriers and contraindications for performing the VOT

<table>
<thead>
<tr>
<th>Indicators</th>
<th>DOT n=198 N (%)</th>
<th>VOT n=78 N (%)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of detention</td>
<td>7 (3,5)</td>
<td>0</td>
<td>&gt;0,05</td>
</tr>
<tr>
<td>Alcohol abuse</td>
<td>12 (6,1)</td>
<td>0</td>
<td>&gt;0,05</td>
</tr>
<tr>
<td>Active tobacco smoking</td>
<td>141 (71,2)</td>
<td>38 (49,1)</td>
<td>&lt;0,001</td>
</tr>
<tr>
<td>Illicit drug use</td>
<td>1 (0,5)</td>
<td>0</td>
<td>&gt;0,05</td>
</tr>
<tr>
<td>From TB cluster</td>
<td>19 (9,6)</td>
<td>31 (39,7)</td>
<td>&lt;0,001</td>
</tr>
<tr>
<td>Associated diseases</td>
<td>61 (30,8)</td>
<td>31 (36,5)</td>
<td>&gt;0,05</td>
</tr>
<tr>
<td>HIV infection</td>
<td>7 (3,5)</td>
<td>0</td>
<td>&gt;0,05</td>
</tr>
</tbody>
</table>

Distribution of the patients according to the final treatment outcome

VOT - successfully treated - 68 (87,2%) cases, including 38 (48,7%) cured and 30 (58,5%) cases who completed the treatment.
therapeutic failure - 2 (2,6%) patients and lost from follow-up in 5 (6,4%).
Died 3 (3,8%) patients, but no one from the progression of tuberculosis.

DOT - successfully treated -151 (76,3%), including 81 (40,9%) cured and 70 (35,3%) cases completed the treatment.
therapeutic failure - 8 (4,1%) patients and were lost to follow-up 16 (8,1%) patients.
Died 23 (11,6%), from which 18 (9%) due to progression of tuberculosis.
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Advantages of the application for VOT performing

- Exposes the names of the patients underwent and ongoing the VOT.
- Represents the adverse drug reactions declared by the recorded patient.
- Exposed the therapeutic adherence by date and month of the patients attributed to each doctor.
- Allow the extraction of the list of the patients distributed by sex, age groups and district of the residence.
Conclusions

- VOT represents a modality for the anti-TB treatment delivery when certain conditions such as electronic devices and wideband internet are put at the disposition of the patient.
- The advantage of the VOT is that it facilitates the treatment follow-up, but does not replace DOT when patients have contraindications: deep social vulnerability - homeless, mental impairment as a consequence of psychic diseases, alcohol abuse, drug use, HIV infection and location of the patient abroad from the R. Moldova.
- The challenging impact of the complex risk factors on the treatment outcome did no differences significantly in patients treated remotely compared with the patients treated under direct supervision.
- Recommendations: VOT can be implemented at the national level in the actual epidemiological conditions of the Republic of Moldova if supporting measures for patients will be used.
Background:

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MDR/RR TB – Multiple drug resistance tuberculosis/ rifampicin resistance tuberculosis
Background (cont.)

<table>
<thead>
<tr>
<th>Region</th>
<th>Tuberculosis incidence /estimated/ numbers</th>
<th>100 000</th>
<th>Incidence of MDR numbers</th>
<th>100 000</th>
<th>Childhood tuberculosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the world</td>
<td>9.8 сая</td>
<td>127</td>
<td>465 000</td>
<td>6.1</td>
<td>7%</td>
</tr>
<tr>
<td>WPR</td>
<td>1.8 сая</td>
<td>93</td>
<td>101 000</td>
<td>5.2</td>
<td>4%</td>
</tr>
<tr>
<td>Mongolia</td>
<td>14 000</td>
<td>437</td>
<td>1000</td>
<td>32</td>
<td>12%</td>
</tr>
</tbody>
</table>

Background (cont.)

WHO Guidance for the surveillance of DR-TB

Part I Principles of anti-TB drug resistance surveillance

1 Mechanisms of surveillance that produce data representative of a geographically-defined population
   1.1 Continuous surveillance systems based on routine DST
   1.2 Periodic surveys for estimating the burden of drug resistance
   1.3 Sentinel surveillance systems for monitoring trends over time
Background (cont.)

**DRS survey results, Mongolia**

<table>
<thead>
<tr>
<th>Drugs</th>
<th>1999</th>
<th>2007</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New</td>
<td>New</td>
<td>Prev. treated</td>
</tr>
<tr>
<td>Any drug resistance</td>
<td>29.4%</td>
<td>18.5%</td>
<td>46.5%</td>
</tr>
<tr>
<td>H</td>
<td>15.3%</td>
<td>12.6%</td>
<td>36.5%</td>
</tr>
<tr>
<td>R</td>
<td>1.2%</td>
<td>2.2%</td>
<td>31.0%</td>
</tr>
<tr>
<td>S</td>
<td>24.2%</td>
<td>11.5%</td>
<td>33.5%</td>
</tr>
<tr>
<td>E</td>
<td>1.7%</td>
<td>1.7%</td>
<td>22.0%</td>
</tr>
<tr>
<td>HR or MDR-TB</td>
<td>1%</td>
<td>1.4%</td>
<td>27.5%</td>
</tr>
</tbody>
</table>

**WHO Guidance for the surveillance of DR-TB**

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- Countries should aim to test at least **80%** of bacteriologically confirmed new and previously treated TB cases for **rifampicin resistance**.
Methodology

Objective: To assess trend of RR-TB among new and previously treated TB cases.

Data source: Laboratory records on TUBIS system
- Sputum smear
- Xpert MTB/RIF

Study population: Sputum smear positive PTB cases those diagnosed from January 2018 to December 2021 at nationwide.

Variables: lab id, age, gender, TB treatment history, smear results, Xper- MTB/RIF results, date of tests, type of TB, specimen type, lab name, patient address.

Mongolia recently reached 80% of coverage of Xpert MTB/RIF for sputum smear positive PTB cases
**Patient enrolment - overall**

Eligible smear pos: 6056 (new: 5144, prev. treated: 912)

- Xpert MTB/RIF performed:
  - Total: 4382 (72.4%)
  - new: 3778 (73.4%),
  - prev. treated: 604 (66.6%)

- **MTB DETECTED:**
  - Overall: 4306 (98.3%)
  - New: 3717 (98.4%),
  - Prev. treated: 589 (97.5%)

- **MTB NOT DETECTED:**
  - Overall: 76 (1.7%)
  - New: 61 (1.6%),
  - Prev. treated: 15 (2.5%)

- **Rif resistant DETECTED:**
  - Overall: 346 (8.0%)
  - New: 262 (7.0%),
  - Prev. treat: 84 (14.3%)

- **Rif resistant NOT DETECTED:**
  - Overall: 3836 (89.1%)
  - New: 3341 (89.9%),
  - Prev. treat: 495 (84.0%)

- **Missing:**
  - Overall: 124 (2.9%)
  - New: 114 (3.1%),
  - Prev. treat: 10 (1.7%)

---

**Patient enrolment – by history and year**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>New</th>
<th>Prev. treated</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did not tested by Xpert</td>
<td>545</td>
<td>453</td>
<td>260</td>
</tr>
<tr>
<td>Tested by Xpert</td>
<td>1033</td>
<td>1011</td>
<td>887</td>
</tr>
<tr>
<td>MTB not detected</td>
<td>24</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>MTB detected</td>
<td>1009</td>
<td>999</td>
<td>873</td>
</tr>
<tr>
<td>Rif_res</td>
<td>77</td>
<td>77</td>
<td>54</td>
</tr>
<tr>
<td>Rif_res_not</td>
<td>925</td>
<td>859</td>
<td>798</td>
</tr>
<tr>
<td>Missing</td>
<td>7</td>
<td>63</td>
<td>21</td>
</tr>
<tr>
<td>Grand Total</td>
<td>1578</td>
<td>1464</td>
<td>1147</td>
</tr>
</tbody>
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Limitation

- From 2018 to 2021, the overall coverage of Xpert MTB/RIF test was less than 80%.
- LPA 1st line test result did not included in the analysis which may lead under-estimation of RR-TB prevalence, specially among previously treated cases.
- Missing value imputation did not conducted.
- No double entry or cross-checking with paper registry.

Conclusion / Discussion

- The expansion of Xpert MTB/RIF makes it feasible to establish a continuous surveillance system for DR-TB in Mongolia.
- The prevalence of RR-TB among new cases might be increasing since last DRS (but still within 95% confidence interval of prevalence in 2016)
- NTP has to make sure >80% of coverage of Xpert MTB/RIF and/or LPA 1st line testing for all sputum smear positive cases.
- Data quality assurance is one of the key factors.
- In dept analysis is required to getting more precise estimation of RR-TB prevalence.
Thank you for your attention
MEDICAL, ORGANIZATIONAL AND LEGAL ASPECTS OF THE ACTIVITY OF NATIONAL COMMITTEE ON MANAGEMENT OF DRUG-RESISTANT TUBERCULOSIS

Pisarenco S.V. – 1, David A.V. – 1, Manea M.L. – 1, Stanceva M.V. – 2, 
Vo̧losciuc I.V. – 1, Cula E.N. – 1, Pisarenco C.S. – 3

1 – Institute of Phthisiopneumology “Chiril Draganiuc”, Chisinau, Republic of Moldova
2 – Municipal Hospital of Phthisiopneumology, Chisinau, Republic of Moldova
3 – Free International University of Moldova, Chisinau, Republic of Moldova

Incidence of new cases and TB recurrence, TB Mortality in Republic of Moldova, 1990 – 2020 (absolute number and per 100 000 population)

In 2020 compared to 2019 a reduction of 38.7% in notification of TB cases was noted
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Committee on Management of DR-TB

- a multidisciplinary structure (phthisiopneumologists, microbiologist, imagist), with an advisory role in TB case management
- created in 2006 within the Institute of Phthisiopneumology "Chiril Draganiuc"
- 2006-2015 – the Committee's activity focused on the selection of patients with MDR-TB for inclusion in the DOTS plus treatment
- since 2016 – Committee has an advisory role for all DR-TB cases

* Indicates the 10 countries included in the TB list based on incidence per 100,000 population in 2019
Committee on Management of DR-TB

- According to the Ministry of Health of the Republic of Moldova, in order to avoid errors generated by the irrational use of drugs, which can lead to expansion of the spectrum of resistance, and the incorrect development of treatment regimens, all cases of DR-TB, including RR/MDR/XDR-TB, are discussed within the Committee.

- The case is presented to the Committee by the patient’s phthisiopneumologist.

Objectives of the Committee

- to meet weekly or as needed to discuss each case presented to the Committee
- to decide about starting the treatment for DR-TB and to select the place of treatment for each patient
- to select the treatment regimen and duration
- to evaluate the intermediate (every 3 months) and final results of the treatment
- to solve the problems that appeared in the management of DR-TB patients
- to transmit the Committee's decision to the patients' phthisiopneumologists
Related documents for case evaluation

- extract from the medical card (form № 027/e)
- questionnaire (personal data, comorbidities, MTB drug resistance, date of treatment`s initiation)
- patient`s medical record from the hospital and/or from ambulatory (when necessary)
- all of the patient`s chest X-rays and CT
- bacteriological and laboratory results
- document about the patient`s daily treatment
- document about de side effects of the drugs

Thus, patient`s management is ensured according to the recommendations of the National Clinical Protocol and WHO Consolidated Guidelines on DR-TB treatment

- patient-centered approach
- drug safety management
- treatment effectiveness monitoring
Statistics

• According to the Committee, in DR-TB treatment program were included:
  • In 2020:
    • 536 patients
    • New cases – 43.5%
    • Recurrence – 25.2%
    • TB treatment failure – 16.4%
    • Lost to follow-up – 14.9%
    • On average, cases were discussed 6 times, every 3 months or more often.
  • In 2021:
    • 576 patients (23 children)
    • New cases 50.7%
    • Ratio between them, TB recurrence, TB treatment failure, lost to follow-up was 5:1.5:1:1. Most of DR-TB was MDR-TB (43.2%). Ratio between MDR-TB and XDR-TB – 7.3:1.
    • On average, cases were discussed 5.5 times, every 3 months or more often.

Using informational system of TB monitoring and evaluation, telemedicine technologies, increased patient’s care control and continuity.

As a result, an increase in DR-TB treatment effectiveness, patient’s safety was noted.
Conclusion

• Committee on Management of DR-TB is an important element in the management of DR-TB in Republic of Moldova
• Committee uses modern medical and informational technologies
• Its activity is regulated by current legislation
• Improvement of Committee, in particular, by adoption of telemedicine law, will contribute to respect patient’s rights and legal interests

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Radiological screening with high-performance technologies for the respiratory health of the rural population from high risk groups in the Republic of Moldova

S. Alexandru, N. Nalivaico, V. Viic

CHIŞINĂU
2022

Tuberculosis continues to remain a widespread disease and is a public health problem

- The need to intensify anti-tuberculosis activities as a priority component of the primary medical care of the population is conditioned by the late detection of tuberculosis.
- The structure of the clinical forms of tuberculosis: bacillary patients with destruction, with MDR TB, requires priority attention to this particularly important health problem.
AIM

- Optimizing the early detection of tuberculosis in an integrated medical system

- Determining the medico-social criteria for the formation of high risk groups and increased vigilance for tuberculosis disease that will contribute to reducing the burden of tuberculosis in the Republic of Moldova.

METHODS

- The groups with increased risk and vigilance of tuberculosis disease were created and the criteria for identifying the risk factors of people expected for prophylactic examinations were assessed.

- Prophylactic screening examinations for people from high risk groups were carried out at mobile digital radiography complexes.

- Retrospective analysis was carried out using official statistical data on TB epidemiology of the respiratory system, medical documentation, results of clinical-diagnostic investigations of patients.
RESULTS

- The characteristics of unfavorable medico-social factors was evaluated in 18 223 people.

- The criteria for identifying risk factors and increased vigilance for tuberculosis disease in subjects that were subjected to prophylactic radiological examinations were evaluated.

The contingent of people examined prophylactically with the AMIKO/PULMOSCAN mobile digital radiodiagnostic complexes

<table>
<thead>
<tr>
<th>The contingent of risk groups and increased vigilance of tuberculosis disease</th>
<th>Prophylactic examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>18223</td>
</tr>
<tr>
<td>Groups of people with increased risk of tuberculosis related to the medico-biological peculiarities of the body.</td>
<td></td>
</tr>
<tr>
<td>1.1 Associated conditions</td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td>9,1%</td>
</tr>
<tr>
<td>Ulcerative disease of the stomach and duodenum</td>
<td>3,1%</td>
</tr>
<tr>
<td>Non-specific chronic diseases of the respiratory system</td>
<td>4,8%</td>
</tr>
<tr>
<td>Mental illnesses, abuse of alcohol, drugs</td>
<td>7,7%</td>
</tr>
<tr>
<td>HIV infected, AIDS patients</td>
<td>0,1%</td>
</tr>
<tr>
<td>Liver damage</td>
<td>1,9%</td>
</tr>
<tr>
<td>People with compromised immunity</td>
<td>0,1%</td>
</tr>
<tr>
<td>Malnutrition</td>
<td>0,5%</td>
</tr>
<tr>
<td>1.2 People with the sequelae of tuberculosis, carriers of pulmonary fibrotic lesions.</td>
<td>4,5%</td>
</tr>
</tbody>
</table>
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### Keywords
Tuberculosis, curriculum, evaluation, medical university, Mongolia

### Risk Groups
<table>
<thead>
<tr>
<th>2.0 Risk groups exposed to detrimental working or environmental conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1. People who work in a noxious environment, with exposure to active chemical reagents, ionizing radiation, physical or nervous overload.</td>
</tr>
<tr>
<td>2.2. Contacts from the tuberculosis outbreak.</td>
</tr>
<tr>
<td>2.3. Medical personnel.</td>
</tr>
<tr>
<td>2.4. People with inadequate hygienic-sanitary level.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3.0 Risk groups related to social factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1. Unfavorable social persons.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4.0 Groups of people at risk related to deficiencies in the organization of tuberculosis detection.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1. People who have not been radiologically examined for a long time (more than 2-3 years).</td>
</tr>
<tr>
<td>4.2. Contingencies of unorganized population.</td>
</tr>
</tbody>
</table>
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QUALITY OF EXAMINATION OF RISK GROUPS & INDIVIDUALS WITH INCREASED VIGILANCE TB

<table>
<thead>
<tr>
<th>Administrative territories</th>
<th>Risk groups &amp; TB increased vigilance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Planned/% of all population</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Basarabeasca</td>
<td>2410/6.7</td>
</tr>
<tr>
<td>Ștefan Vodă</td>
<td>5355/13.2</td>
</tr>
<tr>
<td>Anenii Noi</td>
<td>11272/13.5</td>
</tr>
<tr>
<td>Criuleni</td>
<td>8494/7.3</td>
</tr>
<tr>
<td>Cahul</td>
<td>9314/7.6</td>
</tr>
<tr>
<td>Fălești</td>
<td>14513/16.2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>52378/10.8</td>
</tr>
</tbody>
</table>

The pathology detected during the prophylactic radiological examinations of the risk groups and increased vigilance of tuberculosis disease during the “SCEENING,” 2018

<table>
<thead>
<tr>
<th>Administrative unit</th>
<th>Number of people examined from risk groups</th>
<th>TB sequelae</th>
<th>BNAR</th>
<th>Radiological signs suggestive for</th>
</tr>
</thead>
</table>
|                     |                                           | Total       | inclusiv | Pulmonary neoplastic processes | Infiltrative pneumonic process | Scleremysem | Pneumofibrosis, Bronchic
tube | CVS diseas | Skeletal / bone patho
dogy | Pathology of the diaphragm, liver |
|                     |                                           | Evolutio
nary pulmonary TB |          |                             |                             |              |                              |            |                          |                                    |
| Criuleni            | 4045/508                                 | 160         | 180     | 83   | 97 | 37 | 56 | 93 | 50 | 110 | 21 | 9 |
| Fălești             | 5140/538                                 | 171         | 199     | 99   | 223| 63 | 36 | 196| 79 | 102 | 22 | 6 |
| Ștefan Vodă         | 4922/513                                 | 145         | 199     | 89   | 110| 66 | 56 | 188| 59 | 103 | 13 | 2 |
| Basarabea Sca      | 2510/280                                 | 51          | 104     | 17   | 87 | 20 | 37 | 67 | 35 | 86 | 4 | 2 |
| Cahul              | 2198/233                                 | 63          | 70      | 20   | 50 | 21 | 34 | 36 | 33 | 55 | 19 | 2 |
| Anenii Noi         | 1855/168                                 | 57          | 88      | 31   | 57 | 12 | 11 | 58 | 24 | 45 | 5 | 1 |
| TOTAL              | 20670/2240                               | 647         | 963     | 339  | 624| 219| 230| 638| 280| 501| 91 | 22 |
|                    |                                           | 3.13 | 4.7   | 1.7 | 3.0 | 1.1 | 1.1 | 3.1 | 1.4 | 2.4 | 0.5 | 0.1 |
The pathology detected during the prophylactic radiological examinations of the risk groups and increased vigilance of tuberculosis disease during the "SCEENING" 2018-2019

<table>
<thead>
<tr>
<th>Years</th>
<th>Number of people examined from risk groups</th>
<th>Radiological signs suggestive for</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Evolutinary pulmonaty TB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>20670/2240</td>
<td>647</td>
</tr>
<tr>
<td>2019</td>
<td>34223/3997</td>
<td>1067</td>
</tr>
<tr>
<td>TOTAL</td>
<td>54893/6237</td>
<td>1714</td>
</tr>
<tr>
<td>%</td>
<td>11,4%</td>
<td>3,1</td>
</tr>
</tbody>
</table>

Prophylactic radiological examination of groups at increased risk of tuberculosis

<table>
<thead>
<tr>
<th>NR of persons examined</th>
<th>Suggestive radiological changes of pulmonary TB</th>
<th>Confirmed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Active pulmonary TB</td>
<td>Sequelea of pulmonary TB</td>
</tr>
<tr>
<td>20670</td>
<td>647</td>
<td>92</td>
</tr>
<tr>
<td>%</td>
<td>3,1</td>
<td>14,2</td>
</tr>
<tr>
<td></td>
<td>75,6</td>
<td></td>
</tr>
</tbody>
</table>
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Prophylactic radiological examination of groups at increased risk of tuberculosis

<table>
<thead>
<tr>
<th>NR of persons examined</th>
<th>Suggestive radiological changes pulmonary TB</th>
<th>Sequelae of pulmonary TB</th>
<th>Including</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Large</td>
<td>Small</td>
</tr>
<tr>
<td>20670</td>
<td>1360</td>
<td>471</td>
<td>889</td>
</tr>
<tr>
<td></td>
<td>6,6%</td>
<td>2,3%</td>
<td>4,3%</td>
</tr>
<tr>
<td>%00</td>
<td>65,8</td>
<td>22,8</td>
<td>43,0</td>
</tr>
</tbody>
</table>

Prophylactic radiological examination of groups at increased risk of tuberculosis

<table>
<thead>
<tr>
<th>Number of examined subjects</th>
<th>Suggestive radiological changes:</th>
<th>Non-specific diseases of the respiratory system</th>
<th>Fibrotic lung changes</th>
<th>Scler...</th>
<th>Pathology of the diaphragm (diaphragmatic hiatal hernias)</th>
<th>Skeletal pathology</th>
</tr>
</thead>
<tbody>
<tr>
<td>20670</td>
<td></td>
<td>230</td>
<td>918</td>
<td>501</td>
<td>22</td>
<td>91</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,1%</td>
<td>4,4%</td>
<td>2,4%</td>
<td>0,1%</td>
<td>0,5%</td>
</tr>
<tr>
<td>%00</td>
<td></td>
<td>11,1</td>
<td>44,4</td>
<td>24,2</td>
<td>1,1</td>
<td>4,4</td>
</tr>
</tbody>
</table>
Detection of tuberculosis

<table>
<thead>
<tr>
<th>YEAR</th>
<th>New TB cases</th>
<th>Including:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>For prophylactic purposes</td>
<td>Due to patient presentation</td>
</tr>
<tr>
<td>2018</td>
<td>2451</td>
<td>975 / 39.8%</td>
<td>1476 / 60.2%</td>
</tr>
<tr>
<td>2019</td>
<td>2279</td>
<td>836 / 36.7%</td>
<td>1443 / 63.3%</td>
</tr>
<tr>
<td>2020</td>
<td>1376</td>
<td>452 / 33.0%</td>
<td>924 / 67.0%</td>
</tr>
<tr>
<td>2021</td>
<td>1616</td>
<td>550 / 34.0%</td>
<td>1066 / 66.0%</td>
</tr>
</tbody>
</table>

DETECTION OF NEW AND RECURRENT CASES OF PULMONARY TB

<table>
<thead>
<tr>
<th>Anul</th>
<th>New case and relapses of pulmonary TB</th>
<th>Detected for prophylactic purposes</th>
<th>Detected after patient presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>2731</td>
<td>1023 / 37.5%</td>
<td>1668 / 61.1%</td>
</tr>
<tr>
<td>2019</td>
<td>2605</td>
<td>901 / 34.6%</td>
<td>1680 / 64.5%</td>
</tr>
<tr>
<td>2020</td>
<td>1628</td>
<td>505 / 31.0%</td>
<td>1108 / 68.1%</td>
</tr>
<tr>
<td>2021</td>
<td>1872</td>
<td>582 / 31.1%</td>
<td>1273 / 68.0%</td>
</tr>
</tbody>
</table>
Detection of tuberculosis

<table>
<thead>
<tr>
<th>Detection methods</th>
<th>TOTAL</th>
<th>Due to patient presentation</th>
<th>With the purpose of examination &quot;targeted&quot; at high risk groups</th>
<th>Including: Mobile digital radiodiagnostic complexes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active pulmonary TB</td>
<td>357</td>
<td>181 (50.7%)</td>
<td>176 (49.3%)</td>
<td>92 (52.3%)</td>
</tr>
<tr>
<td>Of them active pulmonary TB</td>
<td>294 (82.4%)</td>
<td>125 (42.5%)</td>
<td>169 (57.4%)</td>
<td>85 (50.3%)</td>
</tr>
<tr>
<td>TB relapses</td>
<td>63 (17.6)</td>
<td>56 (88.9%)</td>
<td>7 (11.1%)</td>
<td>7 (11.1%)</td>
</tr>
</tbody>
</table>

### Health Minister Detection of tuberculosis

<table>
<thead>
<tr>
<th>New case</th>
<th>Address</th>
<th>Prophylactic examinations</th>
</tr>
</thead>
<tbody>
<tr>
<td>64%</td>
<td>36%</td>
<td></td>
</tr>
<tr>
<td>67%</td>
<td>33%</td>
<td></td>
</tr>
</tbody>
</table>

### The contingent of people examined prophylactically with mobile digital radiodiagnostic complexes

**Detected with pulmonary tuberculosis through prophylactic examinations**: 176/92

**Existence of predisposing diseases**

- Non-specific chronic diseases of the respiratory system: 13.1%
- Mental illnesses, abuse of alcohol, drugs: 40.7%
- Hepatic lesions: 11.3%
- Malnutrition: 11.9%
- People with the sequelae of tuberculosis, carriers of pulmonary fibrotic lesions: 34.7%
- Harmful working and environmental conditions - people with inadequate hygienic-sanitary level: 45.4%
- Groups of people at risk related to deficiencies in the organization of tuberculosis detection: 49.4%
Background: In 2021, WHO declared Mongolia as one of the 30 countries with a high burden of tuberculosis, the number of tuberculosis cases per 100,000 population is 428. According to a study conducted in 2009, the duration and content of tuberculosis courses were different both in public and private medical schools, and tuberculosis contents are omitted from the curriculum of some medical classes. There is a need to evaluate the "Curriculum of Tuberculosis" including the content, teaching capacity, availability, and accessibility of training materials.

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Global incidence of tuberculosis

Incidence of pulmonary tuberculosis
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The structure of clinical forms of evolving tuberculosis (from new cases) in the years 1997-2018

The structure of clinical forms of evolving pulmonary tuberculosis 2018
Conclusions

- The main objective of the screening was to ensure early "targeted" digital radiological detection of groups with increased risk and vigilance of pulmonary tuberculosis disease in certain territories and communities with increased epidemiological potential of tuberculosis.

- One of the key principles of TB screening was to properly target high-risk groups and adapt it according to each specific situation, depending on the epidemiological and social conditions.

Conclusions

- Digital radiography is one of the most efficient and cost-effective methods of preventive examinations.
- The average individual dose (0.433 mSv) is well below the admissible limit (1 mSv), established by national, European and international legislation, and much lower than the average annual dose per capita, associated with natural radiation (2.48 mSv/year).
- The (theoretical) risk associated with the collective dose (19 om x SV) from digital radiography for 20670 investigated persons is negligible, compared to the diagnostic value of the method in detecting early pathologies.
- The stored information on the results of the digital radiological examination does not require additional space, can be kept indefinitely and can be compared with previous radiographs.
Conclusions

- The composition of the risk groups in the examined administrative territories are not constant and have been subjected to permanent changes, a fact that required the modification and improvement of tuberculosis detection activities depending on the epidemiological and socio-economic situation in the field.
- The integration of anti-tuberculosis actions into the activity of the entire medical-sanitary network determines the priorities for preventing and combating tuberculosis in certain territories with increased epidemiological potential.
- The family doctor is the first person who has direct contact with a tuberculosis suspect, and the primary role consists in identifying people from groups at risk and increased vigilance of pulmonary tuberculosis.

Conclusions

- Optimizing the intersectoral collaboration of the phthisiopneumology service with the primary health care service in the timely detection of pulmonary tuberculosis together with public health specialists in carrying out control measures of anti-epidemic activities in tuberculosis outbreaks.
Conclusions

The preventive priorities in TB control require the following activities:

- Optimizing work with groups at increased risk of illness;
- Strengthening the activities of health education and culture of the population;
- Ensuring effective monitoring of TB control activities;
- Training of civil society organizations (public organizations, NGOs) in the implementation of national control programs for this disease.

Thank you for your attention!
The trend of Children TB in Mongolia: Exponential regression analysis

Oyunchimeg Erdenee, MD, Ph.D.,
Head of TB Surveillance and Research Department,
National Center for Communicable Diseases,
Mongolia

September 16 2022

Global target
End TB 2030 strategy – “A world free of tuberculosis”

<table>
<thead>
<tr>
<th>INDICATORS</th>
<th>2015</th>
<th>2025</th>
<th>2035</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction of TB deaths</td>
<td>1.5 million</td>
<td>75% (&lt;350,000)</td>
<td>95%</td>
</tr>
<tr>
<td>Reduction in TB incidence rate</td>
<td>112/100,000</td>
<td>50% (&lt; 55/100,000)</td>
<td>90%</td>
</tr>
<tr>
<td>TB affected families facing catastrophic costs (%)</td>
<td>47%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

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1.4 million people died from TB in 2019. 10 million people fell ill with TB, including 1.2 million children in 2019.

TB is the most deadly communicable disease

1.4 million people died from TB in 2019.
10 million people fell ill with TB, including 1.2 million children in 2019.

Childhood TB in the world

- 67 million children are estimated to be infected with Mycobacterium TB.\(^1\)
  - Only 40% of TB infected children are reported. \(^1\)
- 23% of children with household contact being treated. \(^2\)

Childhood TB reflects recent transmission, and main reservoir of the probable future cases.

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Childhood TB situation in Mongolia

99.6% of BCG vaccination within 24 hours of birth.
BUT
~ 400 new childhood TB cases every year
(11.0% of total TB)

Possible problems:
1. No specific interventions against tuberculosis in 0 – 14 age group.
2. No data on childhood TB:
   - Researchers focus on adult TB and MDR/RR TB.
   - Health indicators do not show trends and estimations.
   - Latent tuberculosis and preventive treatment percentage unknown.
   - Possibility of underdiagnosed.


Research objective

• To describe the characteristics of childhood TB in Mongolia
• To show the trends and estimates of childhood TB in Mongolia

Understanding current trend and future estimation of TB provide greater impact on planning.
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Keywords: Tuberculosis, curriculum, evaluation, medical university, Mongolia

Data Method

RESULTS
### Characteristics of childhood TB in Mongolia, 2010 – 2020

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>n (%)</td>
<td>4,242</td>
<td>364</td>
<td>370</td>
<td>311</td>
<td>359</td>
<td>385</td>
<td>421</td>
<td>516</td>
<td>424</td>
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<td>382</td>
<td>397</td>
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<td>Total of Child TB cases</td>
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<td>(100.0)</td>
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<td>8 – 14</td>
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<td>5 – 14</td>
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<td>254</td>
<td>375</td>
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<td>269</td>
<td>285</td>
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</tr>
<tr>
<td>Male</td>
<td>2,111</td>
<td>196</td>
<td>202</td>
<td>159</td>
<td>174</td>
<td>193</td>
<td>202</td>
<td>246</td>
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<td>194</td>
<td>191</td>
</tr>
<tr>
<td>Female</td>
<td>2,131</td>
<td>188</td>
<td>168</td>
<td>152</td>
<td>185</td>
<td>192</td>
<td>219</td>
<td>270</td>
<td>229</td>
<td>134</td>
<td>188</td>
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<td></td>
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<td>PTB</td>
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<td>188</td>
<td>146</td>
<td>171</td>
<td>100</td>
<td>65</td>
<td>74</td>
<td>60</td>
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<td>60</td>
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<tr>
<td>EPTB</td>
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<td>188</td>
<td>285</td>
<td>356</td>
<td>442</td>
<td>364</td>
<td>237</td>
<td>293</td>
<td>337</td>
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<td>MDR TB</td>
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<td>14</td>
<td>15</td>
<td>13</td>
<td>21</td>
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<td>Mortality</td>
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<td>1</td>
<td>0</td>
<td>3</td>
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<td>1</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

### Childhood TB trend and percentages, 2010 – 2020

Tuberculosis were abundant among school age children, and extra-pulmonary form were predominant.

Childhood tuberculosis trend showed peak in 2016, and resurged again since 2018. The average childhood TB percentage were 9.9% (± 1.5) in the observation period.
Background: In 2021, WHO declared Mongolia as one of the 30 countries with a high burden of tuberculosis, the number of tuberculosis cases per 100,000 population is 428. According to a study conducted in 2009, the duration and content of tuberculosis courses were different both in public and private medical schools, and tuberculosis contents are omitted from the curriculum of some medical classes. There is a need to evaluate the “Curriculum of Tuberculosis” including the content, teaching capacity, availability, and accessibility of training materials.

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Extra-pulmonary tuberculosis cases were become predominant type since 2014, and showed increasing trend since 2018.

Childhood TB trend by types, 2010 – 2020

Extra-pulmonary tuberculosis cases were become predominant type since 2014, and showed increasing trend since 2018.

Childhood TB burden in different regions, 2010 – 2020

The Central region accounted for the majority of childhood TB cases, including Ulaanbaatar, a capital city being most disease burdened.
**Background:**
In 2021, WHO declared Mongolia as one of the 30 countries with a high burden of tuberculosis, the number of tuberculosis cases per 100,000 population is 428. According to a study conducted in 2009, the duration and content of tuberculosis courses were different both in public and private medical schools, and tuberculosis contents are omitted from the curriculum of some medical classes. There is a need to evaluate the “Curriculum of Tuberculosis” including the content, teaching capacity, availability, and accessibility of training materials.

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**Childhood TB burden in different regions, 2010 – 2020**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nationwide</td>
<td>384</td>
<td>370</td>
<td>311</td>
<td>359</td>
<td>385</td>
<td>421</td>
<td>516</td>
<td>424</td>
<td>293</td>
<td>382</td>
<td>397</td>
<td>4,242</td>
<td>100.0</td>
</tr>
<tr>
<td>Central region</td>
<td>280</td>
<td>259</td>
<td>235</td>
<td>278</td>
<td>322</td>
<td>340</td>
<td>456</td>
<td>362</td>
<td>239</td>
<td>323</td>
<td>350</td>
<td>3,442</td>
<td>81.2</td>
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<td>Ulaanbaatar (capital city)</td>
<td>218</td>
<td>205</td>
<td>182</td>
<td>227</td>
<td>265</td>
<td>266</td>
<td>397</td>
<td>308</td>
<td>196</td>
<td>262</td>
<td>313</td>
<td>2,839</td>
<td>66.9</td>
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<tr>
<td>Songinokhairkhan district</td>
<td>52</td>
<td>52</td>
<td>31</td>
<td>59</td>
<td>55</td>
<td>50</td>
<td>121</td>
<td>68</td>
<td>31</td>
<td>73</td>
<td>92</td>
<td>684</td>
<td>16.1</td>
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<tr>
<td>Bayanzurkh district</td>
<td>44</td>
<td>32</td>
<td>49</td>
<td>53</td>
<td>79</td>
<td>101</td>
<td>66</td>
<td>38</td>
<td>84</td>
<td>668</td>
<td>15.7</td>
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<tr>
<td>Bayangol district</td>
<td>26</td>
<td>20</td>
<td>26</td>
<td>39</td>
<td>48</td>
<td>57</td>
<td>76</td>
<td>69</td>
<td>53</td>
<td>44</td>
<td>46</td>
<td>504</td>
<td>11.9</td>
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<tr>
<td>Chingeltei district</td>
<td>53</td>
<td>51</td>
<td>36</td>
<td>34</td>
<td>30</td>
<td>33</td>
<td>42</td>
<td>33</td>
<td>30</td>
<td>38</td>
<td>415</td>
<td>11.9</td>
<td></td>
</tr>
<tr>
<td>Khan-Uul district</td>
<td>23</td>
<td>23</td>
<td>18</td>
<td>11</td>
<td>25</td>
<td>37</td>
<td>38</td>
<td>34</td>
<td>18</td>
<td>28</td>
<td>291</td>
<td>6.9</td>
<td></td>
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<tr>
<td>Sukhbaatar district</td>
<td>12</td>
<td>12</td>
<td>17</td>
<td>19</td>
<td>17</td>
<td>21</td>
<td>19</td>
<td>24</td>
<td>19</td>
<td>8</td>
<td>14</td>
<td>182</td>
<td>4.3</td>
</tr>
<tr>
<td>Nalaikh district</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>9</td>
<td>8</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>6</td>
<td>11</td>
<td>68</td>
<td>1.6</td>
</tr>
<tr>
<td>Baganuur district</td>
<td>4</td>
<td>9</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>22</td>
<td>0.5</td>
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<tr>
<td>Bagakhangai district</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>0.1</td>
<td></td>
</tr>
</tbody>
</table>

The capital city and its districts level data are shown in the table.

In the Ulaanbaatar city, the urban area had a high number of childhood TB cases, while suburban area cumulatively accounted for only 2.2% of all cases.

---

**2010 – 2020 trends and 2021 – 2030 estimates of childhood TB**

![Graph A: Central region](image)

![Graph B: Other regions](image)

The number of childhood tuberculosis cases in the central region estimated to continue to increase. In other regions TB estimated to continue to decrease.
DISCUSSION

Prevalence of childhood TB among age subgroups

- In this study:
  68.5% (± 4.1%) of the total childhood TB cases during 2014 – 2020 were 5 – 14 years old children.
- Other studies:
  1. Children (5 – 14 years) with TB 53.0 – 75.0% (Yerramsetti et al., 2021).
  2. TB diagnostic sensitivity is higher in children age 5 – 14 years old (Kunkel et al., 2016).

These studies and our results suggest that TB infection and illness are prevalent in this age group (5 – 14 years old). Social exposure (extra curricular activities, school attending, classmate number) could be a contributing factor.
Childhood TB diagnosis and TB types

➢ In this study:
   Childhood EPTB percentage increased.

➢ Other studies:
   EPTB, 20.0 – 30.0% of all cases (WHO, 2014)
   China 72.1% (Wang et al., 2020)
   Pakistan 23.0% (Tahseen et al., 2020)

EPTB frequently occurred in children, due to the high risk of lymphohematogenous spread.

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Childhood EPTB percentage of all cases</td>
<td>50.8%</td>
<td>84.9%</td>
</tr>
</tbody>
</table>

The high percentage of extrapulmonary TB is probably observed; due to over diagnosing, and lack of preventive treatment for latent cases that may potentially develop into active extrapulmonary TB.

Childhood TB regional difference, trend and estimations

➢ In this study:
   High populated districts and provinces tend to have high number of childhood TB cases.

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population density (Ulaanbaatar)</td>
<td>253.8/km²</td>
<td>339.8/km²</td>
</tr>
<tr>
<td>Childhood TB numbers (Ulaanbaatar)</td>
<td>218</td>
<td>313</td>
</tr>
</tbody>
</table>

➢ Other studies: (Kanchan et al. 2015; Wang et al. 2019; Wardani and Wahono 2020)

➢ Population density is one of the factors that affect the prevalence of childhood TB, because:
   • higher TB transmission rate
   • higher number of children in one classroom
   • socioeconomic disparities
   • (population density, poor family proportion, hygiene)

The high populated density may impacts the consistent high childhood TB number in Mongolia.
### Childhood TB incidence rate ratio in different regions, 2010 – 2020

<table>
<thead>
<tr>
<th>Year</th>
<th>Childhood TB incidence rate per 100,000 children</th>
<th>Incidence rate ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Central region</td>
<td>Other regions</td>
</tr>
<tr>
<td>2010</td>
<td>68.4</td>
<td>33.3</td>
</tr>
<tr>
<td>2011</td>
<td>61.0</td>
<td>35.5</td>
</tr>
<tr>
<td>2012</td>
<td>52.4</td>
<td>24.1</td>
</tr>
<tr>
<td>2013</td>
<td>58.7</td>
<td>25.5</td>
</tr>
<tr>
<td>2014</td>
<td>66.3</td>
<td>18.6</td>
</tr>
<tr>
<td>2015</td>
<td>62.9</td>
<td>22.6</td>
</tr>
<tr>
<td></td>
<td>Central region</td>
<td>Other regions</td>
</tr>
<tr>
<td>2016</td>
<td>82.7</td>
<td>16.6</td>
</tr>
<tr>
<td>2017</td>
<td>63.1</td>
<td>16.6</td>
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<tr>
<td>2018</td>
<td>39.2</td>
<td>14.0</td>
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<tr>
<td>2019</td>
<td>50.9</td>
<td>15.1</td>
</tr>
<tr>
<td>2020</td>
<td>53.3</td>
<td>11.7</td>
</tr>
</tbody>
</table>

The ratio of the incidence rate in the central region to the other regions was increased.

### Childhood TB regional difference, trend and estimations

- In this study:
  Our trend estimation analysis revealed that number of cases of childhood TB in the central region are likely to continuously increase.

- Other studies:
  - Nigeria, China and Brazil showed an increasing trend the same study period.
  - In developed countries: (Cowger et al. 2019; Gafar et al. 2020).
    - Decreasing TB trend observed
    - Foreign born immigrants had stable TB trend

We assume that regional difference of the TB estimation maybe due to the differences in population density, high TB contact, air pollution and/or poverty.
Conclusion

Our findings showed the differences in the pattern between regions:

• The childhood tuberculosis trend in Central region estimated to be increase
• Other regions estimated to be decreased

Further studies are needed:

1. To identify the determinant factors of regional differences
2. Age-specific public health interventions, such as scale-up screening
3. Preventive treatments are in demand in high–prevalence areas.

Acknowledgement

We would like to thank to ALL:

• Study Team members
• TB Research and Surveillance Department and NCCD
• Public Health Department, Gunma University, Japan
• WHO Country office, Mongolia
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BACKGROUND

- Tuberculosis (TB) in children is of primary genesis - represents the response of the macroorganism to the first contact with the source of infection
- Frequently in children Latent TB Infection (LTBI) develops
- In some conditions LTBI progresses to TB disease
- presence of primary immunodeficiency (PID)- one of the decisive factors in the evolution of TB infection

BACKGROUND

- Genetic correlations of TB susceptibility derive from the functionality of TB protection mechanisms: innate and acquired immune response
- The identification of children at high risk for TB is essential and can be achieved by assessing the presence of criteria for PID
- The presence of PID can be a predictor of severe evolution of TB in children
**Aim**: Studying of the clinical evolution, diagnostic and treatment of TB in children with PID criteria

40 new cases of TB in children were analyzed between January 2020 and December 2021, selected based on a result of the IDR score ≥ 6 (Immunodeficiency disease related score), considered as a significant threshold value for the suspicion of a PID condition.
## Immunodeficiency disease related score – IDR score

<table>
<thead>
<tr>
<th>№</th>
<th>Criteria</th>
<th>Score</th>
<th>№</th>
<th>Criteria</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pneumonia, organism unknown</td>
<td>3</td>
<td>20</td>
<td>Malabsorption</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Bacterial pneumonia</td>
<td>3</td>
<td>21</td>
<td>Giardiasis</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Septicemia</td>
<td>3</td>
<td>22</td>
<td>Autoimmune hemolytic anemia</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Emphyema</td>
<td>3</td>
<td>23</td>
<td>Chronic bronchitis</td>
<td>1</td>
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<tr>
<td>5</td>
<td>Bronchiectasis</td>
<td>3</td>
<td>24</td>
<td>Chronic sinusitis</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Osteomyelitis</td>
<td>3</td>
<td>25</td>
<td>Chronic otitis media</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Other abscesses</td>
<td>3</td>
<td>26</td>
<td>Chronic diarrhea</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>Aseptic meningitis</td>
<td>3</td>
<td>27</td>
<td>Acute bronchitis</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Splenic abscesses</td>
<td>3</td>
<td>28</td>
<td>Acute sinusitis</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Chronic mastoiditis</td>
<td>3</td>
<td>29</td>
<td>Fever of unknown origin</td>
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<tr>
<td>11</td>
<td>Bacterial meningitis</td>
<td>3</td>
<td>30</td>
<td>Cutaneous candidiasis</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>Liver abscesses</td>
<td>3</td>
<td>31</td>
<td>Suppurative otitis media</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>Lung abscesses</td>
<td>3</td>
<td>32</td>
<td>Failure to thrive</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>Lymphopenia</td>
<td>2</td>
<td>33</td>
<td>Thrush</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>Cellulitis</td>
<td>2</td>
<td>34</td>
<td>Limphadenitis</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>Granulocytopenia</td>
<td>2</td>
<td>35</td>
<td>Gastroenteritis</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td>Splenomegaly</td>
<td>2</td>
<td>36</td>
<td>Mycosis</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
<td>Peripheral lymphadenopathy</td>
<td>2</td>
<td>37</td>
<td>Acute otitis media</td>
<td>1</td>
</tr>
<tr>
<td>19</td>
<td>Immune thrombocytopenia</td>
<td>2</td>
<td>38</td>
<td>Abnormal weight loss</td>
<td>1</td>
</tr>
</tbody>
</table>

### Results
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Conclusions

- Tuberculosis in children in the presence of PID criteria has the following characteristics:
  - is diagnosed more frequently at an early age
  - pulmonary forms develop more frequently
  - complications are more frequent and more serious

"NICOLAE TESTEMITANU" STATE UNIVERSITY OF MEDICINE AND PHARMACY

THANK YOU!
Background

The three global lists of high-burden countries for TB, HIV-associated TB and MDR/RR-TB to be used by WHO in the period 2021-2025, and their areas of overlap

- In 2021, WHO named Mongolia as one of the 30 countries with the highest burden of tuberculosis.1

1Global TB Report, WHO, 2021
Background

- In 2020, an estimated 10 million people developed TB and 1.5 million died from the disease. About 500,000 new cases of multidrug or rifampicin-resistant tuberculosis (MDR/RR-TB), 10,800 XDR-TB cases are estimated to emerge each year.¹
- In Mongolia, from 2008 to 2018, the average rate of RR/MDR-TB treatment success is 68.2%, 11.8% death, 7.1% failed treatment, and 12.1% was loss of follow-up.²
- In recent years, the success rate of Drug-resistant TB treatment has increased slightly, but the proportion of cases lost to follow-up and failed treatment rates tends to increase.²

References:

¹Global TB Report, WHO, 2020
²B. Buyankhishig et al, The 3rd National surveillance study on Drug-resistant TB in Mongolia, 2016-2017
**Purpose, objectives**

**Goal:**
Evaluate the treatment successes of XDR-TB cases treatment in Mongolia

**Objectives:**
1. Investigating the previous treatment history of XDR-TB cases
2. To evaluate the outcomes of treatment of XDR-TB

**Methods**
- In the study, we sampled 24 cases of XDR-TB, from TB surveillance and Research Department in the years 2016-2019 was collected and recorded in the medical history and reports.
- We used records that epidemiologic histories, treatment card, TB-03 form.
- Statistical analysis was done using SPSS 23.0
Research results:
Socio-demographic indicators

By age group:
16.67% were 14-24 years old
54.2% were 25-34 years old.
16.67% were 35-44 years old
2.5% were over 50 years old.
The majority were working age cases.

Previous treatment history
As for the condition of XDR-TB in the previous treatment history, 71.17% (19/24) were MDR-TB treatment failure, while 12.5% (5/24) were diagnosed primary resistance and 8.3% (3/24) were diagnosed after treatment failure of susceptible TB.
Outcomes of treatment of XDR-TB cases:

- Cured: 29.2% (7/24)
- Follow-up lost: 4.2% (1/24)
- Completed: 8.3% (2/24)
- Failed treatment: 20.8% (5/24)
- Died: 37.5% (9/24)

Regimes and their outcomes:

<table>
<thead>
<tr>
<th>№</th>
<th>Regimens</th>
<th>Cured</th>
<th>Completed</th>
<th>FU lost</th>
<th>Failed</th>
<th>Dead</th>
<th>Enrollments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mpm-Amx/Clv-Cfz-Mfx-Pto-Hh-Z</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>Km-Z-Mfx-Pto-Cfz-Hh-Pas</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Bdq-Cfz-Lzd- Mpm-Amx/Clv-Cm-Z</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Bdq-Cfz-Lzd-Pto-Z-Hh</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>Lzd-Cfz-Lfx-Hh-Z</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Total (%)

<table>
<thead>
<tr>
<th></th>
<th>Cured</th>
<th>Completed</th>
<th>FU lost</th>
<th>Failed</th>
<th>Dead</th>
<th>Enrollments</th>
</tr>
</thead>
<tbody>
<tr>
<td>(29.16)</td>
<td>(8.3)</td>
<td>(4.16)</td>
<td>(20.8)</td>
<td>(37.5)</td>
<td>(100)</td>
<td></td>
</tr>
</tbody>
</table>
Regimes and their outcomes:

Chart 2.

<table>
<thead>
<tr>
<th>Count</th>
<th>BDQ contained</th>
<th>NoBDQ contained</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>5</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>19</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>15</td>
<td>24</td>
<td></td>
</tr>
</tbody>
</table>

Chi-Square Tests

<table>
<thead>
<tr>
<th>Value</th>
<th>df</th>
<th>Approximate Significance (D=0.05)</th>
<th>Exact Sig. (2- sided)</th>
<th>Exact Sig. (1- sided)</th>
<th>Point Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>4.444*</td>
<td>1</td>
<td>0.035</td>
<td>0.049</td>
<td>0.045</td>
</tr>
<tr>
<td>Continuity Correction</td>
<td>2.844</td>
<td>1</td>
<td>0.093</td>
<td>0.093</td>
<td>0.045</td>
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<tr>
<td>Likelihood Ratio</td>
<td>4.641</td>
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<td>0.031</td>
<td>0.031</td>
<td>0.045</td>
</tr>
<tr>
<td>Fisher’s Exact Test</td>
<td>0.059</td>
<td>0.059</td>
<td>0.059</td>
<td>0.059</td>
<td>0.046</td>
</tr>
</tbody>
</table>

Regimes and their outcomes:

There are no statistical significant difference (r=0.089) between BDQ contained and other treatment groups.

Conclusion

1. 79.17% (19/24) of the studied cases had previously treatment history including failed and follow-up lost of drug-resistant TB treatment, then MDR-TB became XDR-TB, which indicates the need to improve MDR-TB treatment follow-up.

2. The treatment success of the XDR-TB rate was 37.5% (9/24 cases). The introduction of bedaquiline in the treatment regimen of multidrug-resistant tuberculosis improved treatment outcomes, but no statistically significant difference was observed compared to the group without bedaquiline.
Discussion

- In 1999, The Union noted that the main cause of drug-resistance of TB is weak control of treatment.¹

- In 1999, 2007, and 2016, a National surveillance study of TB drug-resistance was organized in Mongolia. According to the first study, the proportion of MDR-TB among newly registered TB cases was 1.0% in 2007, 1.4% in 2007, and 5.3% in 2016, which immediately increased 3.8 times.²


²B.Buyankhishig et al, The 3rd National surveillance study on Drug-resistant TB in Mongolia, 2016-2017


Discussion

- Among previously treated cases, the incidence of RR/MDR-TB decreased 1.7-fold from 27.5% in 2007 to 16.5% in 2016. In these results, resistance to fluoroquinolines and injectables was 9.8% among new cases and 4.5% among previously treated cases. The prevalence of XDR-TB among new cases of MDR-TB was 4.9% (95% CI: 1.0%-13.7%).¹

- Only ~50% of patients with MDR-TB and ~20% withXDR-TB have favourable outcomes with regimens not including bedaquiline and linezolid.², ³, ⁴

- Starting in March 2021, the BPaL regimen has been implemented and clinical outcome evaluation is required. Due to the high level of resistance to tuberculosis drugs in Mongolia, there is a need to expand research on the control of resistance to anti-tuberculosis drugs.

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Применение клапанной бронхоблокации в комплексном лечении больных с деструктивным туберкулезом легких

Заведующий эндоскопическим отделением к.м.н.
Доржиев А.Б.

Mongolian People's Republic 2022г

КЛАПАННАЯ БРОНХОБЛОКАЦИЯ

– Клапанная бронхоблокация (КББ) —
– новая разновидность коллапсoterапии, когда с помощью установки клапанного блокатора резинового (КБР) в бронх, в блокированном участке легкого создается локальный искусственный коллапс легкого (ЛИКЛ). В
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Рис. 1 Схема устройства эндобронхиального клапана

1. Полый цилиндр
2. Внутреннее отверстие клапана
3. Перемычка для удерживания клапана
4. Радиальные лепестки для фиксации клапана в бронхе
5. Спадающийся лепестковый клапан
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**Противопоказания для клапанной бронхоблокации**

**Абсолютные**
- Активное воспаление бронхов любой этиологии 2-3й ст.
- Дыхательная недостаточность 2-3й ст (SaO₂≤89%) различной этиологии.
- Неконтролируемая артериальная гипертензия (систолическое давление >200мм.рт.ст., или диастолическое >100мм.рт.ст.).
- Анатомические особенности, деформации и стенозы бронхиального дерева, препятствующие техническому выполнению манипуляции.
- Нарушение дренажной функции бронха, R-ки проявляющиеся уровнем жидкости в каверне
- Декомпенсация любых органов и систем организма

**Относительные**
- Сопутствующие злокачественные заболевания
- Резекционные операции на стороне планируемой КББ.
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Методика клапанной бронхоблокации

Местная анестезия: орошение носовых ходов и ротоглотки лидокаином-спрей 10% 3хкратно

Методика клапанной бронхоблокации

Анестезия голосовых связок раствором лидокаина 2%-2,0мл 2хкратно

Анестезия тусогенных зон бронхов: карина, шпоры долевых бронхов 2% раствором лидокаина 6,0мл
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ОРГАНИЗАЦИОННЫЕ МОМЕНТЫ ДЛЯ УСПЕШНОЙ БРОНХОБЛОКАЦИИ

- Выбрать момент для КББ, беседа с пациентом
- Определить локализацию бронхов
- Подобрать размер КБР
- Научить пациента поведению после установки КБР

*Фтизиатр, рентгенолог, эндоскопист*
LALC В ВИДЕ АТЕЛЕКТАЗА

Изучение рентгенологической динамики при бронхоблокации показывает, что наиболее быстрый результат по закрытию каверны (каверн) достигается у пациентов с LALC в виде ателектаза, он формируется сразу после установки КБР (иногда через несколько часов)

ЧЕРЕЗ 1 СУТКИ ПОСЛЕ КБР УСТЬЯ ПВДБ
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LALC В ВИДЕ ГИПОВЕНТИЛЯЦИИ

У пациентов, у которых пневмофиброз, сращения плевральных листков, LALC рентгенологически проявлялся гиповентиляцией участка легкого или смещением легочных структур относительно ребер. Отсутствие ателектаза при уверенности в правильной установке КБР не должно рассматриваться, как неэффективное и вести к извлечению КБР.
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Клапанная бронхоблокация является эффективным малоинвазивным немедикаментозным методом лечения различных форм туберкулёза лёгких, включая лекарственноустойчивые формы и его наиболее частые осложнения, такие, как лёгочное кровотечение, бронхоплевральные свищи, послеоперационные осложнения. При этом необходимо отметить, что клапанная бронхоблокация не является альтернативой традиционным методам лечения туберкулеза лёгких и его осложнений и должна применяться в комплексной терапии данной патологии.

УДАЛЕННЫЕ КБР У КУРИЛЬЩИКОВ
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МНЕНИЕ ПАЦИЕНТОВ, КОТОРЫМ ПРОВЕДЕНА ФБС И КББ

1. Процедура весьма неприятна, но выполняется быстро

2. Представление пациентов о проведении ФБС, в том числе КББ, и реальность абсолютно разные вещи

3. Степень доверия к медицинскому персоналу

Благодарю за внимание!
"Syndemic" challenge of Tuberculosis, smoking and household air pollution in Mongolia

Dorjavdan Munkhjargal, PhD candidate
Department of Public Health and Hygiene
Kansai Medical University
Japan

Overview

• Syndemic theory and its framework
• Smoking prevalence in globally and in Mongolia
• Tuberculosis prevalence and incidence in globally and Mongolia
• Tuberculosis and smoking association
• Household air pollution and tuberculosis association
• Future consideration
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• Endemic
• Epidemic
• Pandemic
• Syndemic

Syndemic

The term “syndemic”: Theoretical perspective to understand the synergistic interaction of coexisting diseases and biological and environmental factors that worsen the complex outcomes of those diseases in populations.

The term was developed by Merrill Singer in the mid-1990s

Meaning of word: Greek
• Syn-together + (people)-demos

Framework of syndemic

Syndemic theory draws attention to and provide a specific framework of
• disease-disease and
• social condition-disease interaction.

Syndemic tend to reduce treatment efficacies and
Increase treatment cost.

Social condition contribute:
• Formation
• Clustering
• Spread of disease
• Increase susceptibility
• Reduce immune function
• Disease progression

Tuberculosis disproportionately affects population in low and middle-income countries and people living poverty.


Tuberculosis in the worldwide

• 10.0 million people fell ill with TB in 2019
• 1.2 million TB death among HIV-negative people
• 56% of the people who developed TB is men
• 44% of TB cases were in SEA in 2019
• 18% TB cases were in WPR in 2019

Source: Global TB report. 2021
Tuberculosis incidence and mortality rate in Mongolia

Source: Health indicator 2021, TB Surveillance data, NCCD

Smoking prevalence in the world

- Smoking is second large contributor to the global disease burden (GDB), accounting for 200 million DALY’s lost in 2019.
- 80% of smokers live in low and middle-income countries.
- 8 million people die in an early death due to smoking every year.
- 71% of those who die due to smoking was men.
- 15% of the global deaths are attributed to smoking.
- 5 people die due to smoking in an every minute in WPR.
- 1/3 of smokers live in WPR.

Source: Our world in data/smoking GDB report
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Keywords: Tuberculosis, curriculum, evaluation, medical university, Mongolia

Tuberculosis prevalence in Mongolia

Smoking prevalence among population (STEP surveys)

Smoking practice dominant among:
- Urban dwellers
- Young and middle aged
- Low-educated
- Male

Source: Our world in data

Source: *Alessandro R Demaio. Tobacco smoking in Mongolia
**Smoking among Tuberculosis**

Total participants n=30,565

<table>
<thead>
<tr>
<th>Variable</th>
<th>Never smoke n(%)</th>
<th>Ever smoke n (%)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>13,177 (84.8)</td>
<td>2,358 (15.2)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Male</td>
<td>4,054 (26.9)</td>
<td>10,976 (73.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-24</td>
<td>2644 (15.3)</td>
<td>1274 (9.6)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>25-34</td>
<td>3620 (21)</td>
<td>3348 (25.1)</td>
<td></td>
</tr>
<tr>
<td>35-44</td>
<td>3669 (21.3)</td>
<td>3140 (23.6)</td>
<td></td>
</tr>
<tr>
<td>45-54</td>
<td>3709 (21.5)</td>
<td>2796 (21)</td>
<td></td>
</tr>
<tr>
<td>55-64</td>
<td>2164 (12.6)</td>
<td>1784 (13.4)</td>
<td></td>
</tr>
<tr>
<td>65+</td>
<td>1425 (8.3)</td>
<td>992 (7.4)</td>
<td></td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>12,667 (73.5)</td>
<td>10,462 (78.5)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Single</td>
<td>3168 (18.4)</td>
<td>1968 (14.8)</td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>200 (1.2)</td>
<td>335 (2.5)</td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td>1196 (6.9)</td>
<td>569 (4.3)</td>
<td></td>
</tr>
</tbody>
</table>

**Variable** | **Never smoke n(%)** | **Ever smoke n (%)** | **P-Value** |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Smoking</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>16,906 (56.6)</td>
<td>60 (32.4)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Ever</td>
<td>12,976 (43.4)</td>
<td>125 (67.6)</td>
<td></td>
</tr>
<tr>
<td><strong>Year of smoke</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤10</td>
<td>4276 (33.5)</td>
<td>28 (22.4)</td>
<td>0.03</td>
</tr>
<tr>
<td>11-20</td>
<td>3170 (24.8)</td>
<td>35 (28.0)</td>
<td></td>
</tr>
<tr>
<td>21-30</td>
<td>2503 (19.6)</td>
<td>24 (19.2)</td>
<td></td>
</tr>
<tr>
<td>31-40</td>
<td>1691 (13.2)</td>
<td>19 (15.2)</td>
<td>***</td>
</tr>
<tr>
<td>41-50</td>
<td>812 (6.4)</td>
<td>12 (9.6)</td>
<td></td>
</tr>
<tr>
<td>≥51</td>
<td>332 (2.6)</td>
<td>7 (5.6)</td>
<td></td>
</tr>
<tr>
<td><strong>Number of tobacco per day</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>17322 (65.9)</td>
<td>61 (39.1)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>≤5</td>
<td>623 (2.4)</td>
<td>3 (1.9)</td>
<td></td>
</tr>
<tr>
<td>6-10</td>
<td>4040 (15.4)</td>
<td>48 (30.8)</td>
<td></td>
</tr>
<tr>
<td>11-20</td>
<td>3937 (14.9)</td>
<td>40 (25.6)</td>
<td></td>
</tr>
<tr>
<td>≥21</td>
<td>361 (1.4)</td>
<td>4 (2.6)</td>
<td></td>
</tr>
</tbody>
</table>

**Dose and response relationship between smoking and Tuberculosis**

![Dose and response relationship between smoking and Tuberculosis](image)

Multivariate analysis adjusting confounding factors was done. **Confounding factors were:** Age, gender, education, marital status, TB contact, previous history of TB, employment status, and location.
Household air pollution and Tuberculosis

Household solid fuel use among population in Mongolia

Source: D Munkhjargal etc., Association between household solid fuel and TB. EHPM. (2021).
Household air pollution and tuberculosis in Mongolia

Population attributable risk percentage (PAP%) by gender

<table>
<thead>
<tr>
<th>FACTORS</th>
<th>Relative risks (95%, CI)*</th>
<th>Weighted prevalence of the risk factors</th>
<th>PAP% for TB incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active smoking</td>
<td>2.3 (1.5-2.8)</td>
<td>43.2%</td>
<td>35.9%</td>
</tr>
<tr>
<td>Expose to indoor air pollution</td>
<td>1.5 (1.2-3.2)</td>
<td>71.1%</td>
<td>26.2%</td>
</tr>
</tbody>
</table>

PAF% = Pe(RRe – 1) / (1 + Pe(RRe – 1)); Pe: Proportion of population exposed to risk factor; RRe: Risk ratio.

Source: D Munkhjargal etc., EHPM. (2021).
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Future consideration

• Gender specific tobacco control policy is needed
• Age-specific policy, including a smoke-free generation policy for adolescents with targeted education, and mass media campaign is needed
• To help TB patients to quit smoking
• Behavioral intervention for smoking cessation will be able to deliver through TB staffs and moreover, to integrate consistent behavioral interventions for smoking cessation within its TB service

Tobacco cessation intervention

Help them quit
• Take a complete history of tobacco use
• Offer smoking cessation counselling to all patients
• Provide information statement on the need to stop using tobacco
• Set a quit date
• Provide self help materials
• Refer to community program
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Thank you for your attention
New challenges in the management of Rifampicin Resistant Tuberculosis (RR-TB)

Nino Kiria
National Center for Tuberculosis and Lung Diseases, Tbilisi, Georgia
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Georgia

- Population - 3.7 million (excluding occupied by Russia regions of Abkhazia and South Ossetia), of which 32% resides in Tbilisi
- Included in the list of 18 high-priority TB countries of the WHO European region
- The last WHO estimated TB incidence - 3,000 (2,500–3,500) or 74 (62–87) per 100,000 population. The estimated mortality rate in 2019 - 3.8 per 100,000 population
- Has been steadily decreasing the burden of TB cases for last 10 years, and in comparison with 2015 has achieved 50% reduction in the number of new and relapse TB cases
- In 2020 and 2021 total of 1,841 and 1,645 TB cases were registered in Georgia, 92% and 95% of which were bacteriologically confirmed as well respectively

New, plus relapse and total TB case notification in Georgia, 2011-2021
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Georgia

- RR/MDR-TB treatment is carried out since 2008
- Programmatic implementation of new TB drugs (Bedaquiline and Delamanid) since 2015 (occasionally, since 2010, as part of “compassionate use“)
- Implementation of fully oral longer and modified shorter treatment regimens (mSTR) since 2019
Background: In 2021, WHO declared Mongolia as one of the 30 countries with a high burden of tuberculosis, the number of tuberculosis cases per 100,000 population is 428. According to a study conducted in 2009, the duration and content of tuberculosis courses were different both in public and private medical schools, and tuberculosis contents are omitted from the curriculum of some medical classes. There is a need to evaluate the "Curriculum of Tuberculosis" including the content, teaching capacity, availability, and accessibility of training materials.

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MDR/RR-TB treatment outcomes in Georgia, 2011-2019

![MDR/RR-TB treatment outcomes in Georgia, 2011-2019](image)

DST on new and repurposed anti-TB drugs

- Susceptibility testing of Bedaquiline, Linezolid and Clofazimine has been carried out since 2019
- Susceptibility testing of Delamanid has been carried out since 2020
Results of Susceptibility testing of new and repurposed anti-TB drugs in RR-MDR/TB cases

2019→2021

- From 2019 to 2021, resistance to Bedaquiline (Bdq), Linezolid (Lzd), and Clofazimine (Clz) alone appeared to be increasing and ranged from 1.5% to 10.4% among patients with pulmonary RR-TB tested for the drug.

2021

- Resistance to Delamanid was first identified in the 2021 cohort and showed 8.5% of the total tested cases for the drug.

Results of drug resistance testing among RR-TB patients (absolute numbers)
Results of Susceptibility testing of new and repurposed anti-TB drugs in pre-XDR/TB cases

- In 2020, the number of bacteriologically confirmed RR-TB was 12%, of which 28% were resistant to any of the Fluoroquinolones.
- In 2021, the number of bacteriologically confirmed RR-TB was 12%, of which 21% were resistant to any of the Fluoroquinolones.

- In 2020, 28% of pre-XDR-TB cases (50 cases) showed resistance to one of the most effective “group A” drugs: Bdq (24%) or Lzd (4%).
- In 2021, 37 cases of pre-XDR-TB were recorded, among which 10 (27.0%) patients were confirmed to have XDR-TB.
- Among XDR-TB cases, resistance to Bdq alone was observed in 61.0% of patients, and Lzd alone in 20.0%. In 2021, for the first time, 2 patients (20% of XDR-TB patients)
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Conclusions

- In 2019-2021, the growing dynamics of the development of resistance to new and repurposed anti-TB drugs in one country (Georgia) shows that in the upcoming years, we may face a drug-resistant TB crisis again.

- Based on the study results it can be concluded, that the issue of resistance to new and repurposed anti-tuberculosis drugs will grow into a new problem in management of RR-TB in the near future.

- To prevent the process, it is necessary to expand and update the drug base for the treatment of resistant tuberculosis constantly, which can be carried out both through the synthesis of new anti-tuberculosis drugs and restoring anti-TB efficacy of priority drugs using stability inhibitors.
Results of Susceptibility testing of new and repurposed anti-TB drugs in pre-XDR/TB cases

To prevent the process, it is necessary to expand and update the drug base for the treatment of resistant tuberculosis constantly, which can be carried out both through the synthesis of new anti-tuberculosis drugs and restoring anti-TB efficacy of priority drugs using stability inhibitors.
Background

• According to WHO, about 10 million cases of tuberculosis are registered in worldwide every year and 1.3 million people die. About 3,000-4,000 cases of tuberculosis are registered in Mongolia every year, and there are 200 cases deaths.

• Internationally, extrapulmonary tuberculosis is 20-40% of all tuberculosis then skeletal TB accounts for 10-25% of it. More than half of it or 50-69% is spine TB.

• From 2012 to 2016, 150-160 cases of spinal TB were operated on in the Surgical department of NCCD, 80-90% of which were any complicated (severe) cases.
Background

- In the case of spinal tuberculosis, anti-tuberculosis drugs are used for a long time, but the dose of antibacterial drug is not high enough in the affected vertebra and the area with erosive necrosis in the focus of inflammation, so it needs combined surgical treatment.

- The study was conducted because there has been no published study on the results of spine TB surgery and the prevalence of tuberculosis at which level of the spine in our country.

Goal and objectives

**Goal:**
To study the incidence of spinal tuberculosis in Mongolia and its predominant location in the spine

**Objectives:**
1. To study some socio-demographic parameters of spinal tuberculosis
2. To make a review of bacteriological and histological findings in Spine TB cases
3. To study the types of surgical treatment
Methods

• In our research, we have reviewed the data of 364 cases of spine surgery in the Department of NCCD between 2019 to 2021.

• The data of the research sample was collected from the surgical record, notes, records of the National Tuberculosis Reference Laboratory, and Histologic examination data. Then, statistical calculations were performed using the SPSS 20 program.

Research results
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Descriptive indicators

<table>
<thead>
<tr>
<th>Age groups</th>
<th>Male (%)</th>
<th>Female (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;15</td>
<td>3 (0.8)</td>
<td>2 (0.6)</td>
<td>5 (1.4)</td>
</tr>
<tr>
<td>15-30</td>
<td>58 (15.9)</td>
<td>30 (8.3)</td>
<td>88 (24.2)</td>
</tr>
<tr>
<td>31-40</td>
<td>43 (11.8)</td>
<td>35 (9.6)</td>
<td>78 (21.4)</td>
</tr>
<tr>
<td>41-50</td>
<td>42 (11.5)</td>
<td>26 (7.1)</td>
<td>68 (18.6)</td>
</tr>
<tr>
<td>51-60</td>
<td>37 (10.2)</td>
<td>27 (7.4)</td>
<td>64 (17.6)</td>
</tr>
<tr>
<td>&gt;60</td>
<td>28 (7.7)</td>
<td>33 (9.1)</td>
<td>61 (16.8)</td>
</tr>
<tr>
<td>Total</td>
<td>211 (57.9)</td>
<td>153 (42.1)</td>
<td>364 (100.0)</td>
</tr>
</tbody>
</table>

*mean; ± standard deviation

Cases by Districts

![Bar chart showing cases by districts](chart.png)
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**Results of Histologic finding, n=364, between 2019 and 2021**

- Spine surgery at Surgery department of NCCD
  - Tuberculosis: 326 (90%)
  - Inflammatory response: 33 (9%)
  - Cancer: 5 (1%)

**Results of Bacteriological findings**

- Surgical cases: 364 (100%)
  - Tuberculosis: 326 (90%)
    - Smear M.TB+: 135 (41.5%)
    - Culture M.TB+: 102 (31.3%)
    - R/MDR, PDR: 31 (9.5%)
    - Susceptive: 295 (89.5%)
    - Mono/PDR: 27 (87.1%)
    - R/MDR: 4 (12.9%)
  - Inflammatory response: 33 (9%)
  - Cancer: 5 (1%)
    - GenXpert M.TB+: 147 (45.1%)
      - Susceptive: 131 (89.1%)
      - R-resistant: 16 (10.9%)
Spine surgery types:

- In the majority of the study or 303(83.2%) cases were abscess-necrosectomy and necrosectomy (debridement),
- 45(12.3%) cases were bone (iliac) graft,
- 5(1.4%) cases were laminectomy,
- 11(3.0%) cases were abscess drainage
Case 2.

Conclusion

1. It is noteworthy that 234 (64.3%) cases of spinal tuberculosis patients are young people of working age, i.e. 15-50 years old. Spine TB is more common registered in densely populated areas.

2. Among histologically confirmed spine TB cases, 147 (45.1%) were confirmed by Gene-Xpert, 135 (41.5%) were confirmed by smear, and 102 (31.3%) were confirmed by culture. Also, drug-resistant tuberculosis was identified in 31 (9.5%) cases. The most common (34.8%) location of TB inflammation foci is at the level of the lumbar spine (L2-L4).

3. In the surgical care of spinal tuberculosis, abscess necroectomy (debridement) was performed in 303 (83.2%) cases and spinal bone fixation (iliac bone graft) in 45 (12.3%) cases.
Thank you for your attention
Background: In 2021, WHO declared Mongolia as one of the 30 countries with a high burden of tuberculosis. The number of tuberculosis cases per 100,000 population is 428. According to a study conducted in 2009, the duration and content of tuberculosis courses were different both in public and private medical schools, and tuberculosis contents are omitted from the curriculum of some medical classes. There is a need to evaluate the "Curriculum of Tuberculosis" including the content, teaching capacity, availability, and accessibility of training materials.

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Keywords: Tuberculosis, curriculum, evaluation, medical university, Mongolia

Tuberculosis related stigma among Multi-drug resistant tuberculosis patients, in Mongolia

D.Dorjmaa,1,2 Ts.Davaasuren,2 P.Nasanjargal,2 Ch.Khandsuren,3 Ch.Enkhchimeg,3 J.Ermenk,4 Ts.Ariunaa,4 D.Naranzul, O.Baatarkhuu,1 Z.Khashigzul,1
1 – Mongolian National University of Medical Science 2 – National Center for Communicable Diseases 3 – Health union of Chingeltei district 4 – Health union of Sukhbaatar district

Outline

• Introduction
• Goal
• Methodology
• Results
• Discussion
• Conclusion
• Recommendation
**Background:**
In 2021, WHO declared Mongolia as one of the 30 countries with a high burden of tuberculosis, the number of tuberculosis cases per 100,000 population is 428. According to a study conducted in 2009, the duration and content of tuberculosis courses were different both in public and private medical schools, and tuberculosis contents are omitted from the curriculum of some medical classes. There is a need to evaluate the “Curriculum of Tuberculosis” including the content, teaching capacity, availability, and accessibility of training materials.

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**Conclusion:**
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**Keywords:** Tuberculosis, curriculum, evaluation, medical university, Mongolia

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**Tuberculosis situation in Mongolia, 2017-2021**

![Graph showing Tuberculosis notification rate, 2017-2021](image)

Mongolia is one of MDR-TB high burden 8 countries in worldwide.

---

**Rif/MDR-TB treatment outcome, Mongolia, 2017-2021**

![Graph showing Rif/MDR-TB treatment outcome, 2017-2021](image)
Psycho-social issues of MDR-TB patients

<table>
<thead>
<tr>
<th>MDR-TB symptoms</th>
<th>School drop out: 59% (10/17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment duration</td>
<td>Unemployment: 64% (60/94)</td>
</tr>
<tr>
<td>Infectiousness</td>
<td>Financial problem: 57%</td>
</tr>
<tr>
<td>Adverse reaction: 78%</td>
<td>Depression: 21%</td>
</tr>
<tr>
<td>MDR-TB pills</td>
<td>Anxiety: 26%</td>
</tr>
<tr>
<td>Stigma: 48%</td>
<td></td>
</tr>
</tbody>
</table>

Tuberculosis related stigma...

… People avoid accessing TB services as a result of stigma or fear or it…

Stop TB partnership “TB stigma assessment” implementation handbook 2018

… Perceived stigma has a considerable impact on health that renders patients to refuse disease and medical services through discouraging health-seeking behavior which leads to distortion of health condition making difficult to treat that increases infectivity and communicability of the disease…

A.Kurspahis et all, Tuberculosis related stigma and delay in seeking care after the onset of symptoms associate with tuberculosis, Medicinski Glasnik, 2013

… At the individual level, patients fear the diagnosis and related issues and fear of disclosing to the family have led to their being lost to follow up after diagnosis…

Thomas BE et all, Understanding pretreatment loss to follow up of tuberculosis patients: an explanatory qualitative study in Chennai, India, BMJ Glob Heal. 2020
Goal and methodology

Goal:
To study tuberculosis related stigma among MDR-TB patients in Mongolia

Study design:
Randomly assigned case control study

Methods:
Quantitative and qualitative

Sampling

MDR-TB patients: 94

Participants: 83

Case group: 27
Control group: 56

Cognitive behavioral therapy

Inclusive and exclusive criteria:
Died: 2
Mental diseases: 6
Children: 1
Refused: 2

Data collection: Questionnaire, AUDIT, Zung self-Rating depression scale, Zung self-rating anxiety scale, Van-Rie tuberculosis stigma scale

Excluded:
Died: 5
Lost of follow up: 5

Intensive phase: 83
Continuation phase: 73

Ethical approval:
NCCD (№9/533), MNUMS № 2020/3-05
Inclusion and exclusion criteria

<table>
<thead>
<tr>
<th>Inclusion criteria</th>
<th>Exclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short regimen of MDR-TB</td>
<td>Long regimen of MDR-TB</td>
</tr>
<tr>
<td>No treatment history of mental disorder</td>
<td>Have treatment history of mental disorder</td>
</tr>
<tr>
<td>Proved informed consent by themselves</td>
<td>Refused to participate in study</td>
</tr>
<tr>
<td>18≤ years of age</td>
<td>≤ 18 years of age</td>
</tr>
</tbody>
</table>

Qualitative study

Intensive phase of MDR-TB treatment

Cognitive behavioral therapy: 12 Steps

Participants: 3-5 patients in one group
Cognitive behavioral therapy for MDR-TB patients, 12 steps by Minnesota (De Clementio Prochasco model)

Contents:

- Step 1: Why I am here?
- Step 2: The first step
- Step 3: Denial
- Step 4: Power of belief
- Step 5: Relationship
- Step 6: Respect yourself
- Step 7: Understanding yourself
- Step 8: Iced feelings
- Step 9: Family
- **Step 10**: Tuberculosis and Stigma
- Step 11: The continuation of treatment
- Step 12: Work with yourself

Data analyze

- Microsoft Word, Microsoft Excel
- STATA 12.0 (p-value, Cronbach’s alpha)
Socio-demographic characteristics, n=73

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N (%)</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Case group</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>38 (52%)</td>
<td>14 (37%)</td>
</tr>
<tr>
<td>Female</td>
<td>35 (48%)</td>
<td>11 (31%)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-24</td>
<td>12 (16%)</td>
<td>4 (33%)</td>
</tr>
<tr>
<td>25-34</td>
<td>15 (20.5%)</td>
<td>6 (40%)</td>
</tr>
<tr>
<td>35-44</td>
<td>18 (25%)</td>
<td>7 (39%)</td>
</tr>
<tr>
<td>45-54</td>
<td>15 (20.5%)</td>
<td>6 (40%)</td>
</tr>
<tr>
<td>55-аас дээш</td>
<td>13 (18%)</td>
<td>2 (15%)</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No, low</td>
<td>7 (10%)</td>
<td>2 (29%)</td>
</tr>
<tr>
<td>Secondary</td>
<td>46 (63%)</td>
<td>13 (28%)</td>
</tr>
<tr>
<td>College</td>
<td>3 (4%)</td>
<td>1 (33%)</td>
</tr>
<tr>
<td>High</td>
<td>17 (23%)</td>
<td>9 (53%)</td>
</tr>
</tbody>
</table>

Socio-demographic characteristics, n=73

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N (%)</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Case group</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>23 (31.5%)</td>
<td>11 (48%)</td>
</tr>
<tr>
<td>Married</td>
<td>41 (56%)</td>
<td>12 (29%)</td>
</tr>
<tr>
<td>Divorced</td>
<td>7 (9.5%)</td>
<td>2 (29%)</td>
</tr>
<tr>
<td>Widowed</td>
<td>2 (3%)</td>
<td>0</td>
</tr>
<tr>
<td>Family</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alone</td>
<td>10 (14%)</td>
<td>3 (30%)</td>
</tr>
<tr>
<td>Living with family members</td>
<td>63 (86%)</td>
<td>22 (35%)</td>
</tr>
<tr>
<td>Employment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>46 (63%)</td>
<td>20 (43%)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>27 (37%)</td>
<td>5 (19%)</td>
</tr>
</tbody>
</table>
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---

### MDR-TB treatment

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N( %)</th>
<th>Case group</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous TB treatment history</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>22 (30%)</td>
<td>9 (41%)</td>
<td>13 (59%)</td>
</tr>
<tr>
<td>No</td>
<td>51 (70%)</td>
<td>16 (31%)</td>
<td>35 (69%)</td>
</tr>
<tr>
<td>Drug susceptibility</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>54 (74%)</td>
<td>17 (31%)</td>
<td>37 (69%)</td>
</tr>
<tr>
<td>HR</td>
<td>13 (18%)</td>
<td>6 (46%)</td>
<td>7 (54%)</td>
</tr>
<tr>
<td>HRES</td>
<td>6 (8%)</td>
<td>2 (33%)</td>
<td>4 (67%)</td>
</tr>
<tr>
<td>MDR-TB treatment regimen</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-6 Km-Mfx-Pto-Cfz-Z-H*-Emb /5-6 Mfx-Cfz-Z-Emb</td>
<td>38 (52%)</td>
<td>14 (37%)</td>
<td>24 (63%)</td>
</tr>
<tr>
<td>6Bdq-4Lfx-Eto-E-Z-H*-Cfz/5-6Lfx-Cfz-Z-E</td>
<td>35 (48%)</td>
<td>11 (31%)</td>
<td>24 (69%)</td>
</tr>
</tbody>
</table>

---

### Tuberculosis related stigma, n=73

<table>
<thead>
<tr>
<th>Level</th>
<th>Social stigma</th>
<th>Self-stigma</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>4%</td>
<td>12%</td>
</tr>
<tr>
<td>Medium</td>
<td>78%</td>
<td>84%</td>
</tr>
<tr>
<td>Low</td>
<td>18%</td>
<td>4%</td>
</tr>
</tbody>
</table>

*(Cronbach’s α coefficient = 0.848)* *(Cronbach’s α coefficient = 0.767)*
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Psychological situation

<table>
<thead>
<tr>
<th>Depression level</th>
<th>Anxiety level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>40%</td>
<td>40%</td>
</tr>
<tr>
<td>60%</td>
<td>60%</td>
</tr>
<tr>
<td>80%</td>
<td>80%</td>
</tr>
<tr>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>40%</td>
<td>40%</td>
</tr>
<tr>
<td>60%</td>
<td>60%</td>
</tr>
<tr>
<td>80%</td>
<td>80%</td>
</tr>
</tbody>
</table>

(Cronbach’s α coefficient = 0.805)

(Cronbach’s α coefficient = 0.843)

Association between tuberculosis related stigma and other characteristics, n=73 (1)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N (%)</th>
<th>Social stigma</th>
<th></th>
<th>Self-stigma</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Low</td>
<td>Medium, high</td>
<td>P-Value</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>38 (52%)</td>
<td>7 (18%)</td>
<td>31 (82%)</td>
<td>0.887</td>
</tr>
<tr>
<td>Female</td>
<td>35 (48%)</td>
<td>6 (17%)</td>
<td>29 (83%)</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-24</td>
<td>12 (16%)</td>
<td>5 (42%)</td>
<td>7 (58%)</td>
<td>0.159</td>
</tr>
<tr>
<td>25-34</td>
<td>15 (20.5%)</td>
<td>1 (7%)</td>
<td>14 (93%)</td>
<td></td>
</tr>
<tr>
<td>35-44</td>
<td>18 (25%)</td>
<td>2 (11%)</td>
<td>16 (89%)</td>
<td></td>
</tr>
<tr>
<td>45-54</td>
<td>15 (20.5%)</td>
<td>3 (20%)</td>
<td>12 (80%)</td>
<td></td>
</tr>
<tr>
<td>55&lt;</td>
<td>13 (18%)</td>
<td>2 (15%)</td>
<td>11 (85%)</td>
<td>0.159</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No, low</td>
<td>7 (10%)</td>
<td>1 (14%)</td>
<td>6 (86%)</td>
<td>0.442</td>
</tr>
<tr>
<td>Secondary</td>
<td>46 (63%)</td>
<td>10 (22%)</td>
<td>36 (78%)</td>
<td></td>
</tr>
<tr>
<td>College</td>
<td>3 (4%)</td>
<td>1 (33%)</td>
<td>2 (67%)</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>17 (23%)</td>
<td>1 (6%)</td>
<td>16 (94%)</td>
<td></td>
</tr>
</tbody>
</table>
Association between tuberculosis related stigma and other characteristics, n=73 (2)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N (%)</th>
<th>Social stigma</th>
<th>Low</th>
<th>Medium, high</th>
<th>P-Value</th>
<th>Low</th>
<th>Medium, high</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>23 (31.5%)</td>
<td>11 (48%)</td>
<td>12 (52%)</td>
<td></td>
<td>0.604</td>
<td>23 (100%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>41 (56%)</td>
<td>12 (29%)</td>
<td>29 (71%)</td>
<td></td>
<td>3 (7%)</td>
<td>38 (93%)</td>
<td>0.486</td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>7 (9.5%)</td>
<td>1 (14%)</td>
<td>5 (86%)</td>
<td></td>
<td>0</td>
<td>7 (100%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td>2 (3%)</td>
<td>0</td>
<td>2 (100%)</td>
<td></td>
<td>0</td>
<td>2 (100%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alone</td>
<td>10 (14%)</td>
<td>1 (10%)</td>
<td>9 (90%)</td>
<td>0.487</td>
<td>3 (5%)</td>
<td>60 (95%)</td>
<td>0.481</td>
<td></td>
</tr>
<tr>
<td>Living with family</td>
<td>63 (86%)</td>
<td>12 (19%)</td>
<td>51 (81%)</td>
<td></td>
<td>0.903</td>
<td>44 (96%)</td>
<td>0.894</td>
<td></td>
</tr>
<tr>
<td>Employment</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>46 (63%)</td>
<td>8 (17%)</td>
<td>38 (83%)</td>
<td>0.903</td>
<td>2 (4%)</td>
<td>44 (96%)</td>
<td>0.894</td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>27 (37%)</td>
<td>5 (19%)</td>
<td>22 (81%)</td>
<td></td>
<td>1 (4%)</td>
<td>26 (96%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Association between tuberculosis related stigma and other characteristics, n=73 (3)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N (%)</th>
<th>Social stigma</th>
<th>Low</th>
<th>Medium, high</th>
<th>P-Value</th>
<th>Low</th>
<th>Medium, high</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>52 (71%)</td>
<td>11 (21%)</td>
<td>41 (79%)</td>
<td>0.240</td>
<td>2 (4%)</td>
<td>50 (96%)</td>
<td>0.858</td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>21 (29%)</td>
<td>2 (10%)</td>
<td>19 (90%)</td>
<td></td>
<td>1 (5%)</td>
<td>20 (95%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>61 (84%)</td>
<td>12 (20%)</td>
<td>49 (80%)</td>
<td>0.348</td>
<td>3 (5%)</td>
<td>58 (95%)</td>
<td>0.433</td>
<td></td>
</tr>
<tr>
<td>Anxiety</td>
<td>12 (16%)</td>
<td>1 (8%)</td>
<td>11 (92%)</td>
<td></td>
<td>0</td>
<td>12 (100%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previously treated with TB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>22 (30%)</td>
<td>5 (23%)</td>
<td>17 (77%)</td>
<td>0.471</td>
<td>1 (5%)</td>
<td>21 (95%)</td>
<td>0.902</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>51 (70%)</td>
<td>8 (16%)</td>
<td>43 (84%)</td>
<td></td>
<td>2 (4%)</td>
<td>49 (96%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol dependence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low risk</td>
<td>60 (82%)</td>
<td>12 (20%)</td>
<td>48 (80%)</td>
<td>0.293</td>
<td>0</td>
<td>13 (100%)</td>
<td>0.410</td>
<td></td>
</tr>
<tr>
<td>Risky, harmful</td>
<td>13 (18%)</td>
<td>1 (8%)</td>
<td>12 (92%)</td>
<td></td>
<td>3 (5%)</td>
<td>57 (95%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Association between social stigma and self-stigma, n=73

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N (%)</th>
<th>Self-stigma</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Low Medium, high</td>
<td></td>
</tr>
<tr>
<td>Social stigma</td>
<td></td>
<td>Low Medium, high</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>13 (18%)</td>
<td>3 (23%)</td>
<td>10 (77%)</td>
</tr>
<tr>
<td>Medium, high</td>
<td>60 (82%)</td>
<td>0</td>
<td>60 (100%)</td>
</tr>
</tbody>
</table>

TB related stigma of the study participants, n=73

<table>
<thead>
<tr>
<th>Social stigma</th>
<th>Self-stigma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensive phase</td>
<td>Low Medium, high</td>
</tr>
<tr>
<td>Case group</td>
<td></td>
</tr>
<tr>
<td>Control group</td>
<td></td>
</tr>
</tbody>
</table>

| Intensive phase | Continuation phase |
| Case group | | |
| Control group | | |
Discussion

• **TB related social stigma:**
  - Bereket D et all, (2019): 42.4%
  - Rima B et all, (2020): 51%
  - Dorjmaa D et all, (2022): 84%

• **TB related self-stigma:**
  - Alvin Kuo et all, (2020): 56%
  - Ignes W et all, (2019): 78%
  - Dorjmaa D et all, (2022): 96%

• **Factors associated with TB related stigma:**
  - Mustefa et all, (2020): Depression (aOR=8.18)
  - Rima et all, (2020): Education (p<0.01)
  - Bereket et all, (2019): Alcohol use (aOR=1.78)
  - Xu Chen et all, (2021): Gender (p<0.05), anxiety (p<0.001),
  - Dorjmaa et all, (2022): Gender, education, marriage, employment, previous TB history, depression, anxiety (p>0.05)

• **Duration of TB related stigma during MDR-TB treatment:**
  - Bereket et all, (2019): Intensive phase (aOR=1.42)
  - Dorjmaa et all, (2022): Treatment phase (p= 0.349)

Conclusion

• MDR-TB patients perceived high tuberculosis related social stigma and self-stigma in Mongolia

• MDR-TB patients faced self-stigma to due tuberculosis related social stigma
Recommendation

- Patient education program
- Cognitive behavioral therapy for MDR-TB patients
- Advocacy, communication, social mobilization

Acknowledgment

- The WHO Representative Office in Mongolia
- The Global fund supported project on HIV/AIDS and TB
- The Mongolian National University of Medical Science
- The National Center for Communicable Diseases
- The Provincial and district MDR-TB doctors and nurses
- The study participants
Thank you for your attention
THE EVALUATION OF THE “TUBERCULOSIS CURRICULUM” OF MEDICAL UNIVERSITIES OF MONGOLIA

Ass. Professor D. Gantuya (Ph.D., MPH, M.D.)
2022/09/16

INTRODUCTION

- In 2021, WHO declared Mongolia as one of the 30 countries with a high burden of tuberculosis, the number of tuberculosis cases per 100,000 population is 428.
- The medical professional at any level of health care organization needs to have basic knowledge and understanding of the prevention, detection, diagnosis, treatment, and control of Tuberculosis.
- According to a study conducted in 2009, the duration and content of tuberculosis courses were different both in public and private medical schools, and tuberculosis contents are omitted from the curriculum of some medical classes.
INTRODUCTION

In 2012, with the support of the Ministry of Health and the Global Fund, the core curriculum of tuberculosis studies was approved, and a guide was developed for students of medical universities.

There is a need to evaluate the tuberculosis curriculum, content, teaching capacity of the teaching staff, educational materials, teaching manuals, books, textbooks, e-learning opportunities, training environment, etc.

THE PURPOSE

To evaluate the "Curriculum of Tuberculosis" of the state and private universities and colleges that train specialists in the field of medicine.
Background: In 2021, WHO declared Mongolia as one of the 30 countries with a high burden of tuberculosis, the number of tuberculosis cases per 100,000 population is 428. According to a study conducted in 2009, the duration and content of tuberculosis courses were different both in public and private medical schools, and tuberculosis contents are omitted from the curriculum of some medical classes. There is a need to evaluate the "Curriculum of Tuberculosis" including the content, teaching capacity, availability, and accessibility of training materials.

Methodology: We evaluated the 18 Tuberculosis curriculums of the state and private Medical Universities of Mongolia, using a cross-sectional study. The curriculum evaluation checklist was developed and it has 23 questions with specific criteria.

Results: The curriculum's contents, training duration, teaching methodology, and the courses taught were totally different. In the contents of the tuberculosis curriculum the introduction part, the skills to be acquired by the graduate are relatively well defined, whereas the communication and cooperation parts are defined as unsatisfactory. There is a lack number of teachers in private medical universities. The availability of classrooms, laboratories, and textbooks is poor. The practices are often contacted in classrooms, and face-to-face discussions and physical examinations with patients are limited.

Conclusion: Due to the difference in the Tuberculosis curriculum, medical students obtain different knowledge and abilities. It is an urgent need to develop and implement a unified standard Tuberculosis curriculum both for State and private Medical Universities to eliminate the gap.

Keywords: Tuberculosis, curriculum, evaluation, medical university, Mongolia.
The assessment criteria sheet has 23 questions in 9 groups and instructions on how to score each question.

### A1 Curriculum Introduction part - 35 points

<table>
<thead>
<tr>
<th>A1-1</th>
<th>Хөгжилтийн хэлбэрлэгийн 428-н тогтногчийн тогтоол</th>
<th>Түүхий хэрэгцээнд Сургалт нэвтрүүлэг</th>
<th>Нэг жыл, 5 бичээгийн хэрэгсэн хэлбэрлэгийн дагуу баярлана</th>
<th>Балын 5 оноо</th>
<th>Нэг жыл, 5 бичээгийн хэрэгсэн хэлбэрлэгийн дагуу баярлана</th>
<th>Балын 5 оноо</th>
</tr>
</thead>
</table>

### A2 Training methodology - 10 points

<table>
<thead>
<tr>
<th>A2-1</th>
<th>Хөгжилтийн хэлбэрлэгийн баримтлагдлын хүчирхий холбогдон арч агуулга эсвэл хэрэгцээнд баярлалаа</th>
<th>Сургалттай унших боломжтой</th>
<th>3. Нэг жыл, 5 бичээгийн хэрэгсэн хэлбэрлэгийн дагуу баярлана</th>
<th>Балын 5 оноо</th>
<th>Алын нэг дугуу бол 1 оноо хасах зарчим байна</th>
<th>Балын 5 оноо</th>
</tr>
</thead>
</table>

### A3 Training environment requirement's - 5 points

| A3-1 | Сургалтны түгээгийн эрэглээрхийн шаардлагадаа хөгжилтийн тогтоолын нийлэмжийн болон материалтай бус орчныг бүрдүүлэн байна | Хөгжилтийн хэлбэрлэгийн баримтлагдлын хүчирхий холбогдон арч агуулга эсвэл хэрэгцээнд баярлалаа | Судалгаа бүрэн байвал 5 оноо Алын нэг дугуу бол 1 оноо хасах зарчим байна | Балын 5 оноо |
|------|--------------------------------------------------|---------------------------------|-------------------------------------------------|----------|-------------------------------------------------|----------|

### A4 Teaching staff requirements – 10 points

| A4-1 | Ундын багт нь түүнээс хойшлойгийн учралдагаа, магнитнэрээс дэлхий зорчигчтай эсвэл | Ундын багийн судалгаа | Шатлуг унхалтлутай бүрэн хангах 5 оноо | Алын нэг дугуу бол 1 оноо хасах зарчим байна | Балын 5 оноо |
|------|--------------------------------------------------|---------------------------------|-------------------------------------------------|----------|-------------------------------------------------|----------|

### A5 Skills to be mastered by the graduate– 5 points

<table>
<thead>
<tr>
<th>A5-1</th>
<th>Тэсвээрлэхийн зээлээнээр хүчирхий хэлбэрлэгийн тодорхойлолтой байдаг.</th>
<th>Хүчирхий болсон материалтыг урчилсан дадлага, таалагдсан</th>
<th>- Хүчирхий болсон материалтыг урчилсан дадлага, таалагдсан</th>
<th>Бүрэн тодорхойлснон бүрэн 5 оноо</th>
<th>2-р тодорхойлснон бүрэн 3 оноо</th>
<th>1-р тодорхойлснон бүрэн 1 оноо</th>
</tr>
</thead>
</table>

### A6 Students assessment - 10 points

| A6-1 | Ундын материалны хэлбэрлэгийн хэлбэрлэгийн тодорхойллоохдой хувьд шаардлагадаа 2.9.1- гаа засахыг нийлэмжий байна. | Яашаа шаардлагадаа бүрэн хангах 5 оноо | Яашаа шаардлагадаа бүрэн хангах 5 оноо | Шатлуг унхалтлутай бүрэн нэцэн бүрэн 5 оноо | Алын нэг дугуу бол 1 оноо хасах зарчим байна |
|------|--------------------------------------------------|---------------------------------|-------------------------------------------------|----------|-------------------------------------------------|----------|

### A7 New developments

| A7-1 | Английн түүхийн чиглүүлэн Их сургууль бол үндсэн багийн 70 -ас дагуу хувь нь ардчныг шинэчлэлтийн ажил гүйцэтгэд байна. | Тийм гүйгээс ханбовар  хэрэгцээнд | - Тийм бол 5 оноо | Тийм бол 1 оноо |
|------|--------------------------------------------------|---------------------------------|-------------------------------------------------|----------|-------------------------------------------------|----------|

### A8 Old developments

| A8-1 | Сургалтын ажиллажийн ажиллажийн хувьд нь ил тод, хөгжилтийн ажиллажийн ажил гүйцэтгэд байна. | Ундын материалыг хэрэглэдэг | Ундын материалыг хэрэглэдэг | Шатлуг унхалтлутай бүрэн нэцэн бүрэн 5 оноо | Алын нэг дугуу бол 1 оноо хасах зарчим байна |
|------|--------------------------------------------------|---------------------------------|-------------------------------------------------|----------|-------------------------------------------------|----------|

### A9 Additional notes

<table>
<thead>
<tr>
<th>A9-1</th>
<th>Тэгээд багтай гэрэлхийлэн хэрэгцээнд бүрэн шинэчлэлтийн ажил гүйцэтгэд талаар харж болно.</th>
<th>Тайлан унхалтлутай</th>
<th>Ундын материалыг хэрэглэдэг</th>
<th>Бүрэн тодорхойлснон бүрэн 5 оноо</th>
<th>Бүрэн тодорхойлснон бүрэн 5 оноо</th>
<th>Бүрэн тодорхойлснон бүрэн 5 оноо</th>
</tr>
</thead>
</table>

### A10 References

<table>
<thead>
<tr>
<th>A10-1</th>
<th>Хөгжилтийн хэлбэрлэгийн дүрүүдийг Энэтхэгийн, солонгосын, англи-гэрэлээрийн, гэрийн, түүхийн материалын дагуу бүрэн хардуулж байна.</th>
<th>Шатлуг унхалтлуулгыг бүрэн баярлана</th>
<th>Шатлуг унхалтлуулгыг бүрэн баярлана</th>
<th>Бүрэн тодорхойлснон бүрэн 5 оноо</th>
<th>Бүрэн тодорхойлснон бүрэн 5 оноо</th>
<th>Бүрэн тодорхойлснон бүрэн 5 оноо</th>
</tr>
</thead>
</table>

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**DATA COLLECTION**

"SEEKING WAYS TO ELIMINATE TUBERCULOSIS IN ASIA" Fifth international scientific conference, 15th-16th of September, 2022

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Background:
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Conclusion:
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Keywords: Tuberculosis, curriculum, evaluation, medical university, Mongolia
The tuberculosis curriculum is usually one of the compulsory subjects in the 3rd and above courses. However, in some private schools, it is possible to study electively, and in some schools, it is included in the “Infectious Diseases” curriculum as a 2-hour lecture, 4-hour practice, or as the seminar.

The tuberculosis course curriculum of the universities shows that the duration of time, the topics taught, and the teaching environments were different.

In the teaching methodology section, it is written that "Learning activities are student-centered", but the activities to support students' learning participation are not clear, they are not project-based, the group work is not clear, the practice guidelines are too brief, there is no time allocation, detailed work plan, etc.

RESULTS

- In the case of some private medical schools, there is a shortage of trained personnel and professional teachers, such as the fact that there are few main teachers, most part-time teachers are retired, and one teacher teaches the subject in 2-3 schools.
- The knowledge assessment was clearly defined in each curriculum, but the skills assessment method was unclear.
- Student satisfaction surveys are not routinely conducted
- Alumni satisfaction surveys are conducted only during the curriculum accreditations
- Employers are not regularly asked for satisfaction surveys, and the results are not reflected
- With the situation of the Covid-19 pandemic, lectures have gone online and electronic content has been used for training.
- Practice is often conducted in a classroom, and face-to-face discussions and examinations with patients are limited due to the lack of a base hospital for some private Universities and schools.
CONCLUSION

1. The average score for evaluating the Tuberculosis curriculums of public and private universities is 66.9, which is insufficient.

2. Students graduate with different knowledge and skills due to the differences in the Tuberculosis curriculums of public and private universities.

3. There is a shortage of Professional staff teaching tuberculosis in private medical schools.

4. Tuberculosis practices are often conducted in classrooms, and face-to-face discussions and examinations with patients are limited.

5. The methodology for assessing only the knowledge of the learner is clearly written in each program, but it is not clear how to assess the skills.

6. It is urgent to develop and implement a unified, integrated “Tuberculosis curriculum” for State and private Medical Universities to eliminate the gap.

THANK YOU FOR YOUR ATTENTION