Tuberculosis in 2017: Searching for new solutions in the face of new challenges

6th TB Symposium – Ministry of Health of the Republic of Belarus, Republican Scientific and Practical Center for Pulmonology and Tuberculosis, and Médecins Sans Frontières

1-2 March, 2017, MINSK, BELARUS

Diagnosis of TB in Belarus, statistics and challenges of establishing an accurate and timely DR-TB diagnosis in high MDR-TB prevalence settings

Elena Nikolenko, National TB laboratory
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Elena Nikolenko, National TB laboratory (NRL) March 01–02, 2017, Minsk
TB - Laboratory Network
Laboratory network (new methods are included)

- NRL (GX-2)
- 3 BSL laboratories (GX-8)
- 2 BSL laboratories (GX-13)
- 1 BSL laboratories (GX-7)
Microbiological diagnostics of TB

1st sputum sample
- XpertMTB/Rif
- Microscopy
- Culture / drug susceptibility testing on solid and soft media
- LPA

2nd sputum sample
- Microscopy
- Culture / drug susceptibility testing on solid and soft media
Microbiological diagnostics of TB
Number of cultures in solid growth media (SGM) 1993–2016
SGM, Isolation Rate (%), 1993–2016
Culture sputums for BACTEC MGIT 960, 2012–2016


Counts: 16834, 21751, 21737, 25778, 25610
Positive results of Ziehl–Neelsen microscopy on direct sputum smear in 1 BSL laboratories (%), 2000–2016
LPA MTBDRplus


<table>
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<tr>
<th>City</th>
<th>2012</th>
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Brest  Vitebsk  Gomel  Grodno  Minsk  Mogilev  Correctional facility No. 12  NRL
LPA MTBDRs


Brest Vitebsk Gomel Grodno Minsk Oblast Mogilev Correctional facility No. 12 NRL
Efficiency of tests carried out applying different methods and diagnostic specimens, 2016 (absolute count)

- Microscopy (Ziehl–Neelsen): 163304
- Culture Löwenstein–Jensen: 124126
- Culture MGIT: 17094
- GX: 18020
- GX RIF–R
- LPA MTBDRplus RIF–R
- LPA MTBDRsI Ag–R
- LPA MTBDRsI FQ–R

Legend: Negative result, Positive result
Efficiency of tests carried out applying different methods and diagnostic specimens, 2016 (relative value)

- Microscopy Z–N: 0.9
- Culture Löwenstein–Jensen: 6.5
- Culture MGIT: 17
- GX: 13
- GX RIF–R: 48
- LPA MTBDRplus RIF–R: 36.3
- LPA MTBDRsl Ag–R: 9.6
- LPA MTBDRsl FQ–R: 21.2

Legend:
- negative result, %
- positive result, %
Efficiency of microscopic test carried to analyze the deposit in compliance with Ziehl–Neelsen method, Republic of Belarus (2016)
Proportion of LPA tests: direct materials

- Brest (Brestskaya): 47.7%
- Vitebsk (Vitebskaya): 25.5%
- Grodno (Grodno): 1.4%
- Minsk (Minskaya): 0%
- Mogilev (Mogilevskaya): 0%
- Correctional facility No. 12 (РБ ИК № 12): 0%
- NRL Total (ИТОГО): 31.2%

Proportion of tests on direct material

- GenoType MTBDRplus
- GenoType MTBDRsl

Udelyonnuy vestyestov iz nativnogo materiala

- Brestskaya: 54.7%
- Vitebskaya: 39.3%
- Grodno: 0.0%
- Minsk: 0.0%
- Mogilev: 0.0%
- Correctional facility No. 12: 0.0%
- NRL Total: 31.2%
Problems and shortcomings

- Insufficient use of molecular tests (LPA & GX) and prolonged waiting for the LPA results
- Dependence on external supplies and irregularities in supplies
- Insufficient number of staff members
- Need to undertake reorganization in some 3 BSL laboratories
... and successes

- Increased efficiency and quality of tests, improved quality control of laboratory tuberculosis diagnostics
- During several last years the country’s laboratories have been enrolled in external quality control of DST with excellent results
- Development of international co-operation
BACTERIOLOGICAL CONFIRMATION OF RESPIRATORY TUBERCULOSIS AMONG PRIMARY TB CASES (MOH, REPUBLIC OF BELARUS)
Confirmed TB cases among children in 2016, %

- AFB+: 24.3%
- Mycobacterium tuberculosis+: 54.1%

Confirmed TB of other organs, 2016 (%)

- Mycobacterium tuberculosis+: 9.8%
International cooperation

- FIND
  - Expand TB (technical assistance to the NRL and the laboratory of Minsk Oblast TB Dispensary)
    - Expert ULTRA
    - TB–SLMTA
- National Institutes of Health / National Institute of Allergy and Infection Diseases (NIH/NIAID): complete genomic sequencing
1) Genomic analysis of globally diverse Mycobacterium tuberculosis strains provides insights into the emergence and spread of multidrug resistance.


Nature Genetics (2017) doi:10.1038/ng.3767, Received 30 June 2016 Accepted 14 December 2016 Published online 16 January 2017

2) Whole genome sequencing of Mycobacterium tuberculosis provides insight into the evolution and genetic composition of drug–resistant tuberculosis in Belarus.


3) Multidrug–resistant Mycobacterium tuberculosis caused by the Beijing genotype and a specific T1 genotype clone (SIT No. 266) is widely transmitted in Minsk.

Aksana Zalutskaya, Maria Wijkander, Pontus Jureen, Alena Skrahina, Sven Hoffner

Workshops
AKSANA ZALUTSKAYA
INTRODUCTION TO GOOD CLINICAL LABORATORY PRACTICE
86%
14/08/2015

CERTIFICATE OF PROFICIENCY
2016
May 26, 2016 for the SRL in Stockholm

Alena Nikolenka
Certificate in Essential GCP
As successfully completed the online training programme on Essential GCP GCP/05/06 and achieved the following:
- "Essential Good Clinical Practices"
- and has passed the online examination for the Certificate in Essential GCP

Signed
Professor Denis Nunez
Director, Essential GCP

Date of examination: 14 January 2017
Certificate valid for two years
Certificate number: R20167-11558

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INTRODUCTION TO GOOD CLINICAL LABORATORY PRACTICE
100%
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AERAS UNION

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15/01/2017

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Sarai

TDR

Prospects for TB Laboratory Network development

- Introduction of a new diagnostics algorithm
- Capacity to apply rapid methods and molecular tests (GX and LPA) while diagnosing patients
- Centralization of the Laboratory Network
- Conduction of external quality assessment
- Preparation of the NRL for accreditation
- Increasing capacities of the NRL to ensure regular conduction of clinical and scientific trials
Acknowledgements

Staff members of the TB Laboratory Network

Supervisors of the National Programme for the Prevention and Treatment of Tuberculosis

Symposium Organizers