TURNING THE TIDE

THE IMPACT OF HIGH QUALITY CARE DELIVERY ON THE EPIDEMIOLOGY OF TUBERCULOSIS IN TOMSK, RUSSIAN FEDERATION

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INTERNATIONAL WORKSHOP ON MDR-TB
BEIJING, PEOPLES REPUBLIC OF CHINA
JANUARY 16, 2013
TUBERCULOSIS IN THE RUSSIAN FEDERATION
Russian Federation
(Using 1985 Baseline Data)

Source: Shorrocks and Kolenikov 2000
Fig. 2.1. Notification rates for new TB cases and unemployment in the Russian Federation, 1985–2010, all sectors (Sources: Form No. 8 and [29, 38], population data: Forms No. 1 and No. 4)
Prisoner population per 100,000 citizens

Source: OECD.

\[ R^2 = 0.92 \]

Stuckler D et al. PNAS 2008;105:13280-13285
Effective course of chemotherapy
Died
Failure
Treatment interruption (default)
Transferred out

Figure 5.7. Treatment outcomes in the territories which performed cohort evaluation of treatment effectiveness. Cohorts of 2000-2005, new pulmonary smear-positive TB cases. Grey columns represent the number of territories performing the cohort analysis (Source: Form #08-TB)

Source: Russian Ministry of Health and Social Development 2007
a) MDR-TB among new cases, the Russian Federation (Source: Forms No. 33 and No. 7-TB)

Source: Russian Ministry of Health and Social Development 2012
Fig. 10.7. Multidrug resistance in all groups of RTB MbT+ patients with respiratory tuberculosis: the share in RTB patients and the number of MDR-TB cases registered per 100,000 population (the indicator of registered MDR-TB prevalence in the population), the Russian Federation (Source: Form No. 33)
c) distribution of unsuccessful treatment outcomes in the civilian sector of health care

Fig. 7.7. Chemotherapy treatment outcomes in new ss+ pulmonary TB cases, the 2009 cohort. MoH&SD report – 29,832 patients, FSIN – 1,034 patients (Source: Form No. 8-TB)

Source: Russian Ministry of Health and Social Development 2012; Picture adapted
"MDR-TB is too expensive to treat in poor countries; it detracts attention and resources from treating drug-susceptible disease."

- World Health Organization Groups At Risk, 1996
…best practice SCC may even reduce the incidence of MDR-TB where it has already become endemic…

- Dye et al.  
  *Science* 2002
Factors associated with MDR-TB in Tomsk (1999)

Transmission
- High prevalence of drug resistance
- Rising HIV
- Large incarcerated population
- Nosocomial transmission— inpatient management of TB patients during intensive phase of treatment

Treatment Program
- Inadequate drug regimens for re-treatment
  - Unreliable drug supply
- Poor outpatient management systems
  - Limited systems to observe therapy
  - Limited management of side-effects

ADVISED BY THE WHO & DONORS TO FOCUS ON DRUG-SENSITIVE TB ONLY

Social/structural context of the post-Soviet period:
- poverty and unemployment
- weakened state institutions
- substance abuse
- weakened family structure
- anomie/isolation of individual
TOMSK OBLAST
RUSSIAN FEDERATION
Tomsk Oblast
Population: 1,073,600
Area = 317,000 km²
TB Incidence per 100,000 – Tomsk Prison Sector

Source: Tomsk Oblast Tuberculosis Services
TB Incidence per 100,000 – Tomsk Civilian Sector

Source: Tomsk Oblast Tuberculosis Services
## TB Incidence, Prevalence, and Mortality in Tomsk, Russian Federation

**Penal Sector, 1998**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holding Section TB case notification/100,000</td>
<td>3,565</td>
</tr>
<tr>
<td>Holding Section TB Prevalence/100,000</td>
<td>3,743</td>
</tr>
<tr>
<td>Prison TB case notification/100,000</td>
<td>4,042</td>
</tr>
<tr>
<td>Prison TB Prevalence/100,000</td>
<td>21,581</td>
</tr>
<tr>
<td>TB Mortality/100,000</td>
<td>353</td>
</tr>
<tr>
<td>Percentage of MDR-TB among new cases</td>
<td>28</td>
</tr>
<tr>
<td>Percentage of MDR-TB among re-treatment cases</td>
<td>54</td>
</tr>
</tbody>
</table>

Source: Tomsk Oblast Penitentiary Tuberculosis Services, Tomsk, Russian Federation, July 2005.
MDR-TB prevalence among all smear-positive new and re-treatment cases 2001, Tomsk Oblast (n=1303)

Source: Tomsk Oblast Tuberculosis Services
Resistance patterns of Tomsk Cohort (244)

Source: Tomsk Oblast Tuberculosis Services, Tomsk, Russian Federation, 2005.
Difficulties faced by patients

• 18-24 month-long course of treatment
• Twice-daily intake of 4-7 medications
• Side effects common: almost all patients experience side effects, and about 10% of patients experience severe side effects
• Some patients have severe comorbidities (e.g. diabetes and alcoholism), which worsen the tolerance of the medications
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean)</td>
<td>32</td>
</tr>
<tr>
<td>Male</td>
<td>86%</td>
</tr>
<tr>
<td>Prison</td>
<td>45%</td>
</tr>
<tr>
<td>Civilian</td>
<td>55%</td>
</tr>
<tr>
<td>Employed</td>
<td>17%</td>
</tr>
<tr>
<td>Married</td>
<td>38%</td>
</tr>
<tr>
<td>Disability</td>
<td>42%</td>
</tr>
<tr>
<td><strong>Homeless</strong></td>
<td><strong>3.3%</strong></td>
</tr>
<tr>
<td>Previous treatments:</td>
<td>2 (1-6)</td>
</tr>
<tr>
<td>Yrs with TB before MDR Rx</td>
<td>3.3 (0.1-28.3)</td>
</tr>
<tr>
<td>TB contact</td>
<td>67%</td>
</tr>
<tr>
<td>HCW</td>
<td>2.5%</td>
</tr>
<tr>
<td>Previous prison</td>
<td>64%</td>
</tr>
<tr>
<td><strong>Low BMI</strong></td>
<td><strong>42%</strong></td>
</tr>
<tr>
<td>Co-morbidity</td>
<td></td>
</tr>
<tr>
<td>Abnormal LFTs</td>
<td>18%</td>
</tr>
<tr>
<td>Substance abuse</td>
<td>50%</td>
</tr>
<tr>
<td>Alcohol hx</td>
<td>35%</td>
</tr>
<tr>
<td>Alcohol during Rx</td>
<td>32%</td>
</tr>
<tr>
<td>IVDU</td>
<td>18%</td>
</tr>
<tr>
<td>Tobacco use</td>
<td>88%</td>
</tr>
<tr>
<td>Cavitary and bilateral disease</td>
<td>66%</td>
</tr>
</tbody>
</table>

Source: Shin et al., IJTLDS 2006
If the patient has the *right to care* (as is legally the case in the Russian Federation), what needs to be done in order to ensure that they receive care?

Find programmatic solutions for all barriers to care.
SOLUTIONS

• Improvement of facilities
• Transportation assistance for patients and health workers
• Choice of treatment site
• Food assistance for patients
Case detection and management of TB and MDR-TB in Tomsk Oblast

**General polyclinics:**
- Active and passive

**General hospitals:**
- Passive
- Among TB contacts

**TB dispensary, rural TB offices:**
- Active and passive

**Rural clinics, Hospitals:**
- PRISON
- TB Hospital
- Day Care Hospital
- TB dispensary
- Rural TB offices, Rural feldsher or doctor clinics

**Ambulatory treatment:**
- Home visits
- Collaboration with Red Cross

**Sites where patients can receive care and food**
SOLUTIONS

- Improvement of facilities
- Transportation assistance for patients and health workers
- Choice of treatment site
- Food assistance for patients
- Aggressive management of adverse events
- Treatment at home for patients who are unable to ambulate or who live too far
- The use of enablers and incentives
Incentives for patients:
- improved nutrition in the hospital with snacks
- hot meals at the day hospital
- food packets monthly for adherent patients
- travel vouchers (government provided)
- small gifts for adherence
- help with passports, access to pensions, etc.

Incentives for staff:
- hot meals at the day hospital
- food packets monthly for rural health workers and nurses
SOLUTIONS

• Improvement of facilities
• Transportation assistance for patients and health workers
• Choice of treatment site
• Food assistance for patients
• Aggressive management of adverse events
• Treatment at home for patients who are unable to ambulate or who live too far
• The use of enablers and incentives
• Social assistance for patients
SOCIAL ASSISTANCE

Includes hospital social services, psychologists and social workers to:
- Help patients to recover lost documents
- Help in job search
- Donations of clothes
- Provision of food sets
- Legal and psychological help
MDR-TB Patient Treatment Outcomes
N=110

80.8% Cured
3% Default
3.50% Failure
12.70% Died

Source: Tomsk Oblast TB Services
TB mortality in the Tomsk Penitentiary System
(1999 – 2006; per 100,000 population)

Source: Tomsk Oblast TB Services
TREATMENT OUTCOMES OF FIRST COHORT (N=244)  
TOMSK, RUSSIA

Source: Shin et al., IJTLD 2006
Treatment of extensively drug-resistant tuberculosis in Tomsk, Russia: a retrospective cohort study


<table>
<thead>
<tr>
<th></th>
<th>XDR TB (N=29)</th>
<th>Non-XDR TB (N=579)</th>
<th>Total number</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Favourable outcome</td>
<td>14 (48%)</td>
<td>386 (67%)</td>
<td>400 (66%)</td>
<td>0.04*</td>
</tr>
<tr>
<td>Cured</td>
<td>13 (45%)</td>
<td>366 (63%)</td>
<td>379 (62%)</td>
<td></td>
</tr>
<tr>
<td>Treatment completed</td>
<td>1 (3%)</td>
<td>20 (3%)</td>
<td>21 (3%)</td>
<td></td>
</tr>
<tr>
<td>Poor outcome</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Failure</td>
<td>9 (31%)</td>
<td>49 (8%)</td>
<td>58 (9%)</td>
<td>0.0008†</td>
</tr>
<tr>
<td>Death</td>
<td>2 (7%)</td>
<td>29 (5%)</td>
<td>31 (5%)</td>
<td>0.65†</td>
</tr>
<tr>
<td>Default</td>
<td>4 (14%)</td>
<td>115 (20%)</td>
<td>119 (20%)</td>
<td>0.42†</td>
</tr>
</tbody>
</table>

Total number of patients=608. Data are numbers (%). MDR=multidrug resistant tuberculosis. XDR TB=extensively drug-resistant tuberculosis. Non-XDR TB=non-extensively drug-resistant tuberculosis. *This value refers to the comparison between favourable and poor outcome. †This value refers to the comparison between each outcome (ie, failure, death, or default) and all other outcomes.

Table 2: Treatment outcomes of patients with MDR tuberculosis

Source: Keshavjee et al., Lancet, 2008
Tomsk, Russia → Second Cohort of MDR-TB Patients (N=386)

- Cure rate lower in the civilian sector but not in the prison sector
- Drug toxicity about twice as frequent as in prison cohort
- Considerations:
  - Worse adherence
  - Increased substance abuse
  - More difficult cases being addressed now
  - Longer delays to treatment
  - Increasing resistance due to exposure to 2\textsuperscript{nd} line drugs
Treatment Outcomes, Civilian Sector
Tomsk Oblast, Russian Federation

Source: Tomsk Oblast TB Services, Analysis by Dr. D Taran, PIH Moscow
Thinking about defaulters…

? → HIGH DEFAULT RATE
Thinking about defaulters…

Patient-factors:

• alcohol and drug abuse
• homelessness
• previous incarceration
• depression and mental illness
• no desire for treatment
• joblessness

HIGH DEFAULT RATE
Thinking about defaulters…

Social/structural factors:
- poverty
- breakdown in family structure
- anomie

Patient-factors:
- alcohol and drug abuse
- homelessness
- previous incarceration
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HIGH DEFAULT RATE
Thinking about defaulters…

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- no desire for treatment
- joblessness

HIGH DEFAULT RATE

AREAS OF INTERVENTION
“Sputnik” program

• Some patients require assistance to finish treatment

• Need a system of accompaniment to help overcome barriers to treatment (this is different from simple DOT)
  – Social supports
  – Nutritional supports
  – Family support

• One *Sputnik* will look after five to seven patients

• Changes the onus of responsibility for adherence from the patient (“non-compliant”) to the program (programmatic failure)
Philosophy of Sputnik Initiative

• Responsibility for adherence rests with the program, not the patient.

• Creation of patient-centered, convenient and pleasant treatment atmosphere.

• The name “Sputnik” is a translation of “accompagnateur”, which emphasize the role of nurses as patients’ companions or friends.
Sputnik Personnel Duties

- Daily DOT delivery
- Creation of personal connection with a patient
- Better knowledge of patients’ habits, relatives, friends, possible places to reside and etc.
- Complex psychological and social support to the patients
- Diagnosis and management of side effects
53 non-adherent patients were enrolled on Sputnik program from December 17, 2006 to November 30, 2008

2 patients refused to participate

51 patients stayed on Sputnik program

5 patients restarted new treatment course with 83% adherence [baseline adherence 0%]

46 patients continued previous treatment. Adherence increased from 52% before enrolment on the program to 81% while on Sputnik, p<0.0001
* This includes the two patients who refused to participate and one patient who was told to stop by his physician;

□ All deaths were unrelated to tuberculosis

Source: Gelmanova et al., IJTLID 2011
Table 3  Treatment outcomes for all patients referred to the Sputnik program \((n = 53)\) divided by MDR-TB vs. all others

| Patients receiving treatment for | All other patients | Total  \
|---------------------------------|-------------------|-----------
| MDR-TB \((n = 38)\)            | \(n (\%)\)        | \(n (\%)\) | \(n (\%)\) |
| Cured/treatment completed*      | 27 (71.1)          | 9 (60.0)   | 36 (67.9)  |
| Failure                         | 2 (5.3)            | 1 (6.7)    | 3 (5.7)    |
| Died†                           | 2 (5.3)            | 1 (6.7)    | 3 (5.7)    |
| Transfer out                    | 1 (2.6)            | 1 (6.7)    | 2 (3.8)    |
| Default‡                        | 6 (15.8)           | 3 (20.0)   | 9 (17.0)   |

Note: No deaths were due to TB; most were due to violent crimes

“Default” includes the 2 patients who refused to participate in the program

Source: Gelmanova et al., IJTL 2011
Treatment Outcomes, Civilian Sector
Tomsk Oblast, Russian Federation
2001-2007

Source: Tomsk Oblast TB Services, Analysis by Dr. D Taran, PIH Moscow
Interrupting transmission: treatment of all patients

Ambulatory care and community based approaches provide a way to treat large numbers of patients rapidly, and safely
Dynamics of Tuberculosis notification rate in Tomsk Oblast, Siberia, and Russian Federation (per 100,000 population)

Source: Tomsk Oblast TB Services
Dynamics of Tuberculosis prevalence in Tomsk Oblast, Siberia, and Russian Federation (per 100,000 population)

Source: Tomsk Oblast TB Services
Dynamics of Tuberculosis mortality in Tomsk Oblast, Siberia, and Russian Federation (per 100,000 population)

MDR-TB treatment began

Source: Tomsk Oblast TB Services
WE ASPIRE TO A WORLD WITH 
ZERO TB DEATHS

Thank you

JOIN US