Community based approach to the treatment of Drug resistant tuberculosis

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Leeches were introduced on a large scale to treat Phthisis in the First Third of the 19th Century. They were introduced by Dr. Broussai
Introduction

- Drug resistant tuberculosis is an emerging epidemic that threatens to reverse the gains made in TB control by many countries.
Definitions

• Mono-resistance: In vitro resistance to one first line anti TB drugs
• Poly-resistance: Resistance to more than one first line anti TB drugs other than both H and R.
• Multi Drug Resistance: Resistance to both H and R
• Extreme drug resistance: MDR-TB plus resistance to fluoroquinololones and any of the second line injectable drugs (amikacin, capreomycin, kanamycin)
Disease burden: Global

- 500,000 cases of MDR reported globally
- 50,000 cases of XDR reported globally
2. High Burden Countries for MDR TB responsible for 435,470 cases representing 85% of global burden

<table>
<thead>
<tr>
<th>Country</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. India</td>
<td>130,526</td>
</tr>
<tr>
<td>2. China</td>
<td>112,348</td>
</tr>
<tr>
<td>3. Russian Federation</td>
<td>42,969</td>
</tr>
<tr>
<td>4. South Africa</td>
<td>15,914</td>
</tr>
<tr>
<td>5. Bangladesh</td>
<td>14,506</td>
</tr>
<tr>
<td>6. Pakistan</td>
<td>13,218</td>
</tr>
<tr>
<td>7. Indonesia</td>
<td>12,209</td>
</tr>
<tr>
<td>8. Philippines</td>
<td>12,125</td>
</tr>
<tr>
<td>9. Nigeria</td>
<td>11,700</td>
</tr>
<tr>
<td>10. Kazakhstan</td>
<td>11,102</td>
</tr>
<tr>
<td>11. Ukraine</td>
<td>9,835</td>
</tr>
<tr>
<td>12. Uzbekistan</td>
<td>9,450</td>
</tr>
<tr>
<td>13. DR Congo</td>
<td>7,336</td>
</tr>
<tr>
<td>14. Viet Nam</td>
<td>6,468</td>
</tr>
<tr>
<td>15. Ethiopia</td>
<td>5,979</td>
</tr>
<tr>
<td>16. Tajikistan</td>
<td>4,688</td>
</tr>
<tr>
<td>17. Myanmar</td>
<td>4,181</td>
</tr>
<tr>
<td>18. Azerbaijan</td>
<td>3,916</td>
</tr>
<tr>
<td>19. RepMoldova</td>
<td>2,231</td>
</tr>
<tr>
<td>20. Kyrgyzstan</td>
<td>1,290</td>
</tr>
<tr>
<td>21. Belarus</td>
<td>1,101</td>
</tr>
<tr>
<td>22. Georgia</td>
<td>728</td>
</tr>
<tr>
<td>23. Armenia</td>
<td>486</td>
</tr>
<tr>
<td>24. Lithuania</td>
<td>464</td>
</tr>
<tr>
<td>25. Bulgaria</td>
<td>371</td>
</tr>
<tr>
<td>26. Latvia</td>
<td>202</td>
</tr>
<tr>
<td>27. Estonia</td>
<td>123</td>
</tr>
</tbody>
</table>
Estimated number of MDR-TB cases, 2007

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

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Countries with at least one confirmed XDR-TB case, as of March 2009

Armenia  Canada  France  Italy  Myanmar  Philippines  Russian Federation  Ukraine
Argentina  Chile  China, Hong Kong  Georgia  Japan  Namibia  Poland  Slovenia  United Arab Emirates
Australia  Colombia  Germany  Latvia  Nepal  Netherlands  South Africa  United Kingdom
Azerbaijan  Argentina  Chile  Georgia  Germany  Latvia  Lesotho  Lithuania  Namibia  Nepal
Bangladesh  Czech Republic  China, Hong Kong  India  Indonesia  Israel  Japan  Lesotho  Luxembourg
Botswana  Ecuador  Estonia  France  Georgia  Germany  Ghana  Greece  Hungary
Brazil  Estonia  France  Georgia  Germany  Ghana  Greece  Hungary

Additional countries: Australia, Austria, Bangladesh, Belgium, Brazil, Bulgaria, Canada, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Denmark, Finland, France, Georgia, Germany, Greece, Guatemala, Hungary, Iceland, India, Indonesia, Iran, Ireland, Israel, Italy, Japan, Jordan, Kenya, Korea, Kyrgyzstan, Latvia, Lithuania, Luxembourg, Madagascar, Malaysia, Malta, Mexico, Mozambique, Netherlands, New Zealand, Nicaragua, Poland, Portugal, Qatar, Romania, Russia, Rwanda, Sierra Leone, Slovak Republic, Singapore, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Thailand, Turkey, Ukraine, United Arab Emirates, United Kingdom, United States, Uruguay, Uzbekistan, Vietnam, Yemen.
Disease Burden: Kenya

- About 500 cases of MDR diagnosed in Kenya so far
- 2 cases of XDR reported
- There are 220 cases on treatment in the country
- 20 cured
- Average time to sputum smear and culture conversion 3-5 months.
Controversial issues in MDR/XDR care

- No clinical trials comparing different regimens and drugs
- There are only individual clinical experiences and case studies showing varied results
- Frequently changing recommendations
- Varied opinions of best models of care and settings
Treatment delivery settings

• In patient
  – Hospital isolation wards
  – Housing facility

• Out patient
  – Facility based- in door, outdoor
  – Community based: in any agreed place by trained treatment partners.
# Treatment delivery settings

<table>
<thead>
<tr>
<th>Factor</th>
<th>Facility-based</th>
<th>Community-based</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hospitalized</td>
<td>Ambulatory</td>
</tr>
<tr>
<td>1. Cost</td>
<td>Expensive</td>
<td>Costly – daily travel</td>
</tr>
<tr>
<td>2. Need for enablers/incentives</td>
<td>Subsidy for hospitalization</td>
<td>Travel cost</td>
</tr>
<tr>
<td>2. Infection control Nosocomial spread</td>
<td>Costly Danger</td>
<td>Costly if indoor Danger if indoor</td>
</tr>
<tr>
<td>3. Quality of life</td>
<td>Not desired</td>
<td>Not desired (relocated)</td>
</tr>
<tr>
<td>4. Schedule</td>
<td>Constraint</td>
<td>Constraint (clinic hours)</td>
</tr>
<tr>
<td>5. Convenience</td>
<td>May be inconvenient</td>
<td>Inconvenient</td>
</tr>
<tr>
<td>6. Health workers</td>
<td>MDs, nurses</td>
<td>MD, nurse, SW, volunteers</td>
</tr>
</tbody>
</table>
Treatment delivery settings

  – Compared 2 traditional cohorts
    • Community based – 50 patients
    • Hospital based- 57 patients
      – Median time to initiation of treatment
        » 84 days in CM and 106.5 days hospital based
      – Median time to sputum conversion
        » 59 days in CM and 92 days in hospital based
      – Median time to sputum culture conversion
        » 85 days in CM and 119 days in hospital based
Treatment centers

• 32 centers in the country
  – Community based
    • MTRH, CDC- Nyanza
  – Facility based- out patient
    • KNH, Blue house, Port Reitz
  – Facility based- in patient
    • Homa Bay, Daadab
  – Private sector
MDR/XDR program at MTRH

- Started in March 2008
- MDR team identified
- SOPS and protocols developed
  - National guidelines used
Initial Home visit

- History and clinical evaluation by program medical officer
- Assess socio economic status
- Food security or shelter
- Exposure history of known contacts
- Identify private location in the home where treatment could be administered
Initial home visit

- Sought patient commitment to treatment schedule
- Baseline blood works
- Infection control issues
  - Cough hygiene
  - Sleeping arrangements
  - Limited indoor visitation
- Identify DOT worker
Initial home visit

- Train DOT worker
- Supply N95 respirators and surgical masks
- Food support
- Social support
Treatment regimens

• MDR
  – 6 months of capreomycin, ofloxacin, cycloserine, prothionamide, pyrazinamide or ethambutol
  – 18 months of ofloxacin, cycloserine, prothionamide, PZA or Ethambutol

• XDR
  – 6 or 7 antibiotics that organism is sensitive to
  – PAS, clarithromycin, augmentin, linezolid, clofazimine, (+ quinolone and aminoglycoside if sensitive)
Treatment

• Two week medication box supplied to the nurse
• Charting of side effects done by the nurse
• Nurse administers morning dose and household members evening dose
• Medical officer visit: monthly
  – Blood draws and sputum collection
Results

- Total of 21 patients registered
  - 5 patients completed treatment and cured
  - 8 on treatment currently
    - 6 smear and culture negative
    - 2 smear positive
      - Newly diagnosed XDR (Shared same house/room with the first XDR TB case in the country)
      - 1 still smear positive at month 10
MORTALITY
Results

- 8 patients died so far
  - 5 died before start of program
  - 3 died while on treatment
    - 1 died at month 20 due to bacterial pneumonia
    - Died at month 16 culture at month 10 with a rise in smear positivity. Clinically suspected XDR
    - XDR case died at month 11. Smears and cultures remained positive for the entire period.
Special situation

• One patient was pregnant: Given all drugs except capreomycin that was added after she delivered- cured
Conclusions

- Community based MDR/XDR treatment can be embedded in the national TB control program
- Community based treatment is feasible
- Allows patient to be treated in a supportive environment
- Similar programs going on in Haiti, Peru and South Africa
- Challenges: difficult terrains, gathering local team.