Engagement, Screening, Contact Investigation & Prevention in a High-transmission MDR-TB Setting
Experiences from Papua New Guinea

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*All images are used with consent, including children and adolescents*
TB in Papua New Guinea (2021)

- Incidence 424 (340 - 517) per 100,000
- Treatment coverage 68% (56 – 85)

- TB notifications & outcomes
  - Pulmonary 53%
  - Bac+ 36%
  - Child 23%
  - Success rate 74%
  - Case fatality 13% (8 – 19)

MDR-TB 481 cases
  - New 4% (1.6 – 8.4)
  - ReTx 23% (27 -42)
  - Success rate 70%
Unprecedented rates of MDR-TB in Daru, South Fly District, Western Province, PNG

- TB case notification rate of 2,600 per 100,000 population
- 70% of all TB notifications are in Daru residents
- 68% of TB notifications are <35 years

- MDR-TB case notification rate of 600 per 100,000
- One in five TB cases are MDR/RR TB
Supplement: Foundations for Pillar 3 of the End TB Strategy in Papua New Guinea - building capacity in operational research

INTRODUCTION
4-5 The SORT IT model for building operational research capacity: the experience of TB service providers in PNG
P. Asi, S. S. Majumdar, W. Pomer, N. Tehuarami, S. M. Graham, P. Dakulala

6 EDITORIAL
Building operational research capacity in Papua New Guinea and the Pacific Islands
K. Viley, K. Bissell, P. C. Hill

ORIGINAL ARTICLES
7-14 The emergency response to multidrug-resistant tuberculosis in Daru, Western Province, Papua New Guinea, 2014-2017


22-28 Impact of CoAlert on the management of rifampicin-resistant tuberculosis patients, Port Moresby, Papua New Guinea
J. K. Baramu, E. Lawa, K. Johnson, R. Moike, S. S. Majumdar, K. C. Takunda, R. J. Commons

29-35 Implementation of screening and management of household contacts of tuberculosis cases in Daru, Papua New Guinea

36-41 Outcomes in children treated for tuberculosis with the new dispersible fixed-dose combinations in Port Moresby

42-46 A retrospective study of tuberculosis outcomes in Gulf Province, Papua New Guinea
J. Minas, S. Main, R. J. Commons, B. Robertson, A. Miel, M. Gale

47-53 The effects of decentralization of tuberculosis services in the East New Britain Province, Papua New Guinea
A. Mahu, S. S. Majumdar, S. Main, M. Philip, K. Wilan, J. Schudy, P. du Cros

54-60 TB treatment delay associated with drug resistance and admission at Daru General Hospital in Papua New Guinea
E. Majioli, E. T. Franco, P. du Cros, M. Tsane, G. Chain

61-65 Challenges in TB diagnosis and treatment: the Kaiwai Provincial Hospital experience, Papua New Guinea

66-71 A mortality review of adult inpatients with tuberculosis in Mendi, Papua New Guinea
K. Valadon, A. Aroa, M. Sycru, C. Ramon, L. Canne-Thomson, M. Gale, R. J. Commons

72-76 Caps in tuberculosis care in West Sepik Province of Papua New Guinea
T. Keite, K. C. Takunda, R. Commons, B. Vioso, J. Toves, M. Gale

76-82 Successful implementation of bedaquiline for multidrug-resistant TB treatment in remote Papua New Guinea

SHORT COMMUNICATIONS
83-85 A pilot model of patient education and counselling for drug-resistant tuberculosis in Daru, Papua New Guinea

86-88 Tuberculosis treatment unmasking leprosy: management of drug-resistant tuberculosis and leprosy co-infection
C. Karie, G. K. L. Huang, M. Taein, R. Anera, L. Morris, B. Kromhout, A. Marizzato, D. P. O’Brian

The effects of decentralization of tuberculosis services in the East New Britain Province, Papua New Guinea
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Household contact screening and management
Daru, Papua New Guinea
2018-2020
## Household Contact Investigation - Implementation Timeline

<table>
<thead>
<tr>
<th>Start date</th>
<th>Activity</th>
</tr>
</thead>
</table>
| March 2016 – September 2017 | Contact tracing began for XDR-TB and MDR-TB cases*  
Additional HR, tools developed                                                                                                                                                                        |
| October 2017        | Systematic contact tracing for DS-TB and provision of TPT (6H) to <5 contacts  
Community PT clinics established                                                                                                                                                                       |
| 2018                | Systematic screening for active TB                                                                                                                                                                           |
| November 2018       | Community Engagement, Training, SOPs, Human Resources (educator, nurse)                                                                                                                                 |
| January 2019        | New TPT regimens under OR: 3RH for eligible DS-TB contacts & 6LFX for eligible MDR-TB contacts                                                                                                              |
| March 2020          | Contact investigation program stops due to COVID-19 pandemic                                                                                                                                               |
| April 2022          | Program Restarts post pandemic                                                                                                                                                                             |
| November 2022       | Scale-up of TPT to older children, adolescents & adults                                                                                                                                                   |

*Honjepari, Madiowi et al. Public Health Action 2019*
Implementation of the new model of care (2019)

Community Engagement

Tools and SOPs → Electronic record system

Patient-centred education & counselling (peer-led model)

Tuberculin skin testing (TST) and novel regimens
Household contact screening in Daru. Oct 2017 – June 2020

- 781 Index cases
- 6090 Contacts Screened (90% of 6802 identified)
- 19.4% Symptomatic
- 3.2% Active TB (16.5% of symptomatic)

- **Moderate yield**
- **V. high linkage into care**

<table>
<thead>
<tr>
<th></th>
<th>DS</th>
<th>MDR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screened positive</td>
<td>213</td>
<td>91</td>
</tr>
<tr>
<td>Diagnosed with TB</td>
<td>85</td>
<td>52</td>
</tr>
<tr>
<td>Initiated TB treatment</td>
<td>85</td>
<td>52</td>
</tr>
</tbody>
</table>

Bar chart showing:
- 17.9% screened positive
- 22.8% screened positive
- 3.3% diagnosed with TB
- 2.9% diagnosed with TB
- 100% initiated TB treatment
- 100% initiated TB treatment
TPT cascade of care for young child contacts per TPT regimen: 2017 – 2020

- High uptake (99%)
- High completion (82%)
82% Completion rate
Well tolerated

### TPT Outcomes for Child Contacts in Daru, Oct 2017 – Mar 2020 (n = 364)

<table>
<thead>
<tr>
<th>TPT</th>
<th>Complete</th>
<th>Developed TB</th>
<th>Not complete</th>
<th>On treatment</th>
<th>Stopped by clinician</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>6H</td>
<td>171 (78.5%)</td>
<td>0</td>
<td>34 (16.3%)</td>
<td>0</td>
<td>4</td>
<td>209</td>
</tr>
<tr>
<td>3RH</td>
<td>117 (81.8%)</td>
<td>0</td>
<td>24 (16.8%)</td>
<td>1</td>
<td>1</td>
<td>143</td>
</tr>
<tr>
<td>6Lfx</td>
<td>11 (91.7%)</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Regimen</th>
<th>Total</th>
<th>Adverse Event</th>
<th>LTFU</th>
<th>Not recorded</th>
</tr>
</thead>
<tbody>
<tr>
<td>6H</td>
<td>34</td>
<td>5</td>
<td>24</td>
<td>4</td>
</tr>
<tr>
<td>3RH</td>
<td>24</td>
<td>9</td>
<td>23</td>
<td>1</td>
</tr>
<tr>
<td>6Lfx</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>58</td>
<td>14 (24%)</td>
<td>47 (81%)</td>
<td>5 (9%)</td>
</tr>
</tbody>
</table>

All AEs were Grade 1 and 2 (rash and gastrointestinal)
Age-related prevalence of infection in household contacts

**Suggests transmission is mainly outside households**

- High prevalence of LTBI in household contacts
  - Lower than expected in young children
  - Increases in adolescents
- Contacts have multiple index cases (DS and DR-TB)
- 20% of incident TB is MDR/RR-TB → household exposure doesn’t not mean infection with same strain

**DS-TB**: 36% TST+ (n=320)

**MDR-TB**: 47% TST+ (n=562)
Key findings

• Functional model of community-based household contact screening and management established with tools and protocols

• Good yield of active TB case detection in contacts, similar for contacts of DS and MDR TB cases, higher in young children

• High prevalence of infection (TST+) in MDR-TB household contacts increasing sharply with age

• High uptake and completion rate of PT

• To date, new regimens of 3RH and 6Lfx well tolerated
Challenges and considerations

Operational
• Human resources needed
  • Dedicated team, community-based model, task shifting
• TST supply

Social determinants
• Poverty, health literacy, food insecurity, service access
  • Engagement and building trust

Households, re-identification and drug-resistance
• Poor civil registration coverage
• Tracking of contacts across multiple visits / locations
  • Screening, evaluation, treatment
• Linkage of contacts to multiple index cases
• Large, multi-generational households based on kinship and population movement
<table>
<thead>
<tr>
<th>Potential impact on transmission</th>
<th>&lt; 5 years</th>
<th>5-14 years</th>
<th>15-34 years</th>
<th>35-54 years</th>
<th>55 years +</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimal +/-</td>
<td>+</td>
<td>+++</td>
<td>++</td>
<td>+</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symptom screen</th>
<th>For all ages</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>CXR if symptom screen negative</th>
<th>No</th>
<th>Uncertain</th>
<th>Yes</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Test for disease, sputum Xpert</th>
<th>From symptomatic (and CXR abnormal) if available</th>
<th>From all – symptomatic, CXR abnormal and asymptomatic if able to provide</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Test for infection</th>
<th>Not required</th>
<th>Recommended for TPT</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>TPT indicated</th>
<th>TB-exposed and asymptomatic</th>
<th>Evidence of TB infection</th>
<th>Uncertain</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>TPT preferred regimen</th>
<th>3RH or 6Lfx if MDR contact</th>
<th>Consider new regimen in high MDR setting: 6HLfx</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>TPT safety</th>
<th>+++</th>
<th>+++</th>
<th>++</th>
<th>+</th>
<th>+</th>
</tr>
</thead>
</table>
Future directions – community wide intervention
SWEEP-TB Daru: Proposed screening and diagnostic approach to community implementation in a high transmission MDR-TB setting

Community-wide engagement & screening

< 5 years
Symptom screen

Household index case
No BCG

Household index case
BCG Vaccination
6Lfx
3RH

5-34 years
Symptom screen + CAD4TB (if >10 years)

Screen positive
Symptomatic or CXR suggestive
EVALUATE for TB disease

Active TB
Treat for DS or MDR-TB

TST negative
BCG Vaccination
TST positive
6HLfx

No TB

No TB

No TB

No TB
SWEEP-TB Daru
Systematic Island-Wide Engagement & Elimination Project for TB in Daru
TB elimination requires engagement and collaboration with the affected community.

Engagement within our TB work:
- Community Advisory Group
- Community education
- Peer education and counselling
- Representation of people on treatment
- TB survivor empowerment

*Engagement with Civil Society as the Driver for Change, WHO, 2020*
Acknowledgement of the tireless work of the TB program staff and affected communities.