Epidemiology of Tuberculosis in Los Angeles County

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Los Angeles County TB Control Program

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Learning Objectives

• Describe the basic trends and patterns of tuberculosis in Los Angeles County in 2015

• Describe the epidemiology of TB among specific population subsets

• Describe the demographics and clinical characteristics of our TB cases

• Describe two current tuberculosis outbreaks in LA County
TB Cases in LA County, 1992-2015

LA County TB Patients. Data exclude Pasadena and Long Beach TB Patients.
TB patients by Service Planning Area 2015

Total Patients
N=606 [3.6%]

n=132 [12.8%]

n=13 [8.3%]

n=91 [3.4%]

n=59 [-6.3%]

n=10 [25.0%]

n=124 [-10.8%]

n=96 [-3.0%]

n=78 [32.2%]

LA County TB Patients. Data exclude Pasadena and Long Beach TB Patients. Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change. Three Patients were excluded because they were classified as Admin Headquarters. In this figure, SPA refers to the SPA that confirmed the patient. Percent Change is calculated by: ((2015-2014)/2014)*100

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DEMOGRAPHICS of TUBERCULOSIS PATIENTS
TB Case Rates by Sex: LA County 2001-2015

LA County TB Patients. Data exclude Pasadena and Long Beach TB patients.
Age-Gender Distributions: LA County 2014-2015

LA County TB patients, 2015

LA County population (2014)

Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change.
TB Case Rates by Age: LA County 2011-2015

TB Case Rates by Sex and Age: LA County 2015

Tuberculosis in children under 5 years: LA County 2001-2015

LA County TB Patients. Data exclude Pasadena and Long Beach TB patients. Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change.
LA County TB Patients. Data exclude Pasadena and Long Beach TB Patients.
Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change.
U.S. and Non-U.S. Born TB Patients by Race/Ethnicity: LA County 2015

LA County TB Patients. Data exclude Pasadena and Long Beach TB patients. Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change.
TB Patients by Nativity and Race/Ethnicity:
LA County 2015

- Non-U.S. Born, 493, 81%
- U.S. Born, 110, 18%
- Unknown, 3, 1%
- Asian, 7, 6%
- NH White, 19, 17%
- Hispanic, 49, 45%
- Black, 35, 32%

LA County TB Patients. Data exclude Pasadena and Long Beach TB patients.
Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change.
Asian includes NHPI (Native Hawaiian / Pacific Islander).
TB Patients by Nativity and Country of Birth: LA County 2015

Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change.

*Korea includes Democratic People’s Republic of Korea & Republic of Korea

LA County TB Patients. Data exclude Pasadena and Long Beach TB patients.

Non-U.S. Born, 493, 81%

- U.S. Born, 110, 18%
- Unknown, 3, 1%

- Mexico, 145, 29%
- Philippines, 126, 26%
- Vietnam, 35, 7%
- China, 36, 7%
- Other Countries, 128, 26%
- Korea, 26, 5%

*Korea includes Democratic People’s Republic of Korea & Republic of Korea

LA County TB Patients. Data exclude Pasadena and Long Beach TB patients.

Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change.
**TB Patients by Country of Birth (8 highest): LA County 2011-2015**

Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change.

*Korea includes Democratic People’s Republic of Korea & Republic of Korea
LA County TB Patients. Data exclude Pasadena and Long Beach TB patients.
Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change.*

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Mexico</td>
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<td>130</td>
<td>120</td>
<td>110</td>
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<td>90</td>
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<td>20</td>
<td>10</td>
<td>5</td>
<td>3</td>
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<tr>
<td>Guatemala</td>
<td>20</td>
<td>15</td>
<td>10</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>El Salvador</td>
<td>10</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Number of Patients

![Bar Chart](chart.png)

Country of Birth
Non-U.S. Born Patients by Years in the U.S. at TB diagnosis: LA County 2011-2015

- 75% in U.S. 9+Years
- 51% in U.S. 18+ Years

LA County TB Patients. Data exclude Pasadena and Long Beach TB patients. Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change.
Tuberculosis Patients with known HIV Co-Infection: LA County 2001-2015

Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change.
TB Patients missing HIV Status:
LA County 2001-2015

Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change.

LA County TB Patients. Data exclude Pasadena and Long Beach TB patients.
Key Comorbidities among TB Patients: LA County 2011-2015

NOTE: Patients may have more than one comorbidity
Number of Comorbidities* among TB Patients: LA County 2015 (n=606)

- No comorbidities, n=372, 61%
- One comorbidity, n=191, 32%
- Two or more comorbidities, n=43, 7%

*Includes HIV, DM, Immunosuppressed, ESRD, Organ transplant, TNF-alpha therapy

LA County TB Patients. Data exclude Pasadena and Long Beach TB patients. Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change.
TB Patients by Behavioral Risk Factors: LA County 2010-2015

NOTE: Patients may have more than one risk factor

LA County TB Patients. Data exclude Pasadena and Long Beach TB patients. Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change.
TB Patients by Social Risk Factors:
LA County 2010-2015

NOTE: Patients may have more than one risk factor

LA County TB Patients. Data exclude Pasadena and Long Beach TB patients. Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change.

*Incarceration includes: Federal Prisons, State Prisons, Local Jails, Juvenile Detention Facilities, and Other forms of incarceration (e.g. ICE, Military Holding Facilities)
CLINICAL CHARACTERISTICS of TUBERCULOSIS PATIENTS
Primary Reason for TB Evaluation: LA County 2015

- **TB Symptoms**: 317 patients, 52%
- **Abnormal CXR**: 184 patients, 30.4%
- **Incidental Lab Result**: 66 patients, 10.9%
- **Employment/Administrative Testing**: 3 patients
- **Health Care Worker**: 1 patient
- **Contact Investigation**: 16 patients, 5.8%
- **Immigration Medical Exam**: 9 patients
- **Targeted Testing (Other)**: 9 patients
- **Targeted Testing (Shelter Referral)**: 1 patient

Active Case Finding

LA County TB Patients. Data exclude Pasadena and Long Beach TB patients. Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change.
TB Patients by Site of Disease: LA County 2015 (N=606)

- Pulmonary, n=435 (72%)
- Extra-Pulmonary, n=105 (17%)
- Pulmonary & Extra-Pulmonary, n=66 (11%)

Data exclude Pasadena and Long Beach TB patients.

Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change.
# TB Patients by Smear Positivity and Type of Confirmation: LA County 2015

<table>
<thead>
<tr>
<th>Site of TB Disease</th>
<th>Sputum Smear Positive</th>
<th>Sputum Culture Positive**</th>
<th>Other Culture Positive**</th>
<th>NAAT Positive</th>
<th>Clinical Confirmation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Yes</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Pulmonary</td>
<td>37.5</td>
<td>62.5</td>
<td>88.3</td>
<td>70.2</td>
<td>72.7</td>
</tr>
<tr>
<td>Extra-pulmonary</td>
<td>98.4</td>
<td>1.6</td>
<td>0</td>
<td>75</td>
<td>16.7</td>
</tr>
<tr>
<td>Both Pulmonary and Extra-pulmonary</td>
<td>54.8</td>
<td>45.2</td>
<td>78.7</td>
<td>79.3</td>
<td>63</td>
</tr>
</tbody>
</table>

*Smear and culture positivity defined as within 14 days of treatment start date. **Sputum culture includes 'sputum' and 'direct sputum' specimens only. Other culture excludes 'sputum' and 'direct sputum' specimens. Data exclude Long Beach and Pasadena TB cases. Data are provisional and subject to change.
## INH monoresistance

<table>
<thead>
<tr>
<th>Country</th>
<th>Total TB Cases</th>
<th>Culture positive cases with DST</th>
<th>INH resistance</th>
<th>MDR</th>
<th>%INH resistant</th>
<th>%MDR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Cases</td>
<td>Number of Cases</td>
<td>Number of Cases</td>
<td>Yes</td>
<td>Number of Cases</td>
<td>Yes</td>
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<td>Mexico</td>
<td>2096</td>
<td>1624</td>
<td>126</td>
<td>7.8%</td>
<td>15</td>
<td>0.9%</td>
</tr>
<tr>
<td>United States</td>
<td>1747</td>
<td>1221</td>
<td>56</td>
<td>4.6%</td>
<td>7</td>
<td>0.6%</td>
</tr>
<tr>
<td>Philippines</td>
<td>1191</td>
<td>1015</td>
<td>161</td>
<td>15.9%</td>
<td>18</td>
<td>1.8%</td>
</tr>
<tr>
<td>China</td>
<td>447</td>
<td>371</td>
<td>32</td>
<td>8.6%</td>
<td>9</td>
<td>2.4%</td>
</tr>
<tr>
<td>Vietnam</td>
<td>429</td>
<td>364</td>
<td>60</td>
<td>16.5%</td>
<td>4</td>
<td>1.1%</td>
</tr>
<tr>
<td>Korea*</td>
<td>402</td>
<td>334</td>
<td>51</td>
<td>15.3%</td>
<td>11</td>
<td>3.3%</td>
</tr>
<tr>
<td>Guatemala</td>
<td>346</td>
<td>283</td>
<td>27</td>
<td>9.5%</td>
<td>5</td>
<td>1.8%</td>
</tr>
<tr>
<td>El Salvador</td>
<td>293</td>
<td>223</td>
<td>14</td>
<td>6.3%</td>
<td>1</td>
<td>0.4%</td>
</tr>
<tr>
<td>India</td>
<td>153</td>
<td>122</td>
<td>11</td>
<td>9.0%</td>
<td>2</td>
<td>1.6%</td>
</tr>
<tr>
<td>Taiwan</td>
<td>87</td>
<td>76</td>
<td>6</td>
<td>7.9%</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Honduras</td>
<td>78</td>
<td>67</td>
<td>3</td>
<td>4.5%</td>
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<td>1.5%</td>
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<td>Peru</td>
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<td>7</td>
<td>11.5%</td>
<td>3</td>
<td>4.9%</td>
</tr>
<tr>
<td>Cambodia</td>
<td>72</td>
<td>58</td>
<td>9</td>
<td>15.5%</td>
<td>3</td>
<td>5.2%</td>
</tr>
<tr>
<td>Iran</td>
<td>68</td>
<td>57</td>
<td>4</td>
<td>7.0%</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>61</td>
<td>54</td>
<td>6</td>
<td>11.1%</td>
<td>1</td>
<td>1.9%</td>
</tr>
<tr>
<td>Armenia</td>
<td>55</td>
<td>46</td>
<td>3</td>
<td>6.5%</td>
<td>2</td>
<td>4.3%</td>
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<tr>
<td>Ethiopia</td>
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<td>3</td>
<td>7.3%</td>
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<td>2.4%</td>
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<tr>
<td>Burma</td>
<td>43</td>
<td>34</td>
<td>2</td>
<td>5.9%</td>
<td>1</td>
<td>2.9%</td>
</tr>
<tr>
<td>Thailand</td>
<td>45</td>
<td>34</td>
<td>4</td>
<td>11.8%</td>
<td>2</td>
<td>5.9%</td>
</tr>
<tr>
<td>Japan</td>
<td>35</td>
<td>32</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>30</td>
<td>26</td>
<td>2</td>
<td>7.7%</td>
<td>0</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

LA County TB Patients. Data exclude Pasadena and Long Beach TB patients.
Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change.
Multi-Drug Resistant TB (MDR-TB) Patients* confirmed in LA County 2009-2015

*Includes MDR, pre-XDR, and XDR patients

Number of All MDR Patients

Year of Confirmation


0 2 4 6 8 10 12 14

LA County TB Patients. Data exclude Pasadena and Long Beach TB patients. Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change.

Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change.

*Includes only confirmed (counted) patients

LA County TB Patients. Data exclude Pasadena and Long Beach TB patients. Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change.

*Includes only confirmed (counted) patients
MDR-TB Cases by MDR Infection History

- Acquired MDR-TB: 3 cases (6%)
- Primary MDR-TB: 35 cases (67%)
- Secondary MDR-TB: 14 cases (27%)

TB Patients by Type of Therapy Administration*:
LA County 2011-2015

Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change.

*Direct Observed Therapy (DOT); Self Administered Therapy (SAT).

LA County TB Patients. Data exclude Pasadena and Long Beach TB patients.
TB mortality in LA County vs CA, vs US

Deaths Among TB Patients: LA County 2012-2014

Alive
n=1,421, 86.3%

Died
n=225, 13.7%

Died before Tx
21.3%

Died during Tx
77.8%

Died after Tx
1%

*Tx=Treatment. Cause of death not available at this time. Data exclude Long Beach and Pasadena TB patients.
Deaths in Persons with Tuberculosis: LA County 2011-2014

*Tx=Treatment. Cause of death not available at this time. LA County TB Patients. Data exclude Pasadena and Long Beach TB patients. Based on TRIMS data, updated 2/8/16. Data are provisional and subject to change.
Mortality by Age Group

Case Closure
LA County, 2009 – 2013, N=3,163

Completed Tx
Lost to follow-up
Moved
Died
POPULATIONS OF SPECIAL INTEREST

HOMELESS
TB Patients Experiencing Homelessness: LA County 2000-2015

LA County TB Patients. Data exclude Pasadena and Long Beach TB patients. Based on TRIMS data, updated 2/17/16. Data are provisional and subject to change.
Homeless TB Patients by Age: LA County 2015

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Percent of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-34</td>
<td>15.9%</td>
</tr>
<tr>
<td>35-44</td>
<td>20.5%</td>
</tr>
<tr>
<td>45-54</td>
<td>29.6%</td>
</tr>
<tr>
<td>55-64</td>
<td>15.9%</td>
</tr>
<tr>
<td>65+</td>
<td>18.2%</td>
</tr>
</tbody>
</table>

Homeless TB Patients by Sex: LA County 2015

- Male: 93%
- Female: 7%
Homeless TB Patients by Race/Ethnicity: LA County 2015

- African American: 52.3%
- Hispanic: 34.1%
- Non-Hispanic White: 6.8%
- Asian: 6.8%

Homeless TB Patients by Country of Birth: LA County 2015

- Dominican Republic: 13.6%
- El Salvador: 2.3%
- Guatemala: 6.8%
- Honduras: 0%
- Hong Kong: 18.2%
- Iran: 45.5%
- Mexico: 2.3%
- Philippines: 2.3%
- United States: 2.3%
- Unknown: 2.3%
- Vietnam: 2.3%

LA County TB Patients. Data exclude Pasadena and Long Beach TB patients. Based on TRIMS data, updated 2/17/16. Data are provisional and subject to change.
Risk Factors and Mortality among Homeless TB Patients: LA County 2015

![Bar chart showing percentages of patients with different risk factors.]

- Injected Drug Use: 6.8%
- Non-Injected Drug Use: 22.7%
- Alcohol Use: 40.9%
- HIV: 6.8%
- Died: 6.8%

Data exclude Pasadena and Long Beach TB patients. Based on TRIMS data, updated 2/17/16. Data are provisional and subject to change.
**Homeless TB Patients Hospital source: LA County 2007-2015**

<table>
<thead>
<tr>
<th>Year</th>
<th>LAC/USC</th>
<th>LAC/USC %</th>
<th>Non LAC/USC</th>
<th>Non LAC/USC %</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>163</td>
<td>38%</td>
<td>258</td>
<td>61%</td>
<td>421</td>
</tr>
<tr>
<td>2007</td>
<td>23</td>
<td>43%</td>
<td>30</td>
<td>56%</td>
<td>53</td>
</tr>
<tr>
<td>2008</td>
<td>26</td>
<td>44%</td>
<td>32</td>
<td>55%</td>
<td>58</td>
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<tr>
<td>2009</td>
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<td>23</td>
<td>62%</td>
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<td>85%</td>
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<td>2011</td>
<td>22</td>
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<td>31</td>
<td>58%</td>
<td>53</td>
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<tr>
<td>2012</td>
<td>13</td>
<td>33%</td>
<td>26</td>
<td>66%</td>
<td>39</td>
</tr>
<tr>
<td>2013</td>
<td>28</td>
<td>42%</td>
<td>38</td>
<td>57%</td>
<td>66</td>
</tr>
<tr>
<td>2014</td>
<td>17</td>
<td>45%</td>
<td>20</td>
<td>54%</td>
<td>37</td>
</tr>
<tr>
<td>2015</td>
<td>15</td>
<td>34%</td>
<td>29</td>
<td>65%</td>
<td>44</td>
</tr>
</tbody>
</table>
TB Outbreak #1 Update: Epi-Curve
Genotypic cluster G11610: “Large Homeless Outbreak”

LA County TB Patients. Data exclude Pasadena and Long Beach TB patients.
Based on TRIMS and data from the Genotype Cluster and Investigation Assessment Unit, TBCP, updated 2/17/16.
Data are provisional and subject to change. Patients are defined as “homeless” per RVCT definition.
TB Outbreak Update:
Demographics of Homeless patients in Genotypic cluster G11610: LA County 2007-2015

Outbreak of TB in the Homeless, 2007-2015: Age Distribution

% of Homeless Outbreak Patients

<table>
<thead>
<tr>
<th>Age Group (years)</th>
<th>% of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5</td>
<td>0%</td>
</tr>
<tr>
<td>5-14</td>
<td>0%</td>
</tr>
<tr>
<td>15-34</td>
<td>6%</td>
</tr>
<tr>
<td>35-44</td>
<td>28%</td>
</tr>
<tr>
<td>45-54</td>
<td>31%</td>
</tr>
<tr>
<td>55-64</td>
<td>27%</td>
</tr>
<tr>
<td>≥65</td>
<td>8%</td>
</tr>
</tbody>
</table>

Gender

- Male, 97%
- Female, 3%

LA County TB Patients. Data exclude Pasadena and Long Beach TB patients. Based on TRIMS and data from the Genotype Cluster and Investigation Assessment Unit, TBCP, updated 2/17/16. Data are provisional and subject to change. Patients are defined as “homeless” per RVCT definition.
TB Outbreak Update:
Demographics of Homeless patients in Genotypic cluster G11610: LA County 2007-2015

Country of Birth

<table>
<thead>
<tr>
<th>Country of Birth</th>
<th>% of Homeless Outbreak Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>66%</td>
</tr>
<tr>
<td>El Salvador</td>
<td>5%</td>
</tr>
<tr>
<td>Guatemala</td>
<td>1%</td>
</tr>
<tr>
<td>Mexico</td>
<td>19%</td>
</tr>
<tr>
<td>Other</td>
<td>9%</td>
</tr>
</tbody>
</table>

Race/ethnicity

- Black, 49%
- Hispanic, 37%
- White, 12%
- Asian, 3%

LA County TB Patients. Data exclude Pasadena and Long Beach TB patients. Based on TRIMS and data from the Genotype Cluster and Investigation Assessment Unit, TBCP, updated 2/17/16. Data are provisional and subject to change. Patients are defined as “homeless” per RVCT definition.
TB Screening and Treatment among Private Providers Serving Homeless Populations

• Capturing TB screening records for TB clearance
• Encouraging 3HP use
• TBCP weekly screening @ Pathways
• Coming soon: CHS run onsite Pathways to Home clinic

Logo sources:
SJWCFC - http://www.wellchild.org/
TB Screening and Treatment among Private Providers Serving Homeless Populations

- Since 2013, screened 3186
- 408 lost
- 307 TBI+
- 92 started tx
- 57 (62%) completed

Logo sources:
SJWFC - http://www.wellchild.org/
### Homeless 3HP Treatment Status – CHS and LACHC
As of February 9, 2016

<table>
<thead>
<tr>
<th>Status</th>
<th>Homeless</th>
<th></th>
<th></th>
<th>Total</th>
<th>% among Patients with Closure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>%</td>
<td>No</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Initiated Treatment</td>
<td>240</td>
<td>46</td>
<td>286</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>Pending Closure</td>
<td>22</td>
<td>9%</td>
<td>6</td>
<td>13%</td>
<td>28</td>
</tr>
<tr>
<td>Completed 3HP Treatment</td>
<td>157</td>
<td>65%</td>
<td>37</td>
<td>80%</td>
<td>194</td>
</tr>
<tr>
<td>Stopped, Medical Reason*</td>
<td>9</td>
<td>4%</td>
<td>2</td>
<td>4%</td>
<td>11</td>
</tr>
<tr>
<td>Stopped, Other Reason**</td>
<td>52</td>
<td>22%</td>
<td>1</td>
<td>2%</td>
<td>53</td>
</tr>
</tbody>
</table>

*Includes 8 patients stopping due to AE: 4 elevated LFT’s, 1 nausea/vomiting, 1 dry mouth, 1 rash, 1 other
The overwhelming majority of these patients were treated by CHS, and were homeless.
14 patients were identified as Contacts.
9 patients were identified as B-notifications.
All were administered by DOT.
** Other reason includes AMA, lost, moved, or previous treatment

LA County TB Patients. Data exclude Pasadena and Long Beach TB patients.
Based on TRIMS data, updated 2/17/16. Data are provisional and subject to change.
Outbreak #1 Homeless Outbreak
Contact Investigation at Homeless Shelter

- Large number of homeless cluster patients have been housed at one large shelter in LA County

- Ongoing transmission has been suspected

- CDC conducted a large outbreak investigation, (known as Epi Aid) in 2013, the methods of which can be applied to prioritization of contacts in ongoing contact investigations (CIs)
### 2013 CDC Epi Aid Contact Prioritization

<table>
<thead>
<tr>
<th>Tier</th>
<th>Definition</th>
<th>Identified (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>HIV+, or &gt;120 days of exposure</td>
<td>2,474</td>
</tr>
<tr>
<td>II</td>
<td>30-120 days of exposure AND last exposed AFTER January 1, 2012</td>
<td>1,690</td>
</tr>
<tr>
<td>III</td>
<td>30-120 days of exposure AND last exposed BEFORE January 1, 2012</td>
<td>1,267</td>
</tr>
<tr>
<td>IV</td>
<td>1-29 days of exposure</td>
<td>12,226</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>17,657</td>
</tr>
</tbody>
</table>

**Note:** Included contacts to 45 cases with exposure in various shelters
2015 Contact Investigation at Homeless Shelter: Patient Information

- 3 homeless TB patients (all smear 4+/cavitary) presented in early 2015

- All were at the same shelter during their infectious periods – their exposure periods were consecutive and non-overlapping between 10/2014 and 2/2015

- Performed one combined CI for contacts to all three patients at the shelter using CDC Epi Aid prioritization methodology
### 2015 Contact Investigation at Homeless Shelter: Contact Prioritization

<table>
<thead>
<tr>
<th>Tier</th>
<th>Definition</th>
<th>Identified (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>≥ 60 total days of exposure, OR ≥ 50 days of exposure to case #1*</td>
<td>173</td>
</tr>
<tr>
<td>II</td>
<td>Not in Tier I, and total days of exposure ≥ 30 and &lt; 60</td>
<td>249</td>
</tr>
<tr>
<td>III</td>
<td>Total days of exposure ≥ 1 and &lt; 30</td>
<td>871</td>
</tr>
<tr>
<td>Total**</td>
<td></td>
<td>1,293</td>
</tr>
</tbody>
</table>

* A holdover from initial CI assessment of the three patients separately

** Excluding n=2 contacts Tier IV (0 days exposure)
2015 Contact Investigation at Homeless Shelter: Contact Prioritization

*A holdover from initial CI assessment of the three patients separately  
**Excluding n=2 contacts Tier IV (0 days exposure)
Contact Investigation at Homeless Shelter: Screening Results

Total Screened Contacts by Exposure Days

<table>
<thead>
<tr>
<th>Exposure Days</th>
<th>Count</th>
<th>QFT+</th>
<th>not QFT+</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>8</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>10-20</td>
<td>7</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>20-30</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>30-40</td>
<td>6</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>40-50</td>
<td>9</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>50-60</td>
<td>6</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>60-70</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>70-80</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>80-90</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>90-100</td>
<td>4</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>100-110</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>110-120</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

n = 68

Linde L, Poonja S, Curley C, et al. A Contact Investigation for Three Recent Cases in the Large Tuberculosis Outbreak within the Homeless Communities of Los Angeles County, California. Poster session presented at National Tuberculosis Controllers Association (NTCA) Annual Conference; 2016 Feb 24-27; Denver, CO. Corresponding author: llinde@ph.lacounty.gov
Contact Investigation at Homeless Shelter: Screened Tier I Contacts (N=68) according to prior 2013 CDC EPI Aid Tier Status

2013 Tier I (n=13)
- p=9 (69%)

2013 Tier II (n=3)
- p=0 (0%)

2013 Tier III (n=0)
- p=0 (0%)

2013 Tier IV (n=6)
- p=4 (67%)

2013 No Tier (n=46)
- p=14 (30%)

*In chart space:
p= # screened positive for TB (% positivity of Tier)
Contact Investigation at Homeless Shelter: Summary

• LTBI data corroborate findings of 2013 Epi Aid and support this prioritization method

• Use of shelter registration data to calculate smear positive/cavitary exposure nights is useful for prioritization at this shelter

• Data show importance of contact prioritization and investigation based on recognition of the ongoing outbreak, not by individual patients
Outbreak #2
Grupo Cluster: Genotype G10161

- What are Grupos?
  - Community-based alcohol rehabilitation centers that follow a faith-based alcoholic recovery program
  - Population consists of clients that are predominantly from Central or South America
  - Provide cooperative living arrangements and meeting space for recovering drug and alcohol users
  - Sites offer dormitory and communal housing and are supported by their large network of members
Grupo Cluster: Locations in LA County
Grupo Cluster: Demographics

  - 6 confirmed TB patients in 2015
  - 23 are non-U.S. born:
    - Mexico (10)
    - El Salvador (8)
    - Guatemala (3)
    - Honduras (1)
    - Argentina (1)
  - Main risk factor: exposure to one or more Grupos
  - 58% of patients have some degree of homelessness
### Grupo Cluster: Demographics
Comparison between LA County and U.S.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Los Angeles N=26</th>
<th>Rest of U.S N=8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Race/Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>26 (100.0%)</td>
<td>7 (87.5%)</td>
</tr>
<tr>
<td>Asian</td>
<td>0 (0.0)</td>
<td>1 (12.5%)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>21 (91.3%)</td>
<td>6 (75.0%)</td>
</tr>
<tr>
<td>Female</td>
<td>2 (8.7%)</td>
<td>2 (25.0%)</td>
</tr>
<tr>
<td><strong>Birth</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>US Born</td>
<td>2 (7.7%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>non-U.S. Born</td>
<td>23 (88.5%)</td>
<td>8 (100.0%)</td>
</tr>
<tr>
<td>Unknown</td>
<td>1 (3.8%)</td>
<td></td>
</tr>
</tbody>
</table>

Based on TRIMS and data from the Genotype Cluster and Investigation Assessment Unit, TBCP. Data are provisional and subject to change.
### Grupo Cluster: Risk Factors: LA County

<table>
<thead>
<tr>
<th>Selected Risk Factors</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homelessness</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>15</td>
<td>58.0</td>
</tr>
<tr>
<td>HIV</td>
<td>3</td>
<td>12.0</td>
</tr>
<tr>
<td>Yes</td>
<td>3</td>
<td>12.0</td>
</tr>
<tr>
<td>Diabetes</td>
<td>6</td>
<td>23.1</td>
</tr>
<tr>
<td>Yes</td>
<td>6</td>
<td>23.1</td>
</tr>
<tr>
<td>Injecting Drug Use</td>
<td>2</td>
<td>8.0</td>
</tr>
<tr>
<td>Yes</td>
<td>2</td>
<td>8.0</td>
</tr>
<tr>
<td>Non-injecting Drug Use</td>
<td>7</td>
<td>27.0</td>
</tr>
<tr>
<td>Yes</td>
<td>7</td>
<td>27.0</td>
</tr>
<tr>
<td>Alcohol Use</td>
<td>22</td>
<td>85.0</td>
</tr>
<tr>
<td>Yes</td>
<td>22</td>
<td>85.0</td>
</tr>
</tbody>
</table>

Based on TRIMS and data from the Genotype Cluster and Investigation Assessment Unit, TBCP. Data are provisional and subject to change.
Grupo Cluster: Epi Curve

LA County TB Cases in G10161/G10167, 2007-2015 (n=26)

Based on TRIMS and data from the Genotype Cluster and Investigation Assessment Unit, TBCP. Data are provisional and subject to change.
Grupo Cluster: Cases in G10161/G10167, PCR00556 (n=20) with Grupo History During Exposure Period: LA County 2007-2015

Tier I: Red solid triangle
1. Grupos with cases that are cavitary and sputum smear +
2. A Grupo that has two or more cases with one of these cases being cavitary and sputum smear +

Tier II: Blue solid triangle
1. Grupos with cases that are non-cavitary and sputum smear +, or
2. Any case that is cavitary and sputum smear negative

Tier III: Green solid triangle
1. Grupos with cases that are non-cavitary and sputum smear –

Image 1: 20 of the 26 cases in G10161/G10167, PCR00556 had Grupo history during exposure period identified during patient interviews
Source: Genotype Cluster and Investigation Assessment Unit, TBCP, NodeXL.
Coming soon:

- NAAT performance results
- Analysis of TBI Treatment in Contacts
- Implementation and Evaluation of Automated VDOT
- Mortality project continues....
Final Thoughts

How can I use epi data to communicate risk?

How can I use data to prioritize and evaluate my work?

Am I under-reporting or misclassifying data?
THANK YOU!
ANY QUESTIONS?