TB Contact Investigations

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TB Regional Nurses Conference
TB/Refugee Health Division, ISDH
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Contact Investigations....Why?

• To find and treat additional TB disease cases
  – 1% of contacts have TB disease
• To find and treat persons with LTBI to avert future cases
  – 20-30% of all contacts have LTBI
• On average, 10 contacts are identified for each person with infectious TB in the U.S.

Source: CDC
What might happen if we stop doing Contact Investigations?

• 59 potentially infectious cases in 2014
  – 59 cases x 10 contacts each = 590 contacts
• If 1% have TB disease, we could have had ~6 additional cases!
• If 30% of contacts have LTBI, we could have had 177 new LTBI!
• Each of these cases would have contacts, and so on and so on...
Contact Investigations are a fundamental and extremely important strategy for the prevention and control of TB!
Who is responsible?

“The TB Case Manager is responsible for assuring that a contact investigation is conducted and that all contacts are appropriately evaluated and treated within recommended timeframes”

- TB Program Manual, Quality Assurance Protocol
What does that mean?

• Includes **ALL** steps of a contact investigation, including...
  – Field Investigation
  – Evaluation & treatment of all contacts
  – Reporting of contacts & outcomes to ISDH

• Responsibility for **ALL** contacts
  – Within your county
  – In another county
  – In another state
Deciding to Initiate a Contact Investigation
Factors to Consider in Index Case

- Site of Disease
- Sputum Smear & Culture Results
- Radiographic findings
- Age
- HIV Status
- Social Characteristics
Index Case Characteristics with Increased Risk of TB Transmission

- Pulmonary, laryngeal, or pleural TB
- AFB positive sputum smear
- Cavitation on chest radiograph
- Adolescent or adult patient
- Frequent coughing, sneezing, singing
- Close social network
What would you do?

- 34 year-old man with cavitary CXR and sputum smear+, NAA positive?
  - YES!

- 56 year-old man with abnormal CXR, C/W TB, sputum smear +, NAA negative?
  - No!

- 49 year-old woman with normal CXR, no sputum collected, extrapulmonary culture + ?
  - No!
What Would You Do? Part 2!

- 5 year-old boy, no sputum collected?
  - No, Source Case Investigation!
- 27 year-old female, CXR w/ pleural effusion, no sputum collected?
  - Yes, pleural site of disease!
- 35 year-old male, abnormal CXR consistent with TB, sputum smear negative?
  - Yes, if resources available!
Basic Steps to a CI

1. Pre-Interview Preparation
2. Index Patient Interviews
3. Field Investigation
4. Risk Assessment for TB Transmission
5. Prioritization of Contacts
6. Evaluation of Contacts
7. Treatment & Follow-Up of Contacts
8. Decision Regarding Expansion of Testing
9. Evaluation of Contact Investigation Activities
Contact Investigation Step #1

PRE-INTERVIEW PREPARATION
Pre-Interview Preparation

• Gather information about the index case
  – History of TB exposure, disease, and/or treatment
  – Site of disease & symptoms
  – Test results (CXR, Sputum smears & cultures, NAA, HIV)
  – Medical risk factors
  – Identifying demographic information
Determining the Infectious Period

- Used to identify contacts and determine testing timelines
- Necessary to estimate
- Start Date & End Date
Start of Infectious Period

- 3 months prior to symptom onset or 1st positive finding consistent with TB disease
- Ex. Patient reported symptoms starting on January 17, 2015
  - 3 months prior = October 17, 2014
- Ex 2. Patient with no symptoms had abnormal CXR on May 5th, 2015
  - 3 months prior = February 5th, 2015
End of Infectious Period

• Important for isolation status & evaluation of household contacts

• Must meet all three criteria
  – Effective treatment for $\geq 2$ weeks
  – Diminished Symptoms
  – Bacteriologic response (Ex. Sputum Smear Status)
Contact Investigation Step #2

INDEX PATIENT INTERVIEWS
General Principles

• Establish trust and rapport with patient
• Discuss confidentiality and privacy
• Conduct in patient’s primary language or with an interpreter
• Done in person
• At hospital, TB clinic, patient’s home, or other place that accommodates patient's privacy
When?

• First interview (in-person!) within 1 day of notification
  – 3 days for sputum smear - case
• Re-interview 1 to 2 weeks after the first interview
• Additional interviews dependent on amount of information and patient relationship
First Interview

• Confirm known information, including infectiousness timeline
• Records sites of possible transmission
• Record dates/frequency of places of contact
• Gather list of known contacts
Possible Questions to Ask

• Who lives with you?
• Does anyone come & stay periodically? (kids, friends, family)
• Does anyone else come in your house regularly? (housekeepers, babysitters, neighbors)
• Where do you work/go to school?
• What is your work organization like?
• Do you have any other jobs?
• How do you get to work/school?
• Do you go to church?
• What do you do for fun?
• Do you go out to eat? Where?
• Are you in any clubs/organizations?
• What did you do for the holidays?
• Have you traveled anywhere for vacation? For work?
• Do you go to a gym?
• Do you have family that lives in the area?
Identify The Contacts!

- Judy, 53 year old woman, Smear +, symptomatic for one month
  - 5 contacts!
- Michael, 65 year old man, Smear +, symptomatic for two months
  - 5 contacts!
- Amanda, 27 year old woman, Smear +, symptomatic for three months
  - 8 contacts!
Follow-Up Interview

• Confirm information obtained during first visit
• Follow-up on any new information or questions
• Obtain “remembered” information
Proxy Interviews

- Used if patient cannot be interviewed or if additional information is needed that cannot be obtained from patient
- People familiar with patient’s habits, behaviors, practices
- Consider patient confidentiality
Contact Investigation Step #3

FIELD INVESTIGATION
General Principals

• *Essential & Important* step to contact investigation
• Done even if patient has already been interviewed
• Should be initiated within 5 days after investigation starts
• Lack of site visits has contributed to TB outbreaks!
Parts of a Field Investigation

- Observe environmental characteristics
- Identify additional contacts
- Look for evidence of other contacts
- Educate the contacts
- Interview & skin test contacts
- Refer contacts who have TB symptoms
Observing Environmental Characteristics

• Visit each location mentioned during interview (home, workplace, school, social settings)
• Observe & note room size, crowding, ventilation, etc.
• Visit the location when the patient would have been there
  – Don’t go to the Friday-night hang out spot on Monday morning
Estimating Room Size

1 = Vehicle or car
2 = Size of a bedroom
3 = Size of a house
4 = Size larger than a house
Finding Other Contacts

• Talk to contacts about who else might have been around
  – Maintain patient confidentiality!

• Look for evidence of possible other contacts
  – Pictures
  – Toys in house but not children listed
  – Girls clothing in a bachelor pad
Things to Remember

• Follow infection control precautions
• Display identification with photo
• Work in pairs for enhanced safety, if warranted
• Tell someone where you are going and when you will be back
Contact Investigation Step #4

RISK ASSESSMENT FOR TB TRANSMISSION
Risk Assessment for TB Transmission

• Review of all factors collected
  – Infectiousness of patient (sputum smear status, behaviors, etc.)
  – Characteristics of locations of exposure
  – Frequency & duration of time spent with contacts

• Set “levels” for exposure
  – Ex. 120 hours/month of exposure for pulmonary TB w/o lung cavities
Contact Investigation Step #5

PRIORITIZATION OF CONTACTS
Prioritization of Contacts

- Priorities based on likelihood of infection
- Allows resources to be allocated most effectively
- Based upon several factors
  - Characteristics of index patient & contact
  - Age
  - Immune status & other medical conditions
  - Exposure
Prioritization of Contacts, Cont.

• Three mutually exclusive groups: High, Medium, Low
• High & medium groups are target of initial evaluations
• Important to maintain list of low contacts in case expansion is needed
Contacts to Smear + or Cavitary Cases

• High-Priority Contacts
  – Household Contacts
  – Contacts <5 years of age
  – Contacts with HIV or other medical risk factor
  – Contacts exposed during medical procedure (bronchoscopy, sputum induction, autopsy)
  – Contacts in congregate setting
  – Contacts exceeding exposure limits previously set
Contacts to Smear + or Cavitary Cases

• Medium-Priority Contacts
  – Contacts 5-15 years old
  – Contacts exceeding exposure limits previously set

• Low-Priority Contacts
  – All other contacts not in High or Medium priority groups
Contacts to Smear - Cases

• High-Priority Contacts
  – Contacts <5 years of age
  – Contacts with HIV or other medical risk factor
  – Contacts exposed during medical procedure (bronchoscopy, sputum induction, autopsy)

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  – Household Contacts
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Contacts to Smear - Cases

• Low-Priority Contacts
  – All other contacts not in High or Medium priority groups
Contact Investigation Step #6

EVALUATION OF CONTACTS
Evaluation of Contacts Timeline

• Initial assessment within 7 days of contact being identified
  – Gathering information
  – Face-to-face assessment of health
  – Have 14 days for medium-priority contacts

• Medical evaluation should be completed within 5 days from initial encounter
  – Within 10 days for Smear- CIs or medium-priority contacts
Initial Assessment Information

- Contact information
- Demographic information
- Previous history of TB/LTBI & treatment
  - Verbal or documented TST results
- Current symptoms of TB disease
- Medical conditions (HIV, Diabetes, Etc.)
- Type, duration & intensity of exposure

*May need to reevaluate prioritization after initial assessment*
If a contact reports TB symptoms, immediately move to full evaluation for TB disease.
Previous Positives

• Documentation of previous positive TST or IGRA must be provided
  – If no documentation, have contact tested & followed as normal
• Documented previous positive reactors must still have symptom screening to be evaluated
• If no prior LTBI treatment, offer treatment
  – Must have a CXR to begin treatment
TST vs. IGRA

• Testing modality dependent on your population and may vary

• Use the same test for 2\textsuperscript{nd} testing as you did the first
  – IGRAs may be used after +TST if it will convince need for treatment

• If any test is positive, consider positive and evaluate accordingly
  – Discordant result guidelines forthcoming
Interpretation of Tests

• Any TST ≥ 5 mm is positive for a contact investigation
  – Refer for CXR & medical evaluation

• Re-test contacts with initial negative result 8-10 weeks after last exposure date
  – Tests must be at least 1 week apart
  – Use the same test method
Evaluation of Immunosuppressed & Children < 5 Years of Age

- Always assigned as High-Priority
- Test with TST or IGRA, as applicable
- Need full medical evaluation, including chest radiograph, to be fully evaluated
- Consider window prophylaxis
Window Prophylaxis

• Prophylactic treatment for presumed TB infection after initial negative tests

• Recommended for
  – HIV infected contacts
  – Contacts with other immunosuppression
  – Children <5 years of age

• Treatment may be discontinued after 2rd negative test >8 weeks post-exposure
  – May give full course of LTBI for HIV+ & other immunosuppressed contacts
Conversion

• Second test is positive after an initial negative result
• Evidence of recent transmission
• Important evidence to consider for contact investigation expansion
• Contact is referred for CXR and follow-up the same as initial reactors
What would you do?

• Mary Ann, 25 year-old contact, date of last exposure 7/4/15
  – TST placed 7/9/2015, 0 mm
  – Get second test after 8/29/15

• Thomas, 35 year-old contact, date of last exposure 8/15/15
  – TST placed 8/17/15, 7 mm
  – Refer for CXR
What would you do?, Cont.

- Eldon, 4 year old boy, date of last exposure 8/21/15
  - TST placed 8/23/15, 0 mm
  - Obtain CXR & full medical evaluation
  - Begin window prophylaxis, re-test after 10/16/15
  - If second TST is negative, discontinue treatment
Contact Investigation Step #7

TREATMENT & FOLLOW-UP OF CONTACTS
Treatment & Follow-Up of Contacts

• If contact has positive test, normal CXR and no signs or symptoms, recommend treatment for LTBI

• Several different treatment options

• Document therapy elected, start date, and end date

  – If therapy is stopped sooner than planned, document why (death, lost to follow-up, adverse reaction, etc.)
“Difficult” Contacts

• Before closing a contact as lost or unable to locate, must try multiple times
  – Three separate attempts
  – One attempt is a home/field visit

• If contact refuses testing or treatment, educate contact on importance or try making a compromise
  – Bring the testing/treatment to them

• Document all attempts or refusals
Contact Investigation Step #8

DECISION REGARDING EXPANSION OF TESTING
When to Expand Testing

- Ongoing assessment of the extent of recent transmission
- Driven by the data collected during the contact investigation
- Do not expand to low-priority contacts unless objectives for high and medium-priority contacts are being met
Consider Expansion If…

- Unexpectedly large rate of TB infection or disease in high-priority contacts
  - >10% or twice the rate in similar population
- Second-generation transmission
- TB disease in any low-priority contacts
- Infection in contacts <5 years old
- Contacts that convert from negative to positive
Special Circumstances to Notify ISDH

• Expanded contact investigations
• Contact investigations in special settings
  – Schools
  – Congregate settings
  – Large-scale employment settings
• Cases <18 years of age
• Any case/investigation with possible media attention
Who to Contact

- Your regional nurse
- Kelly White, TB Epidemiologist
  - (317) 233-7548
  - KeRichardson1@isdh.in.gov
TB Outbreak Scenarios

• An increase has occurred above the expected number of TB cases
• During a contact investigation, two or more contacts are identified as having active TB, regardless of their priority
• Any two or more cases occurring ≤ 1 year of each other are discovered to be epidemiologically linked, and the linkage is established outside of a contact investigation
• Three or more genotypically linked cases within a year that are either
  – Determined to be an uncommon genotype strain constituting ongoing transmission
  – New genotype cluster for the state of Indiana
TB Outbreak Response

• LHD leads the investigation
• Conference call with ISDH within 24 hours
  – Confirm outbreak
  – Confirm treatment plan
  – Assess additional needs
• Establish and follow outbreak plan
Contact Investigation Step #9

EVALUATION OF CONTACT INVESTIGATION ACTIVITIES
Why Collect Data?

• Manage care & follow-up of index patient & contacts
• Epidemiologic analysis of an investigation in progress as well as overall results of prior investigations
• Program evaluation via performance indicators that reflect performance objectives
2020 Indiana Contact Investigation Targets

• Smear+ patients who have contacts elicited: 95%
• Contacts to smear+ patients who are fully evaluated: 85%
• Contacts to smear+ patients diagnosed with LTBI who start treatment: 95%
• Contacts to smear+ patients diagnosed with LTBI who complete treatment: 75%
2014 Preliminary Contact Investigation Data

• 97.4% of smear+ cases had contacts elicited

• 67.7% of contacts to smear+ cases were fully evaluated

• 96.9% of contacts to smear+ cases with LTBI began treatment

• 81.9% of contacts to smear+ cases with LTBI completed treatment
Contact Investigation Reporting

• All contact investigations are reported through TB SWIMSS

• At least three times, no later than:
  – 3 weeks after the case is reported to you
    • After 1st round of testing
  – 12 weeks after the case was reported to you
    • After 2nd round of testing
  – 12 months after the case was reported to you
    • After all contacts with LTBI have completed treatment
Required Information

• Overall information about investigation on Contact Investigation Summary Report

• Specific information about each contact identified
  – Demographic & contact information
  – Exposure (Type, Date)
  – Testing (TST, IGRA, CXR)
  – Treatment
  – Final outcome
### Contact Investigation Summary Report

**SWIMS-TB ID : 101 INEDSS ID :**

- **Preliminary Report Date:** 06/03/2013
- **Final Report Date:**
- **Infectious Start Date:** 01/01/2013
- **Infectious End Date:** 06/01/2013

**Case Manager:** Kelly Richardson

### Potential Sites/Dates of Exposure *

- Household, Work at Disney Studios, Church at St. Mick’s Cathedral

### Index Case

- **Count Date:**
- **State Case Number:**
- **Sputum Smear Positive**
- **Sputum Smear Negative but Culture Positive**
- **Other**

### Investigation

- **Are there any contacts for this investigation:** Yes
- **If no contacts, why not:**

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SWIMSS CI Tips

• Remember to exit CI module and re-enter for “Contact” link to appear
• Add “Final Report Date” when you have closed all the contacts out & have finished the CI
• Don’t add old test results/CXR/treatment in variables
• If there is a duplicate, notify Kelly
• Select “Outcomes” based on guidance
• “Outcome Date” is the date the outcome was decided, not the date entered
What about everything else?

• Look for future updates to TB SWIMSS to expand and improve the contact investigation module!
  – Expanded exposure information including locations & relation to index case
  – Medical history/risk factors of contacts
  – Comments field for each contact
Case Study

JIM JONES CONTACT INVESTIGATION
Where do we start?

• Pre-Interview Preparation
  – No prior history of TB
  – Pulmonary, HX of cough, fever, fatigue, weight loss since 8/18/15
  – Smear +, Cavitary, PCR Positive, DOT started 10/19/15
  – Infectious Period: 5/18/15 until?
The Interview

- Lives alone in a small apartment
- His girlfriend, Tonya, spends the night several times a week & brings her 2 year old, Sam
- Another girlfriend, Kelly, has stayed over about 10 times in the past 2 months
- Currently Unemployed
- Worked night shift at convenience store with Bob & Tom in last two months
  - Overlapped 1-2 hours per night
  - Once or twice a week
The Interview, Cont.

• He also slept at Kelly’s house last month, where her mother, Madeline, also lives
  – Spent several days there
• He hang’s out at his friend’s apartments nearby or stays at his own apt
• He often goes to the local bar, Puzzles, with his friends Reggie & Melvin
  – Every Friday night
Field Investigation

• Where?
  – Jim’s house
  – Convenience Store
  – Kelly’s house
  – Puzzles (the bar)

• What?
  – Note room size, ventilation, etc.
  – Look for evidence of other contacts
  – Educate & test contacts, if possible
Field Investigation, Cont.

• Jim’s House
  – No evidence of other contacts

• Convenience Store
  – Large, open room, size of a house

• Kelly’s House
  – Large house
  – No evidence of other contacts
  – Mother’s room in separate suite

• Puzzles
  – Sat on semi-outdoor patio
  – Saw third man, Steve, sitting with other contacts on Friday night
Risk Assessment

• Sputum smear+, 3+
• Exposure locations
  – 2 houses
  – 1 larger workplace
  – 1 semi-outdoor bar
• Levels of exposure
  – High: Household contacts
  – Medium: Workplace, social at bar
## Prioritization of Contacts

<table>
<thead>
<tr>
<th>Contact Name</th>
<th>Exposure</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tonya</td>
<td>Household</td>
<td>High</td>
</tr>
<tr>
<td>Sam</td>
<td>Household</td>
<td>High</td>
</tr>
<tr>
<td>Kelly</td>
<td>Household</td>
<td>High</td>
</tr>
<tr>
<td>Bob</td>
<td>Workplace</td>
<td>Medium</td>
</tr>
<tr>
<td>Tom</td>
<td>Workplace</td>
<td>Medium</td>
</tr>
<tr>
<td>Madeline</td>
<td>Social</td>
<td>Medium</td>
</tr>
<tr>
<td>Reggie</td>
<td>Social</td>
<td>Medium</td>
</tr>
<tr>
<td>Melvin</td>
<td>Social</td>
<td>Medium</td>
</tr>
<tr>
<td>Steve</td>
<td>Social</td>
<td>Medium</td>
</tr>
<tr>
<td>Waitress at Puzzles</td>
<td>Social</td>
<td>Low</td>
</tr>
<tr>
<td>Other Friends</td>
<td>Social</td>
<td>Low</td>
</tr>
</tbody>
</table>
# Evaluation of Contacts

<table>
<thead>
<tr>
<th>Contact Name</th>
<th>Priority</th>
<th>1st Round Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tonya</td>
<td>High</td>
<td>Positive</td>
</tr>
<tr>
<td>Sam</td>
<td>High</td>
<td>Negative</td>
</tr>
<tr>
<td>Kelly</td>
<td>High</td>
<td>Positive</td>
</tr>
<tr>
<td>Bob</td>
<td>Medium</td>
<td>Negative</td>
</tr>
<tr>
<td>Tom</td>
<td>Medium</td>
<td>Negative</td>
</tr>
<tr>
<td>Madeline</td>
<td>Medium</td>
<td>Negative</td>
</tr>
<tr>
<td>Reggie</td>
<td>Medium</td>
<td>Negative</td>
</tr>
<tr>
<td>Melvin</td>
<td>Medium</td>
<td>Negative</td>
</tr>
<tr>
<td>Steve</td>
<td>Medium</td>
<td>Negative</td>
</tr>
</tbody>
</table>
Evaluation of Contacts, Cont.

• All three CXRs come back clear
  – Start Tonya & Kelly on LTBI treatment
  – Start Sam on window prophylaxis

• 2nd round testing for all negatives
  – All 2nd tests come back negative, including Sam’s
  – Discontinue window prophylaxis
Should you expand?

- What is positivity rate among high risk?
  - 2 positives/3 high priority contacts = 66.7%!

- **BUT:**
  - No second generation transmission
  - No infection in contacts <5 years old
  - No conversion
  - No positives among medium risk contacts

- Probably OK not to expand
QUESTIONS?