



Case Presentation: Medium Incidence Setting

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Outline

- Case Presentation 1 – cluster investigation showing transmission in multiple locations (Cluster MD_005)
- Case Presentation 2 – false-positive culture investigation (Cluster MD_032)

Case Presentation 1: Cluster MD_005

- Outbreak of 5 *Mycobacterium tuberculosis* (MTB) culture-positive patients and 1 culture-negative patient
- July 2003 through September 2005

MD_005: Index Case Baby A

- 11-month old US-born black (non-Hispanic) male
- July 2003 "Well Baby" check at local health department = TST (22 mm)
- CXR: abnormal and non-cavitary
- Gastric washing: AFB smear negative, MTB culture positive
- Stayed with grandmother during the day
- Family history of TB (grandfather)
- Associate investigation conducted to find source

MD_005: Baby B (Culture Negative)

- Cousin of Baby A: 12-month old U.S.-born black (non-Hispanic) male
- August 2003: Associate investigation of Baby A led to examination at local health department
- TST: 17 mm
- Fever, cough, weight loss
- CXR: abnormal and non-cavitary
- Sputum: AFB smear negative, MTB culture negative
- Lived with same grandmother

MD_005: Source Case

- August 2003: Diagnosed because he drove grandmother to the health department for evaluation during associate investigation
- 45-year-old black (non-Hispanic) male
- Uncle of Baby A and Baby B
- Born in Haiti, arrived in U.S. 1979
- Chronic cough, fever, weight loss, hoarseness, and night sweats for "about a year"
- TST: negative (1 mm)

MD_005: Source Case (2)

- CXR: abnormal and cavitary
- Sputum: AFB positive, multiple MTB positive sputa
- HIV: negative
- Insulin-dependent diabetes
- Multiple roles:
 - Babysitter
 - Church deacon

Cluster MD_005

- Clustered isolates identified from lab report

SPECIMEN				
COLLECTION DATE	CASE	SPOLIGO TYPE	MIRU PATTERN	PCR CLUSTER
07/17/03	Baby A	703333340000000	225425173533	MD_005
08/04/03	Source	703333340000000	225425173533	MD_005

MD_005: Deacon

- 35-year-old black (non-Hispanic) male
- December 2003: Productive cough, night sweats, weight loss, and hemoptysis
- CXR: abnormal and non-cavitary
- Sputum: AFB smear negative, culture MTB positive
- HIV: negative
- Deacon (volunteer) at church – identified during contact investigation of Source Case

Cluster MD_005 (2)

- Clustered isolates identified from lab report

SPECIMEN				
COLLECTION DATE	CASE	SPOLIGO TYPE	MIRU PATTERN	PCR CLUSTER
07/17/03	Baby A	703333340000000	225425173533	MD_005
08/04/03	Source	703333340000000	225425173533	MD_005
12/17/03	Deacon	703333340000000	225425173533	MD_005

Cluster MD_005 (3)

- Clustered isolates identified from lab report

SPECIMEN				
COLLECTION DATE	CASE	SPOLIGO TYPE	MIRU PATTERN	PCR CLUSTER
07/17/03	Baby A	703333340000000	225425173533	MD_005
08/04/03	Source	703333340000000	225425173533	MD_005
12/17/03	Deacon	703333340000000	225425173533	MD_005
03/26/04	Unknown	703333340000000	225425173533	MD_005

MD_005: Chef

- 39-year-old black (non-Hispanic) male
- Fever, fatigue, night sweats, loss of appetite, fainting
- TST: 20 mm
- CXR: abnormal and non-cavitary
- Lymph node: AFB positive; MTB positive
- HIV: negative
- Chef at hotel – NOT identified in contact investigation of Source Case

Cluster MD_005 (4)

- Clustered isolates identified from lab report

SPECIMEN

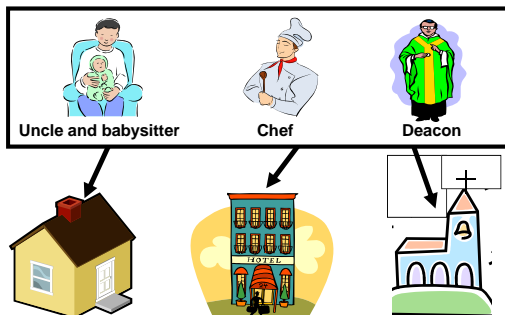
COLLECTION DATE	CASE NO.	SPOLIGO TYPE	MIRU PATTERN	PCR CLUSTER
07/17/03	Baby A	703333340000000	225425173533	MD_005
08/04/03	Source	703333340000000	225425173533	MD_005
12/17/03	Deacon	703333340000000	225425173533	MD_005
03/26/04	Chef	703333340000000	225425173533	MD_005
09/01/05	Unknown	703333340000000	225425173533	MD_005

RFLP: 5RF2362-14

MD_005: Pastor

- 43-year-old black (non-Hispanic) male
- Cough, shortness of breath, fever, weight loss (50 lbs.), diarrhea, and night sweats
- CXR: abnormal and non-cavitary
- Paraspinal fluid: AFB negative, MTB positive
- HIV: negative
- Assistant pastor for the church – NOT identified in contact investigation of Source Case

Cluster MD_005: Multiple Roles = Multiple Locations



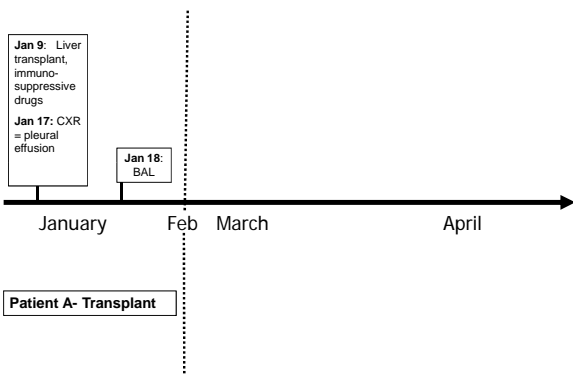
Lessons From This Outbreak

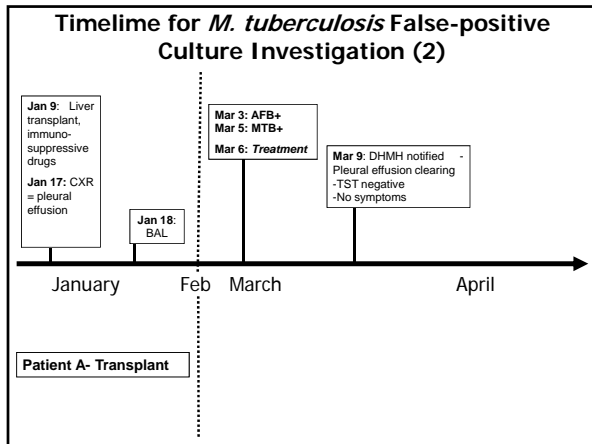
- The Source Case was not the first case identified
- The Source Case was undiagnosed for a long period of time (1 year)
- Delays in diagnosing TB can result in increased transmission
- The Source Case's multiple roles meant exposing others far outside the household
- Genotyping and cluster investigation helped to reveal gaps in the contact investigation for the source case

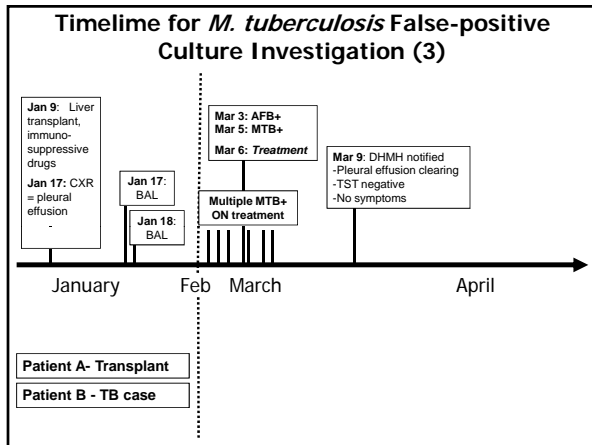
Case Presentation 2: Cluster MD_032

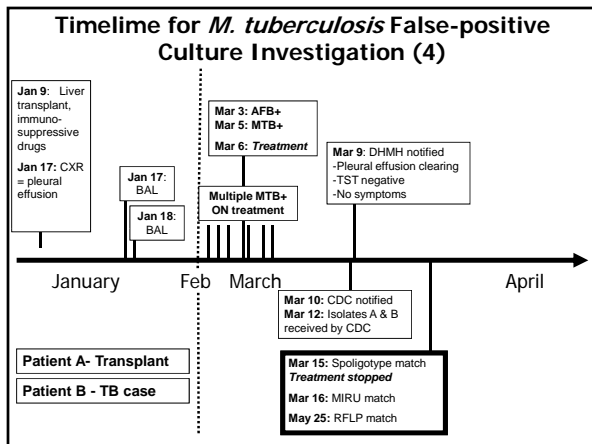
- False positive culture investigation
- Involved three patients who lived in 3 different jurisdictions in Maryland
- All were seen at Hospital X in a 4th jurisdiction

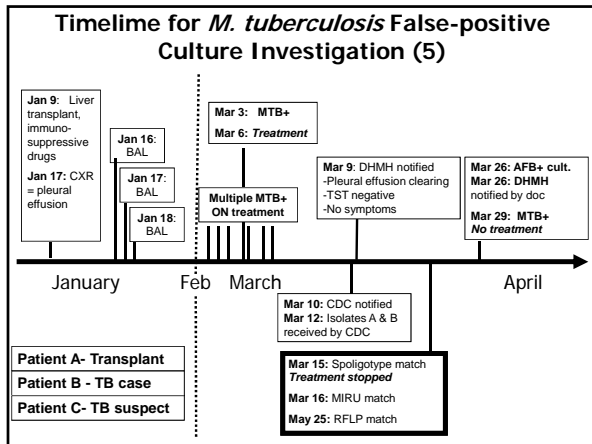
Timeline for *M. tuberculosis* False-positive Culture Investigation

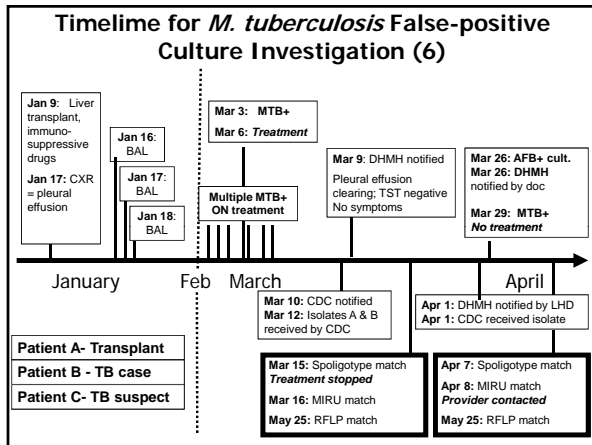












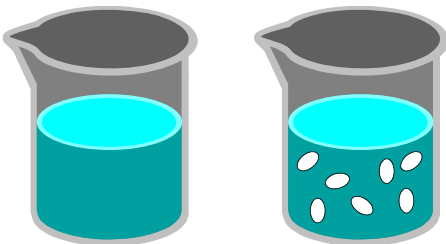
A Single Weekend in January, Hospital X

- Bronchoscope serial numbers were not documented
- Different hospital locations suggested that a different instrument used for each patient
- Laboratory = most likely location where contamination occurred

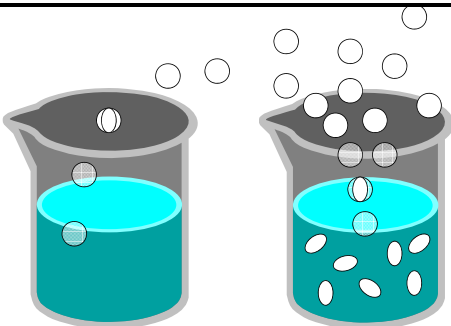
A Single Weekend in January, Hospital X (2)

- Patient C was bronchoscoped the day before Patient B (source) and 2 days before Patient A, so Patient C's specimen could not have been contaminated via the bronchoscope
- 3 specimens processed in Hospital X laboratory on the same day (Monday)
- All 3 patients did well:
 - Rapid genotyping
 - Good clinical judgment
 - Prompt public/private communication

How Lab Contamination Occurs



How Lab Contamination Occurs (2)



Unsuspected False-positive Specimens

- Organize data by cluster and specimen collection date

DATE SENT	ACCESSION NUMBER	CLUSTER	SPECIMEN COLLECTION DATE
10/03/04	MD0400R	MD-003	September 23, 2004
11/15/04	MD0400U	MD-003	September 23, 2004
01/26/04	MD0400A	MD-010	December 1, 2003
02/05/04	MD0400D	MD-010	January 3, 2004
06/12/04	MD0400J	MD-010	May 3, 2004
09/15/05	MD0500P	MD-010	August 30, 2005

When to Suspect False-positive Cultures

- Laboratory
 - AFB smear negative
 - Single positive culture
 - Known MTB positive in lab at same time
- Patient
 - Clinical course inconsistent with TB
 - CXR not suggestive of TB
 - Extra-pulmonary TB without:
 - granulomas on biopsy
 - lymphocytes in fluids
