G07471: The TB Strain That Keeps On Giving

Kelly White, MPH, CPH, Director
TB/Refugee Health

November 21, 2019
May 2015:
It Begins
Case A

• 19-year-old male high school student went to ER on May 22
  – Originally from Democratic Republic of the Congo
• Cough, chest pain, night sweats, fever, weight loss, fatigue since January
• TST 0 mm
• Abnormal, cavitary CXR and CT
• Sputum was >50/field, PCR +, culture +
Case A Genotype

- **G07471**: Not a match to any other Indiana cases
- Genotype associated with 10 other U.S. cases in past 10 years (as of 2015)
- Six of the 10 cases were non U.S.-born:
  - Four of the six from Democratic Republic of the Congo
Summer 2015: Just Another Contact Investigation, Right?
Contact Investigation at School

- K-12 school:
  - Varsity basketball team
  - Senior bus trip
  - Basketball clinic for younger children

- Identified students with shared classes, activities and set up testing onsite at school
  - Letters sent to everyone
Results of CI at School

• First testing event: 294 TSTs placed:
  – 50 positive (17.2% positivity)
• Expanded to entire school:
  – Additional 308 tested
  – 28 more positives (9.1% positivity)
• Where else has he been?
Other Exposure Locations

• Teenager room at large church in neighboring county
• University basketball workout session the week before diagnosis
• Travel basketball league:
  – Two teams
  – Played games throughout Indiana
What About Family?

- Lived with adoptive mother
  - TST negative x 2
- Wife lived in another county
  - TST negative x 1
- Adoptive mother’s family
  - Eight total tested, all negative
Case A CI Summary

- 886 Contacts
  - 156 High-Risk

- 476 Evaluated (53.7%)
  - 134 High-Risk (85.9%)

- 3 TB Cases (clinical)
- 147 LTBI
- 326 Negative

- 116 (78.9%) Initiated Therapy
- 92 (79.3%) Completed Therapy
Transmission from Case A

• 54.4% positivity among high-risk contacts
  – 67.7% among school contacts
    • 100% positivity among seniors on class trip
    • 70% positivity among JV/varsity BB players
  • 88.9% among travel basketball contacts
• 28.9% positivity among medium-risk contacts
• 13.4% among low-risk contacts
Secondary Cases from Case A

• 17-year-old U.S.-born male
  – Played basketball with Case A at school
  – Completed RIPE therapy

• 15-year-old U.S.-born female
  – Attended school with Case A
  – Completed RIPE therapy

• 54-year-old U.S.-born male
  – Worked at school
  – Initiated RIPE, refused after 3 months of therapy
February 2016: It Ends ... Right?
Case A Wrap-Up

• Pansensitive
• Culture conversion occurred within 2 months of RIPE therapy
• Moved to another county for school during treatment
• Completed therapy February 2016
October 2016: Encore
Case B

- 19-year-old male U.S.-born college student
- Cough, night sweats, fever, weight loss, chills since August 2016
- Positive TST and IGRA
- Abnormal, cavitary CXR and CT
- Sputum was 1-10/field, PCR +, culture +
Case B

- No known risk factors or exposure
- Pansensitive
- RIPE therapy initiated and completed
- Contact investigation conducted at school and home, 5 LTBI
- Genotyping returned as G07471
Link Between Case A and Case B?

- Confirmed Case B was not a listed contact to Case A
- Case B’s father was a coach in the same travel basketball league as Case A
- No confirmed direct contact between cases
March 2017: Third Time’s a Charm?
Case C

- 67-year-old male U.S.-born businessman
- Cough and loss of appetite since February 2017
- Indeterminate IGRA
- Abnormal, non-cavitary CXR and CT
- Sputum was <1/field, PCR +, culture +
Case C

- Diabetic, immunosuppression
- Pansensitive
- RIPE therapy initiated and completed
- Contact investigation conducted at home and work
  - Single positive, his son
- Genotyping returned as G07471
Link Between Case A and Case C?

• Confirmed Case C was not a listed contact to Case A
• Case C’s son WAS a contact to Case A
  – Played on same travel basketball league
  – Son had not been evaluated
• Case C had minimal direct contact with Case A
November 2018: This Seems Familiar …
Case D

- 23-year-old U.S.-born female presented to ER in November
- Cough, night sweats, fever, weight loss since July 2018
- Indeterminate IGRA
- Abnormal, cavitary CXR and CT
- Bronchoscopy was smear +, PCR +
- RIPE started
Link Between Case A and Case D?

• Case A is her husband!
  – One negative TST in 2015
Case D

- Sputum was >50/field, PCR +, culture +
- Pansensitive
- Genotyping returned as G07471
- Patient completed 9 months of therapy with LHD
- Larger contact investigation due to progressed disease and length of infectious period
Case D Contact Investigation

- Household contacts included husband (Case A) and 2-year-old son
- Workplace contacts
- Family/social contacts
  - Case A’s adoptive family that had tested negative in 2015
  - Exposure at birthday party and Thanksgiving
Case D Contact Investigation, Continued

- Case A’s repeated CT remained stable
- All of Case A’s family that was previously negative in 2015 converted
  - Converted due to Case D or late reaction to Case A?
- Total of 31 contacts
  - Nine new LTBI
  - What about the son?
December 2018: Glimpse Into the Past
Case E

- 2-year-old U.S.-born male
- Son of Case A and Case D
- History of seizures
- TST negative, QFT positive
- CXR normal
- Gastric aspirate, CSF negative on smear and culture
- TB meningitis
- RIPE + levo started
  - Remains on treatment through LHD
March 2019: It Keeps Going and Going ...
Case F

- 72-year-old U.S.-born female
- Adoptive mother of Case A
- TST negative back in 2015
- Cough dating back to December 2018
- IGRA positive
- CXR abnormal, non cavitary
- Bronchoscopy done 2/1/19 became culture + for MTB on 3/5/19
Case F

- Completed RIPE therapy with LHD
- Sputum was smear and culture negative
- Genotyping returned as G07471
- Contact investigation limited to household and family
  - All also contacts to Case D
  - No testing at workplace due to limited infectiousness
Whole Genome Sequencing

G07471 in Indiana
Results received 5/28/2019

*Four clinical cases not shown
The Future: What Does It Hold for This Strain?
G07471 by the Numbers

932
G07471 Points to Ponder

- Is high transmission rate due to high infectiousness of patients or virulence of this strain?
- Why are we seeing many TST negatives among cases?
- How many more cases will Indiana see?
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Questions?
Contact Information

Kelly White, Director
TB/Refugee Health
317-233-7548
KeWhite@isdh.in.gov