How Close is Close Enough?

{ Managing Expectations in Non-Traditional Subtyping

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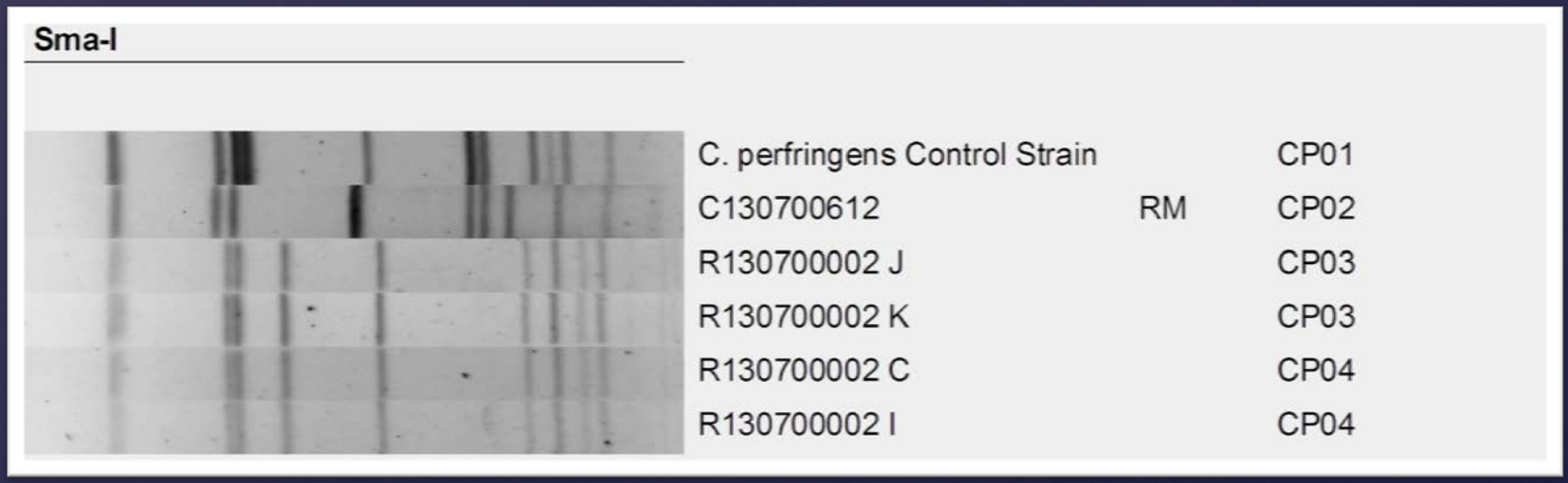
Outline

- The Clusters
- Complicated Explanations
- Start with PFGE Matches
- Start with an Epi-Linked Cluster
- The Big Question
- Conclusions

The Clusters

- Cluster 1 – *Clostridium perfringens*
  - A family meal was left out overnight
  - 4 of 6 members ate meal the next day, reheated by microwave
  - All 4 symptomatic shortly thereafter (mean of 13.5 hours), one became critically ill
    - Suspected *C. perfringens*
  - Soup and patient stool submitted for testing
    - Food lab and bacteriology lab

- *C. perfringens* isolated from soup and stool
- Epidemiologists requested PFGE be performed
  - Could we link patient isolate with the soup?

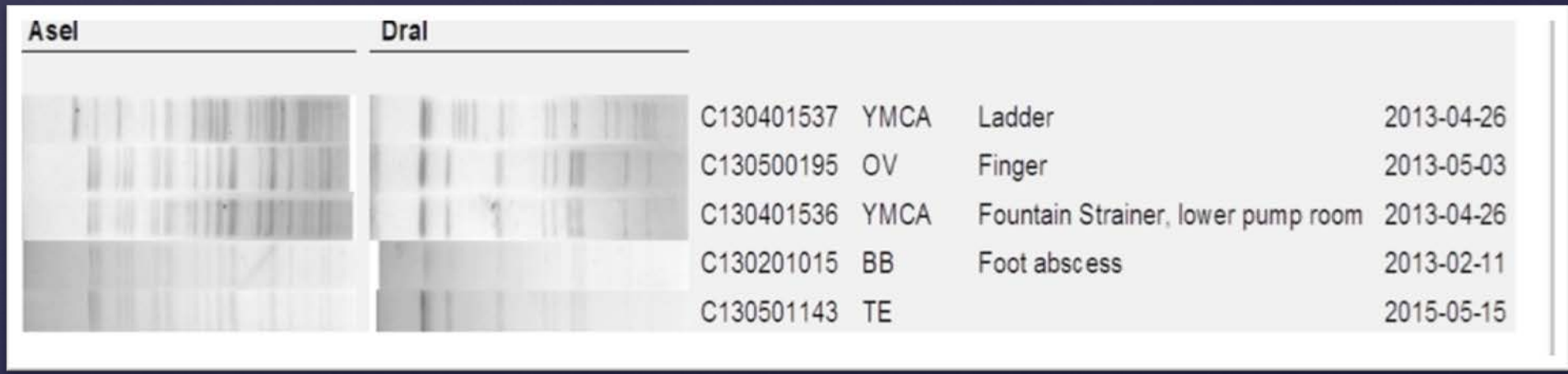


The Cluster

The Clusters

- Cluster 2 – *Mycobacterium abscessus/chelonae*
  - Four children with the same pediatrician all presented with hand and foot abscesses
    - *Mycobacterium abscessus/chelonae* group cultured from all
  - Only common exposure was local fitness facility 'Y' kiddie pool
  - Environmental Health collected samples at the pool for culture
    - *M. abscessus/chelonea* isolated from pool sources

- Epidemiologists requested PFGE be performed on the isolates
  - Did their infections come from the pool?



The Clusters

- What is our most valuable contribution?
  - Results
  - Technical discussion
- Environmental organisms found in association with clinical specimens
- Normal flora or cause of disease

Complicated Explanations

- Atypical Organism for PFGE
  - What does an exact match mean?
  - Is there value without an exact match?
  - How close is close enough?
  - Interpretation of results

- Tenover Criteria

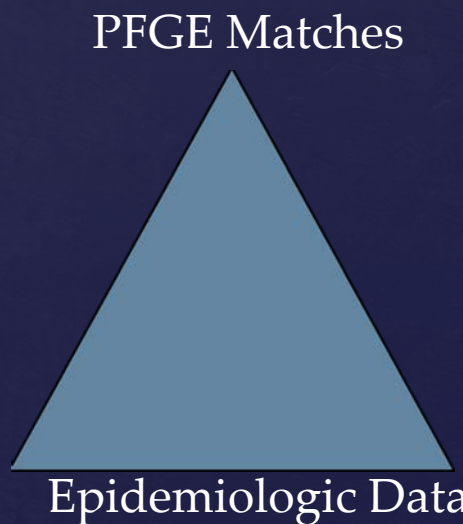
Category	# of Genetic Differences	Typical # of Fragment Differences	Epidemiologic Interpretation
Indistinguishable	0	0	Part of the cluster
Closely Related	1	2-3	Probably part of cluster
Possibly Related	2	4-6	Possibly part of cluster
Different	≥3	≥7	Not part of cluster

Complicated Explanations

F. C. Tenover, R. D. Arbeit, R. V. Goering et al., "Interpreting chromosomal DNA restriction patterns produced by pulsed- field gel electrophoresis: criteria for bacterial strain typing," Journal of Clinical Microbiology, vol. 33, no. 9, pp. 2233–2239, 1995.

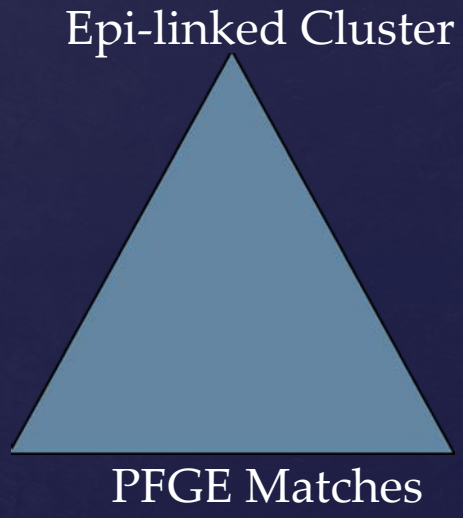
- PulseNet
  - PFGE data supports a possible outbreak
  - Epidemiologic data gathered
    - May or may not support PFGE data
  - Discount the PFGE data?

PFGE Matches



Epi-Linked Cluster

- Cluster 1 and 2
  - All the epidemiologic information points toward an outbreak
  - PFGE data requested
    - Doesn't necessarily support epi data
    - Little context for interpretation
  - Discount the epi data?



The Big Question

- What if the PFGE patterns don't match?
  - Up front discussion about possibilities
  - Probability of seeing multiple strains
    - Environmental organisms
    - Normal flora organisms
  - Picking multiple colonies from all sources to assess variability
  - Have to use different interpretation parameters due to lack of comparison for library-based method

Conclusions

- There is value in performing PFGE on non-PulseNet organisms
- Have an upfront discussion about the possible results
- Assist in the interpretation of results, limitations of testing