

Evaluating the Significance of Equivocal Mycobacterial Smear Results

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Background

- August 28, 2014—both TB analysts retire (on the same day!)
- August 29, 2014—new analyst results a smear as equivocal
 - Previous analysts had always reported a smear as negative if they observed less than four AFB per slide
 - Which way is “correct”?
 - Is it preferable to err on the side of caution, or to wait until you see enough bacilli to be really sure?

What Do Other Labs Do?

- Informally surveyed several other PHLs:
 - Prepare a new smear from same specimen
 - Report as negative
 - Report as suspicious
 - Report as doubtful
 - Perform NAAT
 - Request a new specimen

Study Objective and Design

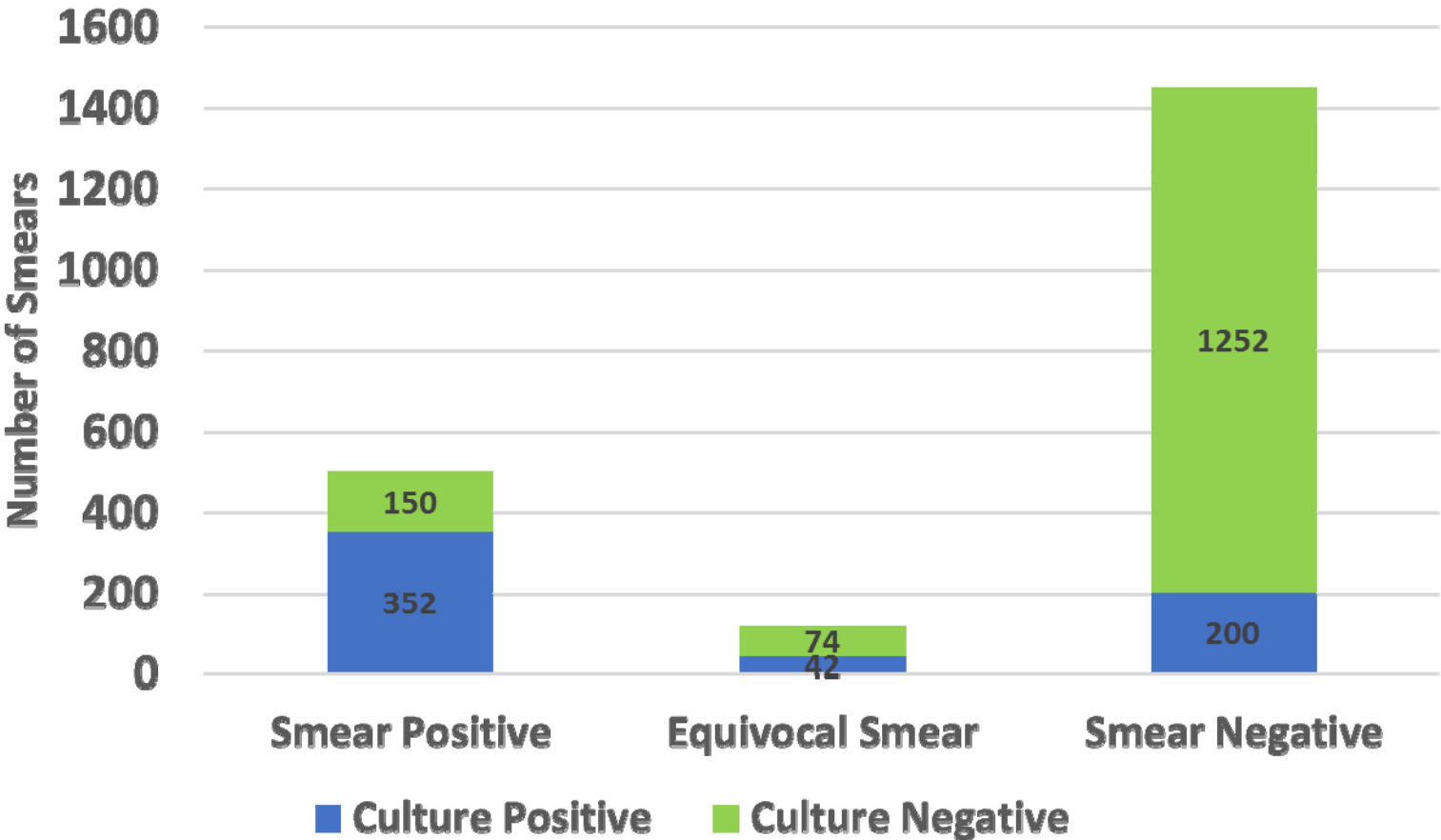
- Objective: To determine the significance of mycobacterial smear results when very few acid fast bacilli are observed in the concentrated smear
- Sputa were digested, decontaminated, and concentrated using standard methods
- Smears were fixed using 70% ethanol with 5% phenol and stained using Auramine O-phenol
- Smears were examined with a fluorescent microscope at 200x magnification, and AFB were counted at 500x
- All slides read by one analyst, and blindly verified by a second analyst
- Reading discrepancies resolved using a third analyst

Total Specimens Processed

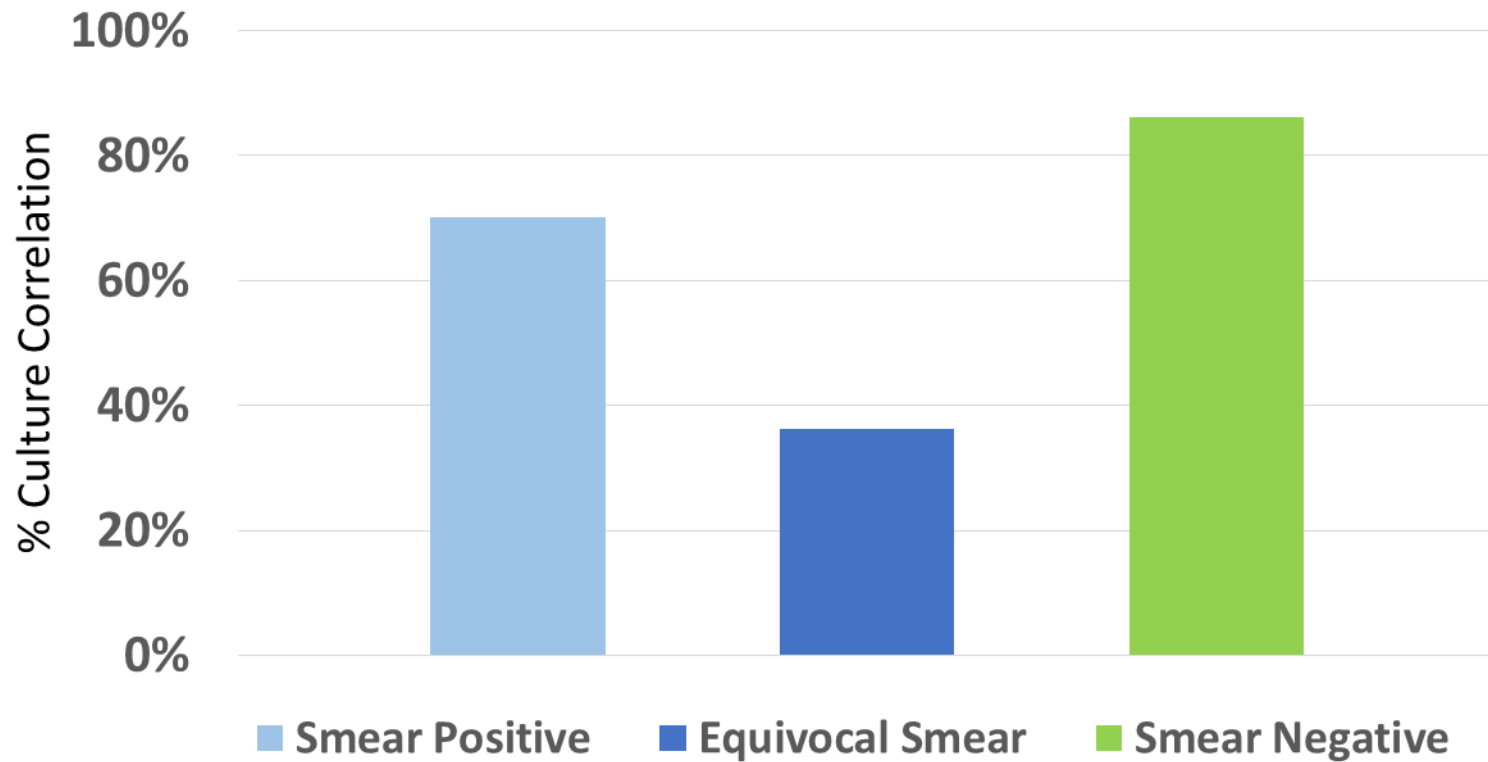
Smear Result	Number	% of Total
Positive	516	24.6%
Equivocal	119	5.7%
Negative	1462	69.7%
TOTAL	2097	

September 1, 2015-August 31, 2016

Culture Results, Stratified by Smear



Smear-to-Culture Correlation Rates



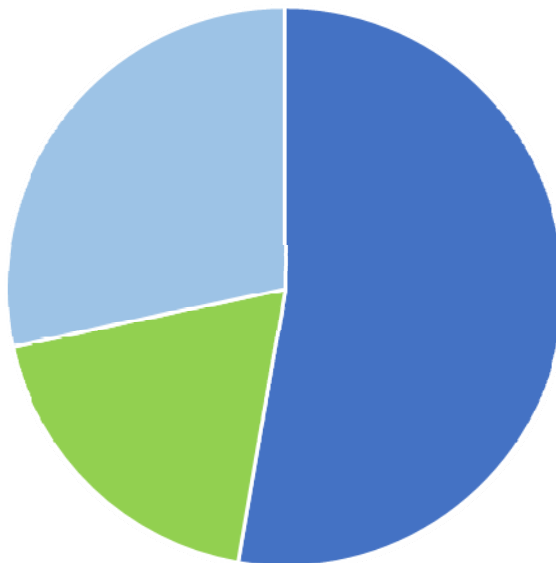
Discordant Smears

Patients categorized into three groups:

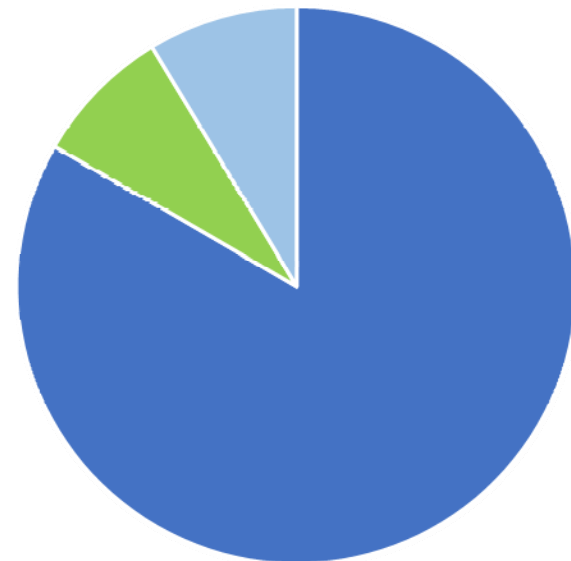
1. Sputa collected from a known TB patient
2. One or more NTMs were isolated from another sputa
3. All cultures for the patient were negative

Negative Cultures, by Patient

Equivocal Smears

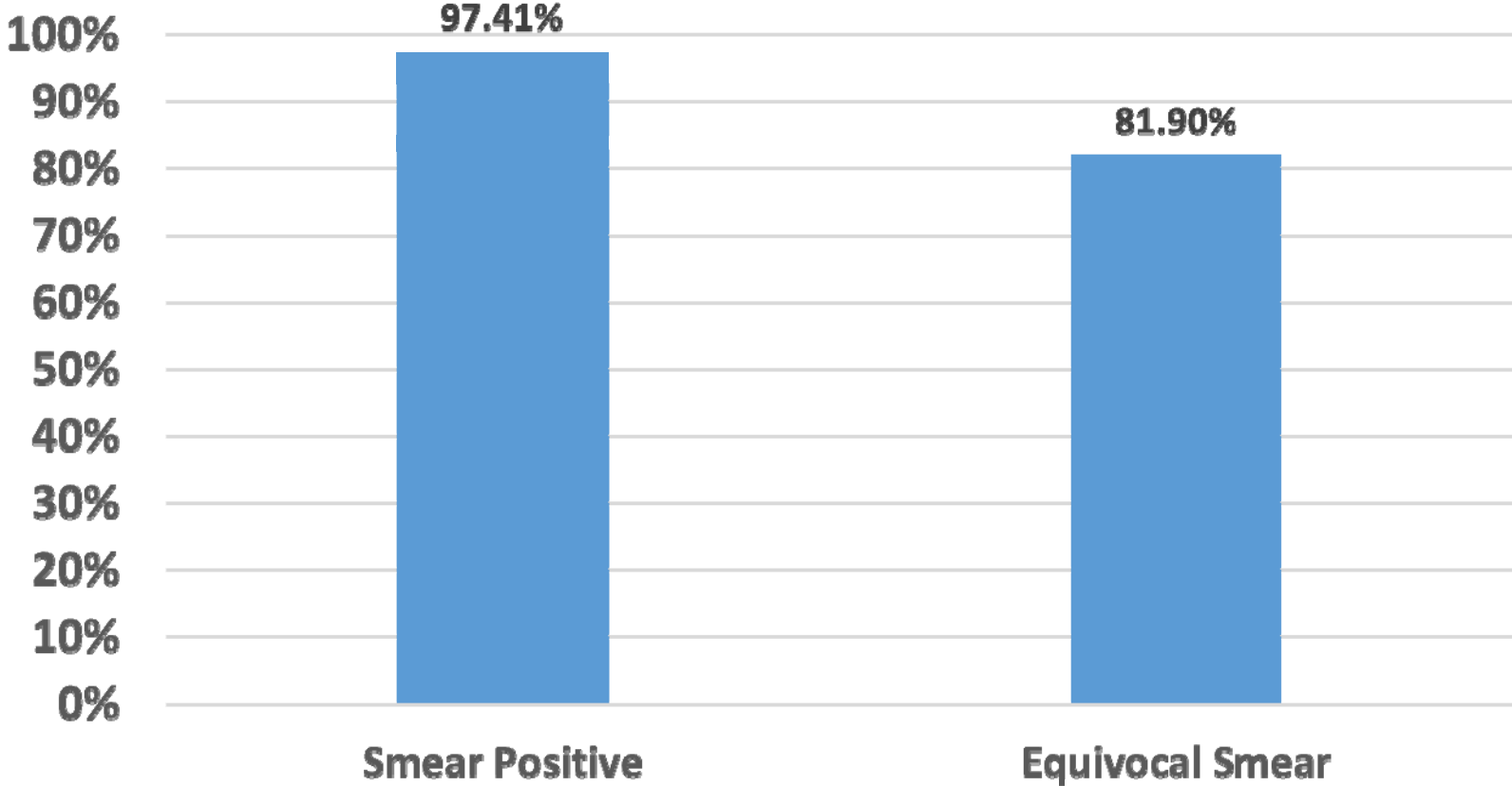


Positive Smears



- TB Patient
- NTM Patient
- True False Positive

Smear Specificity



Discussion

- The majority of culture discordant equivocal and positive smears were collected from previously diagnosed MTBC patients or were accompanied by one or more positive NTM cultures, 71.6% and 91.3%, respectively. It seems likely that the majority of these smear results represent either non-viable MTBC bacteria or low levels of NTM present in the specimen.
- Although none of the equivocal results in this limited data set led to a newly identified case of MTBC (all were follow up samples) the results suggest that additional follow up and testing should be considered.

Practical Considerations

- Analysts should be experienced in reading smears in order to reduce the reporting of “artifacts” as AFB
- Crucial to work with TB Control—how will a new result be used for case management?
- Important to educate submitters about results interpretation

Conclusions

- Equivocal smear results are more often predictive of a positive culture than are negative smear results
- For patients with an unknown TB status, NAAT testing should be performed to rule out MTBC
- For patients with known TB infection, equivocal smears are more likely to indicate infectiousness than negative smears

Questions?

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