Quality Assurance for Molecular Diagnostics

Thomas M. Shinnick, Ph.D.
Associate Director
Division of TB Elimination, NCHHSTP
TMS1@CDC.GOV

SAFER • HEALTHIER • PEOPLE™

Topics/Outline

- **Quality assurance for molecular tests that detect *M. tuberculosis* (active disease)**
- **Quality assurance for molecular tests that detect drug resistance**

Molecular Detection of TB

- Internal Quality Controls
  - Negative controls – every test run
    - assess contamination of reagents
  - Positive controls – every sample kit
    - Limit of detection
    - Do not run with test samples
  - Amplification control
    - Preferably test has an internal amplification control

Molecular Detection of TB

External Quality Assurance
- Proficiency testing
  - mock specimens spiked with *Mtb*
  - detects major errors and contamination
- Performance indicators
  - % smear-positive detected (>99%)
    - assumes no AFB+ due to NTM
  - % *Mtb* culture positive detected
  - Contribution of molecular test to detection of TB in AFB-neg samples
  - Concordant samples
  - % indeterminate results

Molecular Tests for Drug Resistance

- **Internal Quality Controls**
  - **Negative controls – every test run**
    - **assess contamination of reagents**
  - **Positive controls – every sample kit**
    - **Isolates with known mutations**
    - **Do not run with test samples**

Molecular Tests for Drug Resistance

External Quality Assurance

- **Proficiency testing**
  - mock sputum specimens spiked with *Mtb* or isolates – wild type or known mutations
- **Rechecking**
  - Compare molecular result with phenotypic result (reference lab)
  - Compare molecular test result with sequencing result
- **Performance indicators**
  - % agreement molecular/phenotypic tests
  - Concordant samples
  - % indeterminate results