

# **The Variability of Laboratories within the Tuberculosis Trials Consortium (TBTC)**

**Dorothy A. Kaminski**

**Health Scientist**

**Centers for Disease Control and Prevention**

**Atlanta, Georgia, U.S.A.**

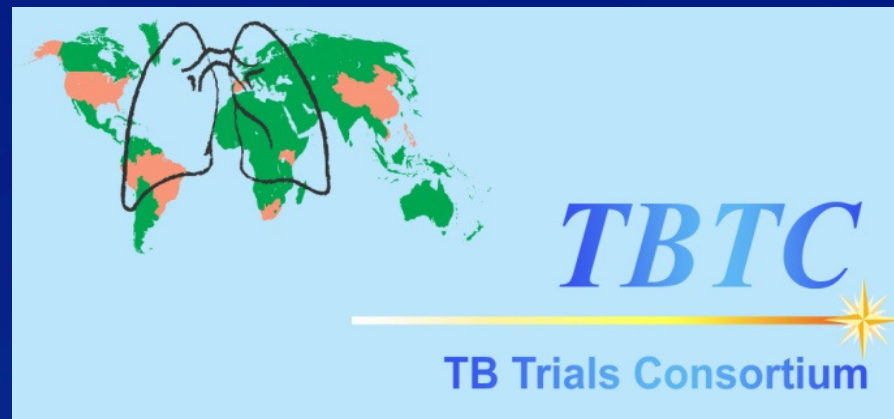
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## Presentation Outline

- ❑ *TBTC Overview*
- ❑ *Role of laboratories in TBTC studies*
- ❑ *Challenges facing laboratories*
- ❑ *Sentinel Mycobacteriology Laboratory Quality Assessment and Improvement Project (SMLQ)*
- ❑ *Summary of SMLQ, year one*
- ❑ *Recommendations , progress made*

# Tuberculosis Trials Consortium

TBTC was officially created in 1997 with a specific mission to conduct programmatically relevant clinical, laboratory and epidemiologic research concerning the diagnosis, clinical management, and prevention of tuberculosis infection and disease.



## Importance of TB Laboratory in TBTC Studies

- ❑ Clinical trials of tuberculosis treatment have become increasingly dependent on detailed and accurate reporting of Mycobacteriology Laboratory results
- ❑ Quality laboratory services and comparability of laboratory methods among participating laboratories are necessary for detailed analysis of laboratory results obtained across the TBTC laboratory network

# **Evolving Role of Microbiology in TBTC Studies**

## **□ Study 27**

- Included both solid and liquid culture media to maximize the sensitivity of the culture

## **□ Study 28**

- Required separate reporting of solid and liquid culture results on study case report forms

## **□ Study 29**

- NaOH/NALC specimen processing method
- MGIT and LJ culture media; each as a primary endpoint
- Microbiology case report forms completed by laboratorians

## Shift in TBTC Clinical and Patient Enrollment Sites

**1999**  
**North  
America**

**2003**  
**International  
Sites added**

**2009**  
**Mostly  
International**

## United States

- Colorado
- New Jersey
- North Carolina
- Tennessee
- Texas (4)
- Washington DC

## International

- Brazil (2 sites)
- China (Hong Kong)
- Kenya
- Peru
- Spain
- South Africa (2)
- Uganda
- Vietnam

## TBTC Study Sites and Partner Institutions 2010-2020



## TBTC Laboratory Support Services 2010 - 2020

- ❑ Laboratory support is provided by laboratories located in the vicinity of the principal investigators and patient enrollment sites
- ❑ Some TBTC sites are comprised of multiple laboratories
- ❑ Laboratories agree to utilize laboratory practices, methods and reporting mechanisms as specified by the study and catalogued via a Laboratory Procedures Questionnaire.

## **Changing paradigm of laboratory services within TBTC Laboratories**

- **Quality outcome of laboratory testing in high-resource countries is the direct result of:**
  - Adherence to national laws, regulations and guidelines governing laboratory performance
  - Use of consensus guidelines for developing evidence-based public health laboratory policy
  - Advances in technology
  - Appropriate leadership and management of laboratories

## **Factors influencing the development of laboratory quality services in resource-poor countries**

- ❑ Multiple factors and challenges have influenced the ability of laboratories in resource-poor countries to achieve a laboratory quality system comparable to that of high-resource countries
- ❑ Countries may not have developed or fully implemented laws, regulations or guidelines to govern laboratory services.

# Challenges for Laboratories in Resource-Poor Countries

## ❑ Human resources

- Laboratory management
- Educational levels and training of laboratory staff vary by country
- Staffing may not be aligned with workload
- Continuing education programs for staff may not be available or sufficient for current needs

## ❑ Laboratory Facilities

- Safety
- Power Supply and Environmental Controls
- Waste Management

# Challenges for Laboratories in Resource-Poor Countries

- ❑ **Laboratory equipment, supplies, reagents**
  - Procurement processes are generally out of the control of the laboratory
  - Resources for equipment, reagents and supplies often do not meet the laboratory's specifications and/or needs
  - Limited resources and procurement processes make it difficult to discard expired reagents or return or replace inadequate supplies
- ❑ **Limited number of medical equipment repair services**

# **Tuberculosis Trials Consortium Sentinel Mycobacteriology Laboratory Quality Assessment and Improvement (SMLQ) Project**

- ❑ Assess and enhance the quality of mycobacteriology laboratory work at selected site laboratories located outside North America and at their national reference laboratory counterparts
- ❑ Strengthen the laboratory foundation of TB control work at participating sites
- ❑ Forge and strengthen strategic partnerships

# SMLQ Site Visit Approach

## □ Preparatory Communications

- Coordinate visit with site circumstances and collaborators

## □ Conduct of the visit

- 1-2 days at each lab
- Review findings and recommendations with lab and site staff

## □ Follow-up to visit

- Present written report to site laboratory directors, CDC branch chiefs and TBTC data center staff
- Continue open lines of communications with site to help resolve issues through duration of the project

# Laboratory Quality System Approach

## Quality System Essentials

Organization

Personnel

Equipment

Purchasing and Inventory

Process Control

Documents and Records

Information Management

Occurrence

Assessment

Process Improvement

Customer Service

Facilities and Safety

## Path of Workflow

*Pre-Analytic*



*Analytic*



*Post-Analytic*

# **SMLQ Project - Year One Sites Visited**

- Spain – state of the art laboratory**
  - Hospital Clinic of Barcelona, Hospital Universitari de Bellvitge and Vall d’Hebron in Barcelona
- Uganda – high volume participant in multicenter trials and single site for microbiology sub-study**
  - Joint Clinical Research Centre/Makerere University and Mulago Hospital in and National Reference Lab in Kampala
- Kenya – preparatory visit, not yet participating in TBTC Studies**
  - KEMRI/CDC Research Lab in Kisumu and National Reference Lab in Nairobi
- Peru – preparatory visit, not yet participating in TBTC Studies**
  - Universidad Peruana Cayetano Heredia Research Lab and Diresa III Lab in Lima

## SMLQ Project - Year One Preliminary Findings

- ❑ Laboratories are enthusiastic about the SMLQ project
- ❑ TB Laboratory services are not equally optimized among laboratories visited
- ❑ Quality systems are not as well developed in some sites as in others visited
- ❑ Interactions with laboratories are limited and protocol teams have not adequately engaged laboratories as an integral part of TBTC studies
- ❑ The Study 29 Laboratory Questionnaire does not meet study needs

## SMLQ Project - Year One Recommendations

- ❑ Create a list of minimum quality requirements for TBTC network laboratories
- ❑ Introduce regularly scheduled meetings and other forms of communication to engage participation of microbiologists, and collaboration among all TBTC laboratories and with the CDC team
- ❑ Revise Study 29 Laboratory Questionnaire

## Benefits of SMLQ Project to TBTC Studies

- ❑ Establishes better lines of communication between TBTC research laboratories and CDC
- ❑ Enhances training of site laboratory staff in details of TBTC procedures
- ❑ Increases detailed understanding of site-specific laboratory procedures and processes
- ❑ Ensures that site laboratories have the understanding and information needed to provide adequate services within the framework of TBTC studies and goals
- ❑ Provides quality laboratory oversight for optimal performance

## SMLQ Project Where Are We Now?

- ❑ Conference calls with TBTC laboratory microbiologists have been initiated
- ❑ Mechanisms to allow future participation of microbiologists in the biannual meetings of TBTC are being explored
- ❑ The Study 29 TBTC Laboratory Questionnaire has been revised and ready to be sent to all laboratory sites for completion

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**THANK YOU!**  
**Questions?**

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