THE REPUBLIC OF UGANDA
MINISTRY OF HEALTH

UGANDA Supranational® Reference Laboratory
Timely Accurate Diagnostics for a TB-Free Africa

Training on Proficiency Testing Scheme (Microscopy PT)

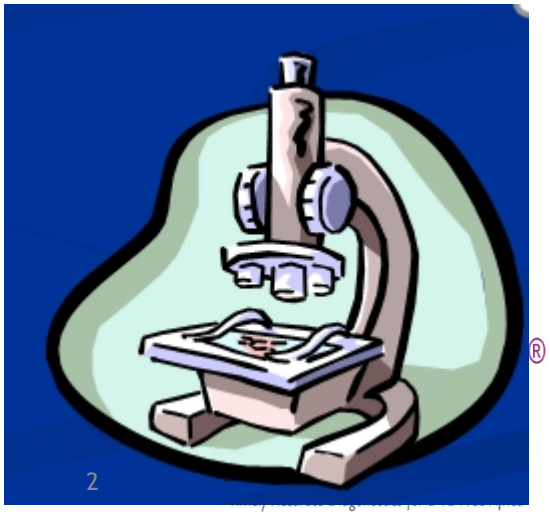
Module 9: Data analysis

24th- 29th April 2018

Uganda Supranational Reference Laboratory

Content outline

- What is panel testing?
- What is panel testing used for?
- Organization of a panel testing round
- Analysis of results; scoring system
- Forms
- Feedback



THE REPUBLIC OF UGANDA
MINISTRY OF HEALTH

Getting Started: Issues to Consider

- System for sending slides
- Frequency of testing
- Forms to record and report results
- Time allowed for technicians to complete PT
- Availability of microscopes
- Performance criteria
- Feedback and corrective action if needed
- Mechanism to resolve discrepant results

Implementation of Panel Testing

- Responsibility of the NRL- from preparation of slides to analysis of results and feedback
- Determine the number of AFB technicians who will participate in PT (ensure preparation of the needed number of panels)
- Communicate with Public Health Directors regarding EQA activities
- Prepare the schedule for panel testing in each location
- Collaborate with intermediate laboratories

Sending Slides

- Delivery system based on services, regulations, resources available:
  - mail/post
  - courier
  - supervisory visit
- Turnaround time

- Safe package to prevent breakage of slides:
  - strong plastic slide holders

Performing a Panel Test Round

- Frequency: at least one to two times a year
- A standardized PT reporting form / an accompanying letter to provide instructions
- Individual, not group work
- No incentives or punitive actions as a result of the PT exercise
- Time allowed to complete the PT exercise, maximum:
  - 2 hours for a stained slide set
  - 3 hours for an unstained slide set

Individual Results of Panel Testing /

Queensland Health Pathology Service- Central
Herston Hospitals Complex
Butterfield St. Herston 4029,
Brisbane Australia

QUEENSLAND MYCOBACTERIUM REFERENCE LABORATORY
(A WHO Collaborating Centre in Tuberculosis Bacteriology)
Phone 61 7 3636 0032 *Fax* 61 7 3636 1336
E-mail chris_gilpin@health.qld.gov.au

SRL Brisbane, Australia Use Only
Test Slide set #: 06:08:1-10
Date sent: 3rd August 2006
Date returned:

AFB Panel test for Pacific Island Countries

Testing Country:_____

Testing Laboratory:_____

Date panel test returned to Brisbane laboratory:_____(DD/MM/YY)

Name of technician reading test smears:_____

Note: If more than one technician performs AFB microscopy in each laboratory, each technician should read all 10 smears and record their results on a separate form. Technicians should not discuss result or share forms until all results have been returned to the Brisbane SRL for evaluation.

		SRL Brisbane, Australia Use Only		
Slide Number	Result	Expected result	Error type	Points
06:08:1				
06:08:2				
06:08:3				
06:08:4				
06:08:5				
06:08:6				
06:08:7				
06:08:8				
06:08:9				
06:08:10				

Feedback				
Total points:			Pass/Fail	
HFP	HFN	LFP	LFN	QE
Recommended action:				

MINISTRY OF HEALTH

Form PT3: PANEL TESTING INDIVIDUAL RESULTS AND FEEDBACK FORM

Central Laboratory Use Only:
Test slide set No: _____ Passsing score: _____
Date of sending set: _____ Date results received: _____

Peripheral Laboratory: _____
District: _____
Date PT conducted: _____
Name of technician reading test smears: _____

Note: If more than one technician performs AFB microscopy in the laboratory, each technician should read all 10 smears and record their results on a separate form. Technicians should not discuss results or share forms until all results have been sent back to the central laboratory. Forms for all technicians should be sent to the central laboratory for evaluation.

		Central Laboratory Only		
Slide Number	**Result**	**Expected result**	**Error Type**	**Points**
Feedback:				
Total Points:		**Pass / Fail:**		
HFP:	**HFN:**	**LFP:**	**LFN:**	**QE:**
Recommended Action:				

Supervisor: _____

ational®
Laboratory
ostics for a TB-Free Africa

Management of PT During a Supervisory Visit

- Administration of PT during on-site visits:
  - can be effective in some circumstances
  - provides direct observation of work under PT exercise
  - corrective action may be easily facilitated
  - BUT: may be impractical in routine conditions
  - can be done in a special survey

- Important: PT must not disrupt routine patients' examinations, therefore consider:

  - Careful planning of a supervisory visit
  - Allocating sufficient time for a visit

Analysis of PT Results

- A scoring system is to be developed prior to test
- Distinguish major and minor errors
  - false positive/negative related to 1+, 2+ or 3+ errors are major errors
  - quantification errors (at least a 2 grade difference) and false positive / negative errors in the scanty group (1-9 AFB) are considered minor
- Determine successful score
- Determine plan of action for poor performances

Analysis of PT Results

- A scoring system is to be developed prior to test
- Distinguish major and minor errors
  - false positive/negative related to 1+, 2+ or 3+ errors are major errors
  - quantification errors (at least a 2 grade difference) and false positive / negative errors in the scanty group (1-9 AFB) are considered minor
- Determine successful score
- Determine plan of action for poor performances

Types and Classification of Errors

Result of Technician	Result of Controller				
	Negative	1-9 AFB/100 f	1+	2+	3+
Negative	correct	LFN	HFN	HFN	HFN
1-9 AFB/100 f	LFP	correct	correct	QE	QE
1+	HFP	correct	correct	correct	QE
2+	HFP	QE	correct	correct	correct
3+	HFP	QE	QE	correct	correct

Correct: No errors

QE	Quantification error	Minor error
LFN	Low False Negative	Minor error
LFP	Low False Positive	Minor error
HFN	High False Negative	Major error
HFP	High False Positive	Major error

THE REPUBLIC OF UGANDA
MINISTRY OF HEALTH

UGANDA Supranational® Reference Laboratory
Timely Accurate Diagonostics for a TB-Free Africa

Example of PT Scoring

- Set of 10 slides, each slide is worth 10 points, total possible score = 100
  - HFP and HFN scores 0
  - LFP, LFN and QE scores 5
    (QE = 2 grades difference)
  - Passing score = 80 – 90

Analysis of PT Results

- Study the aggregate results from all laboratories
- Post-validate panel slides/batches
  - Assure that poor performance is not due to panel slide problems in NRL
- If a majority of technicians fail to report correct results for the same slide/batch it may represent a problem with slide preparation at NRL:

  ⟶ exclude this slide from scoring
  ⟶ check returned discrepant slides
  ⟶ detect problems in preparation of panel smears
  ⟶ undertake measures to improve the quality of panel smears preparation

PT– Interpretation of Results

- False positive and negative errors should be considered separately
- False positives - lack of proficiency / faulty microscope
- False negatives - poor stain / inadequate examination time / poor microscope

Feedback to Laboratories on PT results

- Timely and confidential
- Individual and aggregate test results
- Criteria for acceptable performance
- Reports to TB program coordinator should provide appropriate background information and recommendations and not simply scores
- Poor performance often requires a visit to laboratory

PT Aggregate Results of Multiple Laboratories

Form PT4: PANEL TESTING REPORT OF MULTIPLE LABORATORIES FOR DISTRICT SUPERVISOR AND NTP

District: _____ District Supervisor: _____

Supervising Laboratory: _____ Period PT conducted: _____

Panel test slide set(s): _____ Passing score: _____

Peripheral Lab	Annual volume	SPR, %	Technician(s) participated in PT	PT score	HFP	HFN	LFP	LFN	QE	Total errors
District Averages										

SPR: slide positivity rate; PT - panel testing; Annual volume - annual volume of smear examinations; HFP - high false positives; HFN - high false negatives; LFP - low false positives; LFN - low false negatives; QE - quantification errors

Report submitted by: _____ Date: _____

PT Aggregate Results Report: Example

PANEL TESTING REPORT OF MULTIPLE LABORATORIES FOR DISTRICT SUPERVISOR AND NTP

District: # 8
Supervising Laboratory: Laboratory H
Panel test slide set(s): # 35 - # 58

District Supervisor: Dr. XXX
Period PT conducted: III quarter 2006
Passing score: 90

Peripheral Lab	Annual volume	SPR, %	Technician(s) participated in PT	PT score	HFP	HFN	LFP	LFN	QE	Total errors
801	3146	7.7	801 / 01	95				1		1
			801 / 02	95				1		1
802	623	0.5	802 / 01	75		1	1	1	1	4
803	822	2.1	803 / 01	90			1	1		2
804	2005	3.4	804 / 01	90				2		2
805	937	3.6	805 /01	100						0
806	1895	3.2	806 / 01	90				2		2
807	876	2.2	807 / 01	70		2		2		4
			807 / 02	75		1		2		3
808	899	2.7	808 / 01	90				2		2
			808 / 02	90				2		2
809	1086	14.2	809 / 01	90				2		2
810	847	1.4	810 / 01	85		1		1		2
811	1424	4.8	811 / 01	90				1	1	2
			811 / 02	85		1		1		2
812	322	6.5	812 / 01	100						0
813	2440	2.3	813 / 01	85		1		1		2
814	406	15.5	814 / 01	100						0
815	2440	2.3	815 / 01	95				1		1
816	1029	12.5	816 / 01	90				1	1	2
817	421	3.3	817 / 01	90		1				1
818	1729	1.2	818 / 01	95					1	1
819	1900	10.8	819 / 01	95				1		1
820	881	1.7	820 / 01	85		1		1		2
District Averages	26128	5	24	89	0	9	2	26	4	41

SPR: slide positivity rate; PT - panel testing; Annual volume - annual volume of smear examinations; HFP - high false positives; HFN - high false negatives; LFP - low false positives; LFN - low false negatives; QE - quantification errors.

Report submitted by: Dr. YYY Date: 15-Oct-06

THE REPUBLIC OF UGANDA
MINISTRY OF HEALTH

anational®
ce Laboratory
Timely Accurate Diagonostics for a TB-Free Africa

Key Messages:

- PT is an effective method when it is necessary to quickly obtain information about capabilities of individual laboratory technicians to read smears and report results according to standards approved by NTP.

- A well functioning system should be established to distribute panels, collect and analyze data; provide timely feedback to peripheral laboratories.

References

- GLI TB training package http://www.stoptb.org/wg/gli/trainingpackages.asp
- www.hain-lifesciences.com

Acknowledgments

KOFIH
Korea Foundation for International Healthcare
한국국제보건의료재단