National Guidelines

on

External Quality Assessment - LQAS

for

Sputum AFB Microscopy

National Tuberculosis Reference Laboratory

Department of Public Health

Myanmar

2nd Edition

September, 2015

This National Guidelines was prepared by National EQA Unit, National TB Reference Laboratory, National Tuberculosis Programme (NTP) in 2015.

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We would like to acknowledge Mrs. Akiko Fujiki (JATA) for her appreciated advice for development of this second version of National Guidelines on External Quality Assessment for sputum AFB Microscopy (2015). This book is updated with addition of Fluorescence Microscopy work.

We are also grateful to the Director (Laboratory Services), the Deputy Directors and Microbiologists from National TB Programme and National Health Laboratory, Yangon for proof reading. Last but not the least to TB Officers and Senior TB Laboratory Supervisors for their active participation and suggestions given at the Workshop on Improvement of Quality Assurance System for AFB Microscopy.

Preface

Tuberculosis is a chronic infectious disease which is still a major global health problem especially in the less developed regions of the world including Myanmar. For the National Tuberculosis Programme, the diagnosis as well as monitoring of treatment progress of tuberculosis depends mainly on sputum AFB microscopy.

To have a correct results, the skill of technicians for smear preparation, staining and smear reading play an important role. To improve the quality of work and then to maintain it, microscopy performance need regular monitoring.

With this in mind, NTP developed the first guidelines on "External Quality Assessment-LQAS for sputum AFB Microscopy" in 2007. In the first book only Ziehl Neelsen method was mentioned. In 2012 NTP introduced Fluorescence microscopy as additional tool. Till now there are 149 iLED microscopes in National TB Programme by which we can examine both Ziehl Neelsen and Auramine O Fluorescent stained slides. The Fluorescence Microscopy gains more sensitivity and quick reading than bright field microscopy, thus less time is needed for examination.

To assess smear preparation quality, bright field microscopy with Ziehl-Neelsen staining method has six (6) check points termed specimen, staining, cleanliness, size, thickness and evenness but Fluorescence Microscopy can be assessed by five (5) check points except quality of staining. The reporting scale for reading of Fluorescence Microscopy also differs from that with Ziehl-Neelsen Microscopy.

Therefore this 2nd version of National Guidelines on External Quality Assessment - LQAS (Lot Quality Assurance System) for sputum AFB microscopy was upgraded in (2015) where both ZN staining method and Fluorescent staining method included.

This guideline is a useful tool to have correct results for both Bright field microscopy and Fluorescence microscopy and will be beneficial in our fight against tuberculosis.

Professor Dr. Htay Htay Tin
Director (Labs)
September (2015)

Abbreviations

AFB	Acid Fast Bacilli
APHL	Association of Public Health Laboratories
CDC	Centers for Disease Control
EQA	External Quality Assessment
FM	Fluorescence microscopy
FN	False Negative
FP	False Positive
HC	Health Center
IUATLD	International Union Against Tuberculosis and Lung Disease
JICA	Japan International Cooperation Agency
KNCV	Koninklijke Nederlandse Cetrale Vereniging ter Bestrijding van tuberculose [KNCV Tuberculosis Foundation]
LQAS	Lot Quality Assurance System
Lab MO	Laboratory Medical Officer
MO	Medical Officer
Msp	Microscopist
NTP	National Tuberculosis Programme
NTRL	National Tuberculosis Reference Laboratory
QA	Quality Assurance
QC	Quality Control
QE	Quantification Error
RIT	Research Institute of Tuberculosis
SPR	Slide Positivity Rate
STLS	Senior Tuberculosis Laboratory Supervisor
TMO	Township Medical Officer
VF	Visual Field
WHO	World Health Organization
WPRO	Western Pacific Regional Office
ZN	Ziehl- Neelsen

Contents

INTRODUCTION

In many countries with a high prevalence of tuberculosis, direct sputum smear microscopy remains the most cost effective tool for diagnosing patients with infectious tuberculosis and for monitoring their progress on treatment. The World Health Organization strategy for tuberculosis control (DOTS) relies on the network of laboratories that provide acid fast bacilli (AFB) sputum smear microscopy. The establishment of a broad network of well functioning peripheral laboratories within the context of the health system and readily accessible to the population is a high priority for any tuberculosis programme.

National Tuberculosis Programme (NTP) has made considerable advances in its effort to control TB in Myanmar. Since 1997 NTP utilizes the DOTS strategy. The NTP activities are implemented through integration approach with primary health care services. Nationwide DOTS coverage was achieved by the end of Year 2003.

Microscopy errors are likely to result in failure to detect persons with infectious tuberculosis who will then continue to spread infection in the community, or giving unnecessary treatment for "non-cases". Errors in reading of follow-up smears may result in patients being placed on prolonged treatment, or in treatment being discontinued prematurely. Therefore quality assurance of laboratory services including AFB smear microscopy is essential.

Quality Assurance (QA) is a system designed to continuously improve the reliability and efficiency of laboratory services. As defined by both the WHO and the International Union Against Tuberculosis and Lung Disease), a quality assurance programme for AFB smear microscopy has several components. QA is a total system consisting of internal quality control (QC) (*where internal monitoring of working practices, technical procedures, equipment, and materials including quality of stains*), assessment of performance using external quality assurance **(EQA)** methods, and continuous quality improvement (QI) of laboratory services.

Since 1997 The NTP, Myanmar started to develop the framework for the implementation of quality assessment activities using conventional method in which all positive slides and 10% of the negative slides examined are checked. It was expanded to all Region and States in 1999. The big number of slides examined for quality checking made burden on STLSs so that new EQA method based on Lot Quality Assurance System (LQAS)* was introduced in 2007. Sample size was fixed as six slides per month for cross checking according to national TB figures. In 2010 it was conducted in whole country with different sample sizes for each and every microscopy centers covering both public and private laboratories.

The focus of EQA is on the identification of laboratories where there may be serious problems resulting in poor performance, not on the identification of individual slide errors or the validation of individual patient diagnosis. It is also an important tool for communication with and motivation of laboratory technician who may otherwise feel isolated in their work. Three methods that can and should be combined to evaluate laboratory performances are:

- On-site Evaluation
- Panel Testing
- Blinded Rechecking

On-site Evaluation

Visits to the peripheral laboratories by trained laboratory personnel from the reference /State/Regional laboratory are essential to obtain a realistic assessment of the conditions and skills practiced in the laboratory.

On-site visits by experienced person from a higher-level laboratory provide an opportunity for immediate problem solving, corrective action and on-site retraining.

When poor performance has been identified through on-site evaluation, blinded rechecking or panel testing and additional visits from a higher level laboratory are mandatory.

Panel Testing

Panel testing is a method of EQA that is used to determine whether a laboratory technician can adequately perform AFB smear microscopy. This method evaluates individual performance in staining and reading but not all the laboratory activities. Utilization of panel testing for EQA is considered to be less effective than random blinded rechecking of routine slides because it does not monitor routine performance.

In Myanmar for AFB Microscopy panel testing is used under NHL / NTP for State and Regional Hospitals and TB Centers because these institutions do not have routine slides for blinded rechecking. Panel testing is performed to Senior TB Laboratory Supervisors (STLS) who are Laboratory Officers, Medical Technologists and Senior technicians from State and Regional Level designated by The Ministry of Health. Panel testing is not performed as a routine to other level laboratories, as they will have regular on-site evaluation and blinded rechecking by STLS.

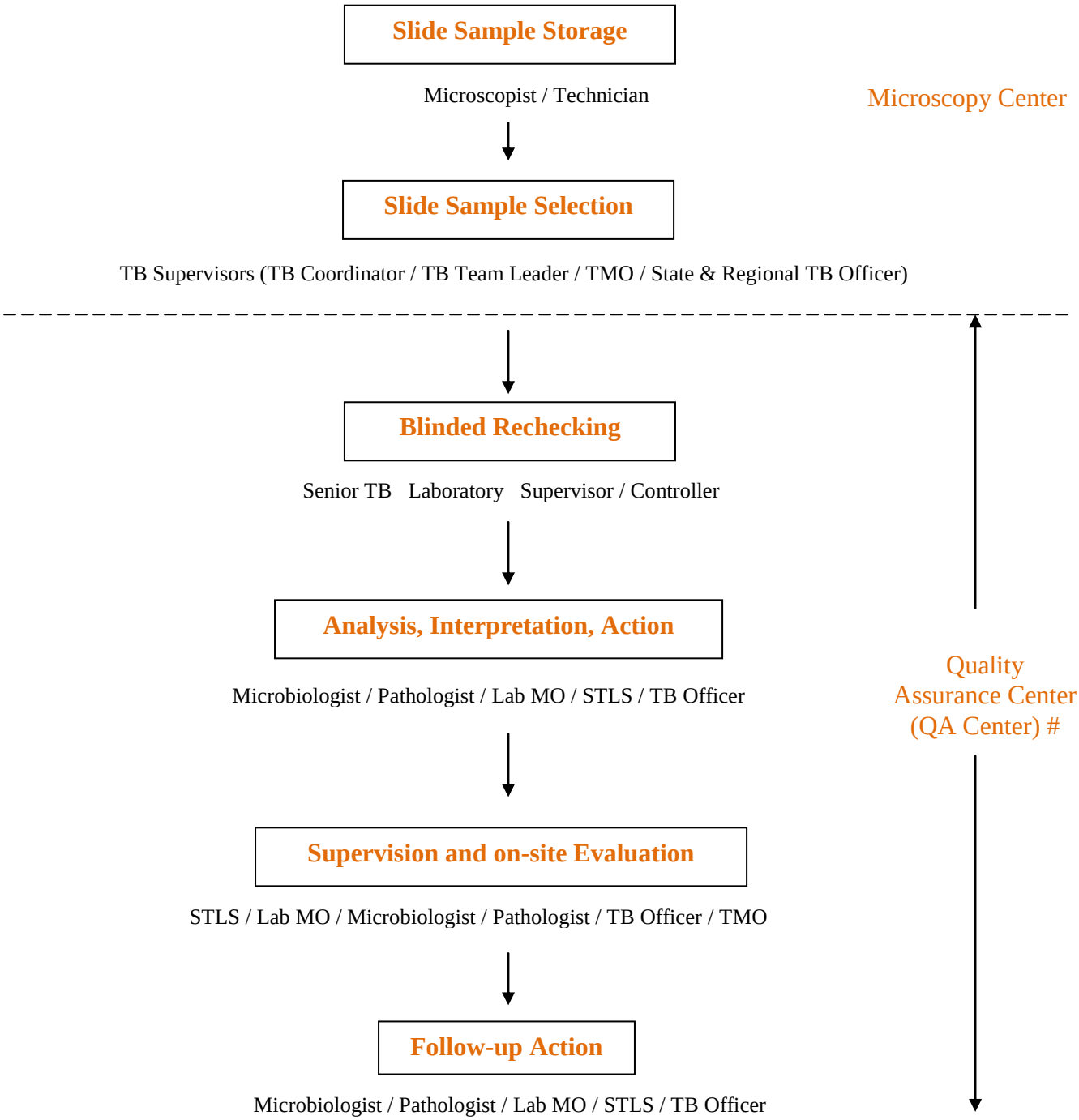
Blinded Rechecking

Blinded rechecking is a process of rereading a sample of slides from a laboratory to assess whether that laboratory has an acceptable level of performance.

Pilot studies had been carried out at Yangon and Mandalay Regions on EQA-(LQAS) System and found that this system can be applied in Myanmar provided there is a national guideline and necessary training given to TB Supervisors. At least once in a quarter visits to the district and peripheral laboratories by TB Supervisors from State and Regional level is required. Laboratory Officials from Central (NTRL) must visit to State and Regional Level at least once in a year.

Flowchart of EQA System

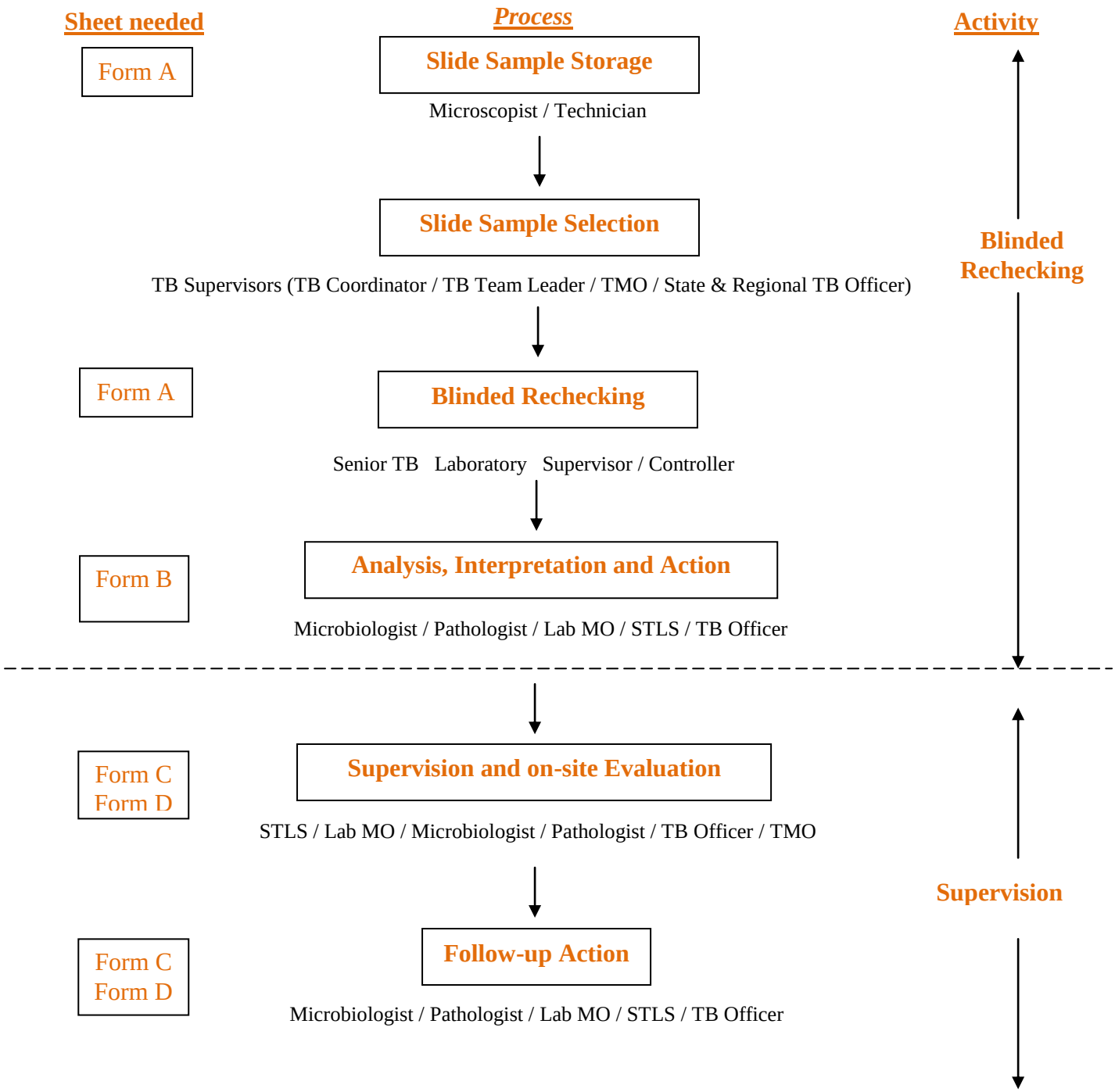
(Responsible Person)



QA Center is located at State and Regional level Laboratories and is responsible for effective implementation of quality assurance on AFB microscopy services of peripheral laboratories within its State and Region.

Flowchart of EQA System

(Required forms and activities)



Form A	Work sheet for smear slide checking
Form B	Feedback Sheet
Form C	Supervision Checklist
Form D	Follow-up Sheet
Form A.3	Discordant Slide Sheet

Checking of Daily Tuberculosis Laboratory Register

Checking of smear grading

Checking of slide during Supervisory visit

Checking of smear preparation

Operating Procedures

(1) Slide Sample Storage

Responsible person: Microscopist / Laboratory technician

- Remove the oil from the slide with Xylene (needed for slides used by ZN staining method).
- Store all the examined slides chronologically in the slide box as in TB laboratory register until slides are selected and keep away from direct sun light.

(2) Slide Sample Selection

Responsible person: TB Supervisors – State & Regional TB Officer/ TB Coordinator / TB Team Leader / TMO / who are called slide selector.

- Microscopist / Technician together with the slide boxes, TB Laboratory Register and ***Form A*** have to go to the slide selector.
- Select slide samples as determined for a month for each center.
- If the slides examined for one month is less than six (6), all slides must be taken.
- Select the slides from TB Laboratory Register as instructed in Page 9. Ensure that the result is not written on the slide.
- If a particular slide is broken or missing, take the next slide.
- Enter the details of slides in **Form A** (**see Example. 1**).This will be known as **Form A data sheet.**
- Take out the selected slides in sequence and transfer to the smaller slide box in the presence of the supervisor (the slide selector).
- Write the name of microscopy center and month on the slide box.
- Pack the slide box and send it with **Form A data sheet** to QA center.
- Leave a duplicate of **Form A** at microscopy center.
- Discard all the remaining slides in the slide boxes.

(3) Blinded -Rechecking

Responsible person: STLS /Controller

- Handover the slides and **Form A**, to Responsible person of QA center.
- Record the name of microscopy center, month and slide numbers (but not results) in a new **Form A.**
- Give the slides together with this new **Form A** to the Controller, who must not be the person responsible for data entry.

- **For QC slides used by Ziehl-Neelsen (ZN) staining method**. The controller must check the quality of smear preparation based on six (6) assessment points both macroscopically and microscopically.
- Read with bright field microscope to check capability of reading and enter the results in **Form A** (**see Example. 2**). This will be known as **Form A result sheet**.
- All discordant ZN QC slides must be re-stained with ZN staining method and read again with bright field microscope.
- **For QC slides used by Fluorescence staining method**. The controller must check the quality of smear preparation based on five (5) assessment points both macroscopically and microscopically.
- Re-stain all FM QC slides with Fluorescence staining method to check capability of reading.
- Read with fluorescence microscope and enter the results in **Form A result sheet**.
- Give the **Form A result sheet** together with examined slides to the Responsible person of QA center.
- The controller must complete re-reading within one week after receiving the slides.

(Note: For ZN staining method. All QC slides must be restained after smear assessment in special occasions like MCs where less experienced person performs FM microscopy or poor quality stains are used.)

(4) Analysis, Interpretation and Action

Responsible person: Microbiologist / Pathologist / Lab MO / MO / STLS.

- The responsible person transcribes the peripheral laboratory results from the data sheet to result sheet.(**See Form A Example. 3**)
- In case of discrepancy, ask / request to same or another controller to examine the discordant slide and verify the results by using **Form A.3** known as **discordant slide sheet (see Form A Example. 4)**
- Keep all discordant slides for discussion during next supervisory visit.
- Discard the remaining slides.
- Record the assessment results in **Feedback Sheet** (**Form B**).
- Make analysis and interpretation on smear reading and smear preparation by responsible person.
- Calculate the overall proportion of good / poor smear preparation.
- Include likely explanations as well as suggestions for corrective actions in the feedback. Praise good work. Provide feedback for the discordant slides.

- Review any detected error as a potential indicator of diminished competency and investigate further.

  Note :(1) Major errors are seen, it means the need for prompt on-site supervision and also re-training of technicians.

  (2) An occasional minor error (quantification) is not a problem, but if this occurs repeatedly or if smear preparation quality is continuously below the acceptable standard of 90%, the laboratory performance should be reassessed.

(5) On- Site Evaluation/ Feedback/ Follow-up

- QA center makes supervisory visit to microscopy center at least quarterly based on **Feedback sheet** (**Form B)**. Emphasis is placed on the identification and correction of error found in rechecking. Major error indicates serious defect in microscopy service of that center. Therefore, once the major error is identified, action must be taken immediately by QA center, that is within 7 to 10 days after rechecking.
- Send the filled **Form B** Sheet within 2 - 4 weeks by postal service either to TMO or TB Team Leader who is responsible person of the respective microscopy center. This sheet must be shown to the technician so that he/she will know the mistakes and corrections to be made.
- During supervisory visit take along the discordant slides and filled **Form B** of that microscopy center for discussion. Record findings, recommendations and actions taken in the **Follow-up Sheet** (**Form D**) as reference for the next field visit.
- Leave a duplicate of **Form D** at the microscopy center.
- The Supervision Check List for TB Laboratory (**Form C**) needs to be filled at quarterly visit.

(6) Monitoring purposes

- The consolidated data sheets of each microscopy center (Form 1 and Form 2) are useful to assess the condition and progress of that participating laboratory. Data must be filled monthly or quarterly at QA Center. Regular entry of results is needed for midterm and annual report.
- The consolidated data sheets of each QA Center (Form 3 and Form 4) at State and Regional level will help to State/ Regional TB Officer to monitor the situation of laboratory performance as a whole. This will also indicate the laboratory which needs attention and refresher training.

Determination of Sample Size in Myanmar

In Myanmar, LQAS (Lot Quality Assurance System) sampling method is adopted with 80% sensitivity, 100% specificity and acceptance error (d) = zero (0).Based on the Table "Recommended annual sample sizes." (See in Appendices) NTP, Myanmar makes Simplified Table of Monthly Sample Sizes (See the Table below) in 2009. Calculation of sample sizes will be made based on annual negative slides and slide positivity rates for each and every microscopy center. The sample sizes will be revised every 3 years.

Since 2010 the NTP, Myanmar started different sample sizes for each and every microscopy center and therefore will be reviewed once every three (3) years. If there is any change, it will be informed.

Simplified Table of Monthly Sample Sizes

Number of Negative Slides/year	Slide positivity Rate		
	< 7.50% - 7.50%	**7.51% - 12.50%**	**12.51% - >12.51%**
	Number of slides for rechecking		
>500	13	7	6
501-1000	15	8	6
>1000	18	9	6

(80% sensitivity, 100% specificity, '0' acceptance number)

Procedure for Slide Selection

Example:

Today is 5th June 2006.

- You are going to select the slides examined for the month of May 2006.

- Number of slides to be selected for the month is 6 **(six)**.

The technician must bring the slide boxes and TB Laboratory Register to the person who will select the slides.

1) Check the TB Laboratory Register, and determine the number of smear examined in May, 2006.

2) Total number of smear examined is (e.g. 210). Count the number of slides in the slide boxes to make sure there are 210 slides.

3) Sampling interval is $\frac{\text{Total number of slides examined}}{\text{Number of slides to be selected}} = \frac{210}{6} = 35$

4) Choose any number below the sampling interval (between 1 to 35).

5) Say 3. Therefore, the first slide to be taken is 3rd. slide from the slide box. Then make a circle on the TB Laboratory Register every 35th. Slide counting from 3rd slide. i.e. 3, 38, 73, 108, 143 and 178.

6) Ask the technician to do the following:-

   a) take out the above slides and put it in a new slide box.

   b) to fill Form A (The Slide Selector must sign on the form to prove that the slide selection is made by him / her. Signature of lab technician must also be included.

   c) to discard the remaining slides in the slide boxes.

7) Keep the carbon copy of Form A at the Microscopy Center.
   Send the slides together with filled Form A to the QA Center.

AFB Slide Reading

WHO and IUATLD recommended quantification scale

Reporting scale for Bright Field Microscopy (Ziehl - Neelsen Method)	
1,000 X magnification (One length = 2 cm = 100 fields)	
Reporting scale	AFB seen
(3+)	More than 10 AFB per field in at least 20 fields
(2+)	1- 10 AFB per field in at least 50 fields
(1+)	10-99 AFB per field in at least 100 fields
(Scanty) Report actual number	1-9 AFB per 100 fields
Negative = neg	No AFB seen in at least 100 fields

Reporting Scale For Florescence Microscopy (Auramine Method)	
200 X magnification (One length = 2 cm = 30 fields)	
Reporting scale	AFB seen
(3+)	More than 250 AFB per field on average
(2+)	25-250 AFB per field on average
(1+)	3-24 AFB per field on average
(Scanty) Report actual number	5-49 AFB per one length *if found (1- 4 AFB) in one line (Confirmation needed**)*
Negative = neg	No AFB seen in one length

****Confirmation required by another technician or prepare another smear, stain and read**

Note(1); for FM microscopy , to check reading, use 20 x objective to scan the smear and the 40 x objective for confirming suspicious objects.

Note(2); The typical appearance of AFB is a long, slender, slightly curved rod but variable in shape and staining intensity.

Interpretation of Readings

- Quality of reading will be assessed with the type of error (major errors/ minor errors) found. Major and minor errors must be looked for. These are HF(+), HF(-), LF(+), LF(-) and QE.

- No error in any type is considered as optimal performance.

- Any major error indicates unacceptable performance and triggers an evaluation and corrective action.

- It is possible that no significant problems in laboratory practice will be found and performance trends should be monitored over time.

- Repeated occurrence of similar minor errors is required further evaluation.

False positive (+) = Positive result by Laboratory technician at microscopy center but read negative by Controller

False negative (-) = Negative result by Laboratory technician at microscopy center but read positive by Controller

Classification of errors

Bright field Microscopy

Result by controller	Result by Microscopist					Total
	0	1-9 AFB / 100 fields	1+	2+	3+	
0	Correct	LF (+)	HF (+)	HF (+)	HF (+)	
1-9 AFB/ 100 f	LF (-)	Correct	Correct	QE	QE	
1+	HF (-)	Correct	Correct	Correct	QE	
2+	HF (-)	QE	Correct	Correct	Correct	
3+	HF (-)	QE	QE	Correct	Correct	
Total						

Fluorescence Microscopy

Result by controller	Result by Microscopist					Total
	0	5-49 AFB / one length	1+	2+	3+	
0	Correct	LF (+)	HF (+)	HF (+)	HF (+)	
5-49 AFB / one length	LF (-)	Correct	Correct	QE	QE	
1+	HF (-)	Correct	Correct	Correct	QE	
2+	HF (-)	QE	Correct	Correct	Correct	
3+	HF (-)	QE	QE	Correct	Correct	
Total						

Correct = Consistent result (same result by both Microscopist and Controller)

LF (+) = Low False Positive (Minor Error)

LF (-) = Low False Negative (Minor Error)

QE = Quantification Error (Minor Error)

HF (+) = High False Positive (Major Error)

HF (-) = High False Negative (Major Error)

Possible Causes and Suggested Actions

Type of Error	Possible Causes	Suggested Actions
HFN (major errors)	- Insufficient time spent for scanning smear	- Check scanning manner
	- Poor smearing technique (very thick smear)	- Evaluate quality of smear preparation
	- Staining problems, poor stain, insufficient staining time or heating (pale AFB, insufficient contrast in background)	- Check staining performance and Stains. Use new staining reagents
	- Defective microscope	- Check microscope (position of Condenser, Diaphragm for poor light). Test with positive smear.
	- Mistranscription of the result	- Check laboratory register and compare with QC list.
HFP (major errors)	- Artifact (e.g. stain deposits or crystals) incorrectly interpreted as AFB	- Filter carbol fuchsin/Auramine O and/ or prepare new stains
	- AFB carried over in immersion oil from a previous positive smear for ZN method	- Clean x 100 objective lens and check microscopy performance
	- Staining problem and fading of Fuchsin stain of AFB	- Restain slides to check for fading
	- Mistranscription of the result	- Check laboratory register and compare with QC list.
LFN **LFP** **QE** (minor errors)	- Insufficient time spent in scanning smear	- Check scanning manner
	- Technician does not understand scoring system	- Check AFB reporting scale
	- Poor staining technique	- Check reagents and staining technique
	- Defective microscope	- Check microscope

HFN = High False Negative HFP = High False Positive QE = Quantification Error

LFN = Low False Negative LFP = Low False Positive

Possible Causes of False Reading Results

Check point	Causes	False Negative (FN)	False Positive (FP)
Smear Size	- Too big - Too small	✓ ✓	
Smear Evenness	- Uneven - Sloughed-off	✓ ✓	
Smear Thickness	- Too thick - Too thin	✓ ✓	
Smear Cleanliness	- Dirt - Artifact	✓	✓ ✓
Sputum Quality	- Saliva	✓	
Staining	- Overheating - Insufficient heating/ time - Poor decolourization	 ✓ ✓	✓ ✓

Main Factors leading to false results

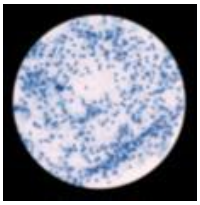
Step	False (-)	False (+)
Specimen	- Poor quality & quantity	- Error in handling - Artifact in specimen
Smear Preparation & Staining	- Thick, uneven and too little material with too thin smear preparation - Insufficient heating /staining - Intensive counterstaining	- Over heated staining - Inadequate decolourization - Deposit/ Cristal in stains
Reading	- Insufficient scanning - Defective microscope - Erratic attitude - Physical problem	- Transfer of positive smear particle - Erratic attitude
Recording	- Mistranscription - Mislabeling of specimen	- Mistranscription - Mislabeling of specimen

Assessment Points of Smear Slide Preparation

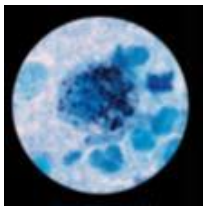
Quality of smear slide preparation will be evaluated in term of six (6) check points mentioned below. All these six (6) check points will be used for ZN QC smears. Proportion of good smear preparation for each assessment point should be 90% or more.

Stained smear slides can be evaluated whether they are good or poor in terms of the dominance of the following checkpoints in the smear area macroscopically and microscopically.

1) Specimen Quality: **The presence of dust cell (macrophage) or presence of more than 25 leucocytes per field at total magnification of x 100 are observed.**

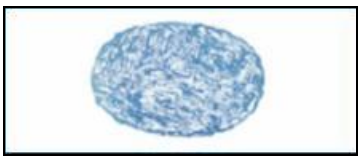


Leucocyte (x 100)



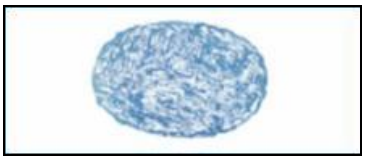
Dust cell (x 1,000)

2) Smear Size: **Approximately 2 x 3 cm in size.**

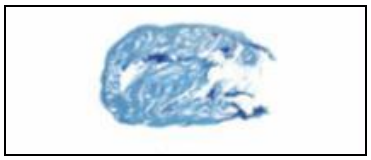


size of 2cm x 3cm

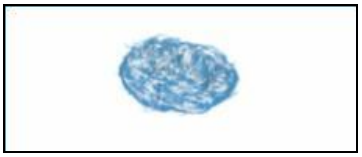
3) Evenness: **Smear area is not extremely uneven or smear is not sloughed off.**



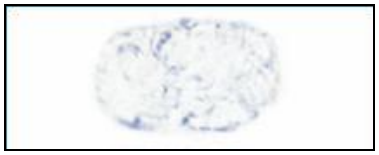
Good



Sloughed off

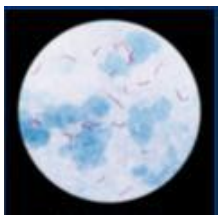
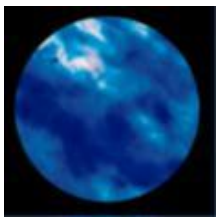
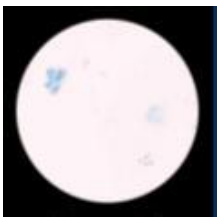
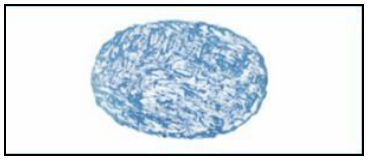
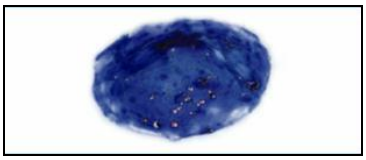


Good



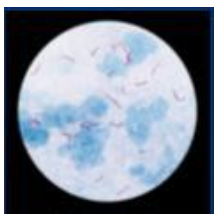
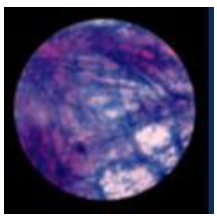
Uneven

4) Smear Thickness: **The whole depth of the smear layer can be focused sharply in each field.**

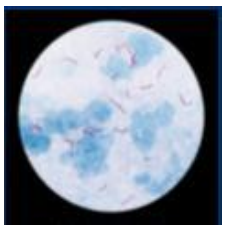
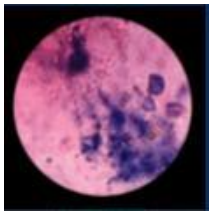

Good **Too thick** **Too thin**

5) Staining Quality: **AFB background is clearly distinguished (over/under staining).**

Good **Under decolourization**

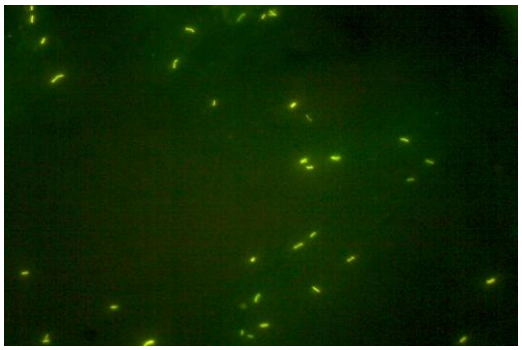
6) Smear Cleanliness: **Presence of stain deposit, dirt, debris, etc. should be avoided as much as possible so as not to cause interference in reading.**

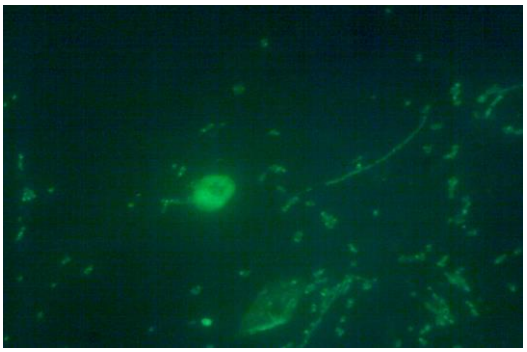
Good **Dirt with crystal**

Note: Smear preparation quality of FM QC smears will be assessed with five (5) check points except staining quality and it must be used with 10x objective of fluorescence microscope by ordinary light, not by fluorescent light. Ways of assessment are same like ZN method.

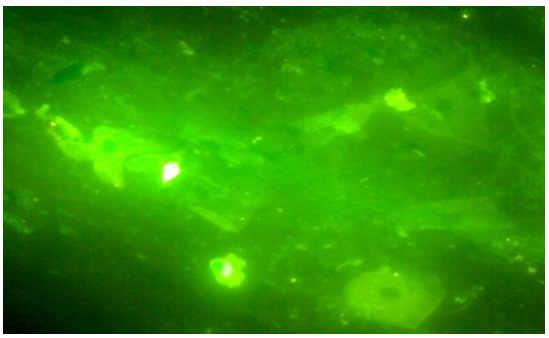
a. Auramine stained good smear with 20 x mignafication



b. Auramine stained smear with stain deposit



c. Auramine stained smear with under decolorization



Appendices

1) Forms

Form A	Work sheet for smear slide checking
Form B	Feedback Sheet
Form C	Supervision Checklist for TB Laboratory
Form D	Follow-up Sheet

2) Consolidated Data Sheets

Form 1:	Smear Slide Preparation by Microscopy Center
Form 2:	Smear Slide Reading by Microscopy Center
Form 3:	Smear Slide Reading (State/ Division QA Center)
Form 4:	Smear Slide Preparation (State/ Division QA Center)

3) Example (Filling of Forms)

Form A.1

National Tuberculosis Programme, Myanmar

Quality Control Work Sheet for Sputum Smear Examination

Microscopy Center: _____ District: _____

Month: _____ Year: _____

Sr. No.	Slide No.	AFB result by		Specimen Quality		Staining		Cleanliness		Smear Size		Thickness		Evenness	
		Msp	Con	Gd	Pr	Gd	Pr	Gd	Pr	Gd	Pr	Gd	Pr	Gd	Pr
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Msp = Microscopist Con = Controller Gd = Good Pr = Poor B = Too big S = Too small

Tk = Too thick Tn = Too thin O = Over decolourization U = Under decolourization

Date: _____ Analyzed by (with signature): _____

Example 2

Form A .2

National Tuberculosis Programme, Myanmar

Quality Control for Sputum Smear Examination

(With controller's result)

Microscopy Center:_____ District:_____

Month:_____ Year:_____

Sr. No.	Slide No.	AFB result by		Specimen Quality		Staining		Cleanliness		Smear Size		Thickness		Evenness	
		Msp	Con	Gd	Pr	Gd	Pr	Gd	Pr	Gd	Pr	Gd	Pr	Gd	Pr
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Msp = Microscopist Con = Controller Gd = Good Pr = Poor B = Too big S = Too small

Tk = Too thick Tn = Too thin O = Over decolourization U = Under decolourization

Remarks: by controller

Date:_____ Analyzed by(with signature):_____

Form A -3

National Tuberculosis Programme, Myanmar

External Quality Assessment Work Sheet for Sputum Smear Examination

Discordant Slides Form

Microscopy Center: _____ District: _____

Year: _____

Sr. No.	Month	Discordant Slide No.	AFB result by			Specimen Quality		Staining		Cleanliness		Smear Size		Thickness		Evenness	
			Msp	STLS /Con	Ump	Gd	Pr	Gd	Pr	Gd	Pr	Gd	Pr	Gd	Pr	Gd	Pr
1.																	
2.																	
3.																	
4.																	
5.																	
6.																	
7.																	
8.																	
9.																	
10.																	
11.																	
12.																	
13.																	
14.																	
15.																	

(note) Msp = Microscopist STLS = Senior TB laboratory Supervisor Con=Controller Ump = Umpire reader

Gd = Good Pr = Poor B = Too big S = Too small

Tk = Too thick Tn = Too thin O = Over decolourization U = Under decolourization

Comments / Suggestions by umpire reader

Date: ---------- Analyzed by (with signature): ----------

National Tuberculosis Programme, Myanmar

Form B 1

External Quality Assessment

Feedback Sheet (Bright Field Microscopy)

Microscopy Center: _____ Month/ Quarter/ Year: _____

Smear Reading

Result by Controller	Result by Microscopist					Total
	Neg	1-9 AFB/ 100f	1+	2+	3+	
Neg		LF (+)	HF (+)	HF (+)	HF (+)	
1-9 AFB/ 100f	LF (-)			QE	QE	
1+	HF (-)				QE	
2+	HF (-)	QE				
3+	HF (-)	QE	QE			
Total						

Classification of errors		Number	No. of slide discussed
Major Error	HF (+)		
	HF (-)		
Minor Error	LF (+)		
	LF (-)		
	QE		
Total No. of errors			

Smear Preparation (Total number of slides rechecked =)

	Good		Poor			
	no.	%	no.	%		
Specimen Quality						
Staining					O (%)	U (%)
Cleanliness						
Thickness					Tk (%)	Tn (%)
Size					S (%)	B (%)
Evenness						

Good = acceptable O = Over decolourization U = Under decolourization

Tk = Too thick Tn = Too thin S = Too small B = Too big

Comments for Improvement:

Date report submitted: _____ Report by: _____

National Tuberculosis Programme, Myanmar Form B.2

External Quality Assessment

Feedback Sheet (Fluorescence Microscopy)

Microscopy Center: _____ Month/ Quarter/ Year: _____

Smear Reading

Result by Controller	Result by Microscopist					Total
	Neg	5-49 AFB/ 20f	1+	2+	3+	
Neg		LF (+)	HF (+)	HF (+)	HF (+)	
5-49 AFB/ 20 f	LF (-)			QE	QE	
1+	HF (-)				QE	
2+	HF (-)	QE				
3+	HF (-)	QE	QE			
Total						

Classification of errors		Number	No. of slide discussed
Major Error	HF (+)		
	HF (-)		
Minor Error	LF (+)		
	LF (-)		
	QE		
Total No. of errors			

Smear Preparation (Total number of slides rechecked =)

	Good		Poor		
	no.	%	no.	%	
Specimen Quality					
Staining					
Cleanliness					
Thickness					Tk (%) Tn (%)
Size					S (%) B (%)
Evenness					

Good = acceptable O = Over decolourization U = Under decolourization
Tk = Too thick Tn = Too thin S = Too small B = Too big

Comments for Improvement:

Date report submitted: _____ Report by: _____

National Tuberculosis Programme — Form C

Supervision Check List for TB Laboratory

Date:

Name of Township:

☐ Genaral Laboratory

☐ TB Laboratory

Sr. No.	Questions	Answers
1	**Interview with laboratory staff** ●How many staff work in the laboratory? Any vacancy?	
	●Have they received NTP training? When?	
	●Do they have the NTP laboratory manual?	
2	**Sputum Collection** ● When do patients cough up the sputum specimens?	
	●How many sputum specimens are collected from each presumtive TB?	
3	**Smear request form** ●How are smears requested and reported?	
	●Is the NTP smear request form used?	
4	**Sputum containers** ●Are there adequate supplies?	
	●Are they marked properly (laboratory number on the side) ?	
5	**Laboratory register** ●Is the NTP laboratory register used?	
	●Is it filled completely?	
	●Do negative presumtive TB have 2 negative smears?	
	●Do positive cases have 1 positive smear?	
	●Are positive results written in red?	
	●How many smear (diagnosis and follow - up) were examined recently?	
	●Do they put township TB register number is remark column of lab. register?	
6	**Slides** ● Are there adequate supplies?	
	●Is the laboratory number marked on the slide properly?	
	●Check some positive and negative smears are they smeared, stained and reported correctly?	
7	**Reagents** ●Are there sufficient quantities of reagents?	
	●Are bottles label with the name,date of preparation and expiry ?	

8	**Microscope** ●Type (Bright Field Microscope binocular/ monocular) ●Light source (electricity/day light) (Fluorescence Microscope) ●Condition (function/not)	
9	**Quality Control** ●Are slides kept for quality control?	
	●Are there sufficient slide boxes?	
	●How often are slides sent for quality control?	
	●How are slides sampled for quality control?	
	●How long are the slides kept before sending for quality control?	
	●Has the laboratory received feed-back results of quality control?	
10	**Disposal** ●Method of waste disposal (burial/ burning)	
Others:		
Problems:		
Suggestion Given:		
		Signature:
		Name/ Designation:
	Original to: - Microbiologist, NTP	
	Copy to: - State/ Regional TB Officer	
	- TMO or TB Team Leader	

National Tuberculosis Programme, Myanmar Form D

Follow-up Sheet

Microscopy Center:_____ Month : _____ Year : _____

Finding	Actions Taken	Result/ Follow - up

Date report submitted:_____ Reported by: _____

This sheet is filled during supervisory visit.Left one copy at Microscopy Center and one copy brought with the supervisor.The supervisor on next visit must review whether these points are improved or not.

National Tuberculosis Programme, Myanmar

Form (1)

Smear Slide Preparation by Microscopy Center

Microscopy Center:

Year:

Month			1	2	3	1st Qtr	4	5	6	2nd Qtr	7	8	9	3rd Qtr	10	11	12	4th Qtr	Annual
Slide no. for EQA		n																	
		%	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
Specimen Quality	Good	n																	
		%																	
	Poor																		
Staining	Good	n																	
		%																	
	O																		
	U																		
Cleanliness	Good	n																	
		%																	
	Poor																		
Thickness	Good	n																	
		%																	
	Tk																		
	Tn																		
Size	Good	n																	
		%																	
	S																		
	B																		
Evenness	Good	n																	
		%																	
	Poor																		

O: Over decolurization
U: Under decolurization

Tk: Too thick
Tn: Too thin

S: Too small
B: Too big

National Tuberculosis Programme, Myanmar — Form (2)

Smear Slide Reading by Microscopy Center

Microscopy Center: Year:

Month	1	2	3	1st Qtr	4	5	6	2nd Qtr	7	8	9	3rd Qtr	10	11	12	4th Qtr	Annual
Slide no.																	
for QA	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
(-) by Mx																	
(+) by Mx																	
Correct																	
HF (+)																	
HF (-)																	
LF (+)																	
LF (-)																	
QE																	
Total * n																	
Error %	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )

HF (+) = High False Positive = Major Error — LF (+) = Low False Positive = Minor Error — QE= Quantification Error = Minor Error

HF (-) = High False Negative = Major Error — LF (-) = Low False Negative = Minor Error

* Total error = Major error + Minor error — n= number

National Tuberculosis Programme, Myanmar

Form (3)

External Quality Assessment

Smear Slide Reading (State/Region, QA Center)

State/ Region: _____ Month/ Quarter/ Year: _____

	Microscopy Center	Slide for QA	Major Error		Minor Error			Major Error		No. of slides discussed
			HF(+)	HF (-)	LF(+)	LF(-)	QE	(n)	%	
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
Total										

HF(+) = High False Positive = Major Error LF(+) = Low False Positive = Minor Error QE = Quantification Error = Minor Error

HF(-) = High False Negative = Major Error LF(-) = Low False Negative = Minor Error

National Tuberculosis Programme, Myanmar

Form(4)

External Quality Assessment

Smear Slide Preparation(State/Region, QA Center)

State/ Region: _____ Month/ Quarter/ Year: _____

Microscopy Center		Slide for QA		Specimen Qty		Staining			Cleanliness		Thickness			Size			Evenness	
				Good	Poor	Good	O	U	Good	Poor	Good	Tk	Tn	Good	S	B	Good	Poor
1			n															
			%															
2			n															
			%															
3			n															
			%															
4			n															
			%															
5			n															
			%															
6			n															
			%															
7			n															
			%															
8			n															
			%															
9			n															
			%															
10			n															
			%															
Total			n															
			%															

O : Over decolourization Tk: Too thick S: Too small n = number

U: Under decolourization Tn: Too thin B: Too big

Example 1 Form A.1

National Tuberculosis Programme, Myanmar

Quality Control Work Sheet for Sputum Smear Examination

(With Microscopist's Result)

Microscopy Center: Dagon Myo Thit (South) District: East Yangon

Month January Year: 2015

Sr. No.	Slide No.	AFB result by		Specimen Quality		Staining		Cleanliness		Smear Size		Thickness		Evenness	
		Msp	Con	Gd	Pr	Gd	Pr	Gd	Pr	Gd	Pr	Gd	Pr	Gd	Pr
1	15-006-1	neg													
2	15-042-2	neg													
3	15-103-1	neg													
4	15-144-2	neg													
5	15-159-1	neg													
6	15-261-2	neg													
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Msp = Microscopist Con = Controller Gd = Good Pr = Poor B = Too big S = Too small

Tk = Too thick Tn = Too thin O = Over decolourization U = Under decolourization

Remarks: by controller

Date: 5th. Feb. 2015 Analyzed by (with signature):

Slide selection made by: Dr. A

Example 2

Form A .2

National Tuberculosis Programme, Myanmar

Quality Control for Sputum Smear Examination

(With controller's result)

Microscopy Center: Dagon Myo Thit (South) District: East Yangon

Month: January Year: 2015

Sr. No.	Slide No.	AFB result by		Specimen Quality		Staining		Cleanliness		Smear Size		Thickness		Evenness	
		Msp	Con	Gd	Pr	Gd	Pr	Gd	Pr	Gd	Pr	Gd	Pr	Gd	Pr
1	15-006-1		neg	✓		✓		✓		✓		✓		✓	
2	15-042-2		neg	✓		✓		✓		✓		✓		✓	
3	15-103-1		neg	✓		✓		✓		✓		✓		✓	
4	15-144-2		neg	✓		✓		✓		✓		✓		✓	
5	15-159-1		neg	✓		✓		✓		✓		✓		✓	
6	15-261-2		5 afb	✓		✓		✓			S		Tn		✓
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Msp = Microscopist Con = Controller Gd = Good Pr = Poor B = Too big S = Too small

Tk = Too thick Tn = Too thin O = Over decolourization U = Under decolourization

Remarks: by controller

Date: 10th Feb. 2015

Analyzed by(with signature): MMSA

Myint Myint San Aye

Example 3 Form A.2

National Tuberculosis Programme, Myanmar

Quality Control Work sheet for Sputum Smear Examination

(With controller's result)

Microscopy Center : Dagon Myo Thit (South) District: East Yangon

Month: January Year : 2015

Sr. No.	Slide No.	AFB result by		Specimen Quality		Staining		Cleanliness		Smear Size		Thickness		Evenness	
		Msp	Con	Gd	Pr	Gd	Pr	Gd	Pr	Gd	Pr	Gd	Pr	Gd	Pr
1	15-006-1	neg	neg	✓		✓		✓		✓		✓		✓	
2	15-042-2	neg	neg	✓		✓		✓		✓		✓		✓	
3	15-103-1	neg	neg	✓		✓		✓		✓		✓		✓	
4	15-144-2	neg	neg	✓		✓		✓		✓		✓		✓	
5	15-159-1	neg	neg	✓		✓		✓		✓		✓		✓	
6	15-261-2	neg	5 afb	✓		✓		✓			S		Tn		✓
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Msp = Microscopist Con = Controller Gd = Good Pr = Poor B = Too big S = Too small

Tk = Too thick Tn = Too thin O = Over decolourization U = Under decolourization

Comments/suggestions by controller

Date: 10th Feb. 2015 Analyzed by(with signature): AAT

Aye Aye Thin

Example 4

Form A -3

National Tuberculosis Programme, Myanmar

External Quality Assessment Work Sheet for Sputum Smear Examination
Discordant Slides Form

Microscopy Center: *Dagon Myo Thit (South)*

District; *East District*
Year: *2015*

Sr. No.	Month	Discordant Slide No.	AFB result by			Specimen Quality		Staining		Cleanliness		Smear Size		Thickness		Evenness	
			Msp	STLS /Con	Ump	Gd	Pr	Gd	Pr	Gd	Pr	Gd	Pr	Gd	Pr	Gd	Pr
1.	Jan	15-261-2	**5afb**	neg	neg	√		√		√			S		Tn		√
2.																	
3.																	
4.																	
5.																	
6.																	
7.																	
8.																	
9.																	
10.																	
11.																	
12.																	
13.																	
14.																	
15.																	

(note) Msp = Microscopist STLS = Senior TB laboratory Supervisor Con=Controller Ump = Umpire reader

Gd = Good Pr = Poor B = Too big S = Too small

Tk = Too thick Tn = Too thin O = Over decolourization U = Under decolourization

Comments / Suggestions by umpire reader

To make smear thicker and even. The Staining solution must be filtered before use.

Date: *10 th Feb 2015*

Analyzed by (with signature): *TTM*

Dr. Tin Tin Mar

Example 5

National Tuberculosis Programme, Myanmar

External Quality Assessment

Feedback Sheet (Bright Field Microscopy)

Form B.1

Microscopy Center: Dagon Myo Thit (South) Month/ Quarter/ Year: Jan-15

Smear Reading

Result by Controller	Result by Microscopist					Total
	Neg	1-9 AFB/ 100f	1+	2+	3+	
Neg	5	LF (+)	HF (+)	HF (+)	HF (+)	5
1-9 AFB/ 100f	LF (-) 1			QE	QE	1
1+	HF (-)				QE	0
2+	HF (-)	QE				0
3+	HF (-)	QE	QE			0
Total	6	0		0	0	6

Classification of errors		Number	No. of slide discussed
Major Error	HF (+)	0	
	HF (-)	0	
Minor Error	LF (+)	0	
	LF (-)	1	
	QE	0	
Total No. of errors		1	

Smear Preparation (Total number of slides rechecked = 6)

	Good		Poor		
	no.	%	no.	%	
Specimen Quality	6	100			
Staining	6	100			O (%) U (%)
Cleanliness	6	100			
Thickness	5	83	1	17	Tk (%) Tn (17%)
Size	5	83	1	17	S (17%) B (%)
Evenness	5	83	1	17	

Good = acceptable O = Over decolourization U = Under decolourization
Tk = Too thick Tn = Too thin S = Too small B = Too big

Comments for Improvement:

Smear size should be 2x3cm and thickness should be thick enough to read printed words from newspaper kept behind the slide.

Date report submitted: 15 February, 2015

Report by: Dr. Thin Lei Swe

Example 6 | National Tuberculosis Programme, Myanmar | Form B.2

External Quality Assessment

Feedback Sheet (Fluorescence Microscopy)

Microscopy Center: Dagon Myo Thit (South) Month/ Quarter/ Year: Jan-15

Smear Reading

Result by Controller	Result by Microscopist					Total
	Neg	5-49 AFB/ 20f	1+	2+	3+	
Neg	5	LF (+)	HF (+)	HF (+)	HF (+)	5
5-49 AFB/ 20 f	LF (-)1			QE	QE	1
1+	HF (-)				QE	0
2+	HF (-)	QE				0
3+	HF (-)	QE	QE			0
Total	6	0	0	0	0	6

Classification of errors		Number	No. of slide discussed
Major Error	HF (+)	0	
	HF (-)	0	
Minor Error	LF (+)	0	
	LF (-)	1	
	QE	0	
Total No. of errors		1	

Smear Preparation (Total number of slides rechecked = 6)

	Good		Poor			
	no.	%	no.	%		
Specimen Quality	6	100				
Staining						
Cleanliness	6	100				
Thickness	5	83	1	17	Tk (%)	Tn (17 %)
Size	5	83	1	17	S (17%)	B (%)
Evenness	5	83	1	17		

Good = acceptable O = Over decolourization U = Under decolourization
Tk = Too thick Tn = Too thin S = Too small B = Too big

Comments for Improvement:

Smear size should be 2x3cm and thickness should be thick enough to read printed words from newspaper kept behind the slide.

Date report submitted: 15th Feb. 2015 Report by: Swe

Dr. Thin Lei Swe

Example.7 National Tuberculosis Programme Form C

Supervision Check List for TB Laboratory

Date: 6/10/2014

Name of Township: Dagon Myo Thit (South)

☑ Genaral Laboratory

☐ TB Laboratory

Sr. No.	Questions	Answers
1	**Interview with laboratory staff** ● How many staff work in the laboratory? Any vacancy?	GI Technician (U Aung Kyaw Oo) G II Technician (Daw May Win) No Vacancy
	● Have they received NTP training? When?	Yes. Both had training (2012)
	● Do they have the NTP laboratory manual?	Yes.
2	**Sputum Collection** ● When do patients cough up the sputum specimens?	At the time of visit to TB Center . Next, early morning and then another spot.
	● How many sputum specimens are collected from each presumtive TB?	2 specimens
3	**Smear request form** ● How are smears requested and reported?	Request for sputum examination from MO(or) Nurse from NTP
	● Is the NTP smear request form used?	Yes, filled by request person.
4	**Sputum containers** ● Are there adequate supplies?	Yes.
	● Are they marked properly (laboratory number on the side) ?	No.
5	**Laboratory register** ● Is the NTP laboratory register used?	Yes.
	● Is it filled completely?	Not completely filled
	● Do negative presumtive TB have 2 negative smears?	Not all
	● Do positive cases have 1 positive smears?	Yes
	● Are positive results written in red?	Yes
	● How many smear (diagnosis and follow - up) were examined recently ?	422 for Sepember (20 slides/ day)
	● Do they put township TB register number is remark column of lab. register?	Some not filled
6	**Slides** ● Are there adequate supplies?	Yes
	● Is the laboratory number marked on the slide properly?	No. Marked 1005-15-1 Instruct to write 15-1005-1
	● Check some positive and negative smears are they smeared, stained and reported correctly?	Check 5 negative and 5 positive slides All found correct
7	**Reagents** ● Are there sufficient quantities of reagents?	Yes
	● Are bottles label correctly with the name,date of preparation and expiry ?	Yes

8	**Microscope** ●Type (Bright Field Microscope binocular/ monocular) ●Light source (electricity/day light) (Fluorescence Microscope) ●Condition (function/not)	OLYMPUS, Binocular (electric/ light) Good
9	**Quality Control** ● Are slides kept for quality control?	Yes
	● Are there sufficient slide boxes?	No
	● How often are slides sent for quality control?	Monthly, but sometimes after 2 months
	● How are slides sampled for quality control?	(6) slides/ month selected by MO
	● How long are the slides kept before sending for quality control?	1 month but sometimes 2-3 months
	● Has the laboratory received feed-back results of quality control?	Yes, but sometimes received only at next quarter
10	**Disposal** ● Method of waste disposal (burial/ burning)	One night immersed in 5% phenyl, then burnt the next morning

Others:

Problems: Insufficient slide boxes.

Suggestion Given:

Sealed of TMO office

(1) To put 5 or 10 watt bulb in the microscope case (to prevent fungal growth).

(2) To store all the slides serially in slide boxes.

(3) To put the label on the side of the sputum container.

(4) To label the slide as (year-lab. serial number - slide number).

Signature of TMO — Signature: Aung Min

Name/ Designation: Aung Min, Medical Technologist,NTRL, Yangon.

Original to: - Microbiologist, NTP

Copy to: - State/ Regional TB Officer

- TMO or TB Team Leader

Example | National Tuberculosis Programme, Myanmar | Form D

Follow-up Sheet

Microscopy Center: Dagon MyoThit(South) Month: May Year: 2015

Finding	Actions Taken	Result/ Follow - up
- Township TB register no. of Dx (+) cases were not filled in remark column.	- Taught the technician how to fill TB laboratory register properly.	**During June visit** found out that technician filled township TB register no. of Dx (+) cases in red colour in remark column.
- Some smear are thin	- Advised was given to repeat making smear 2-3 times if the specimen is salivary.	- Improvement on smear size and thickness seen.
- Some smear are small in size	- Smear size must be 2x3 cm and coiled type.	
- Smear sticks were not dipped in antiseptic solution.	- Smear sticks must be dipped in 5% phenol and burnt the next day	- Smear sticks were still not disposed properly.

Date report submitted: 5th May 2015

Reported by: Wint

Dr. Wint Wint Nyunt

This sheet is filled during supervisory visit.Left one copy at Microscopy Center and one copy brought with the supervisor.The supervisor on next visit must review whether these points are improved or not.

Example

National Tuberculosis Programme, Myanmar

Form (1)

Smear Slide Preparation by Microscopy Center

Microscopy Center: Dagon Myo Thit (South)

Year: 2015

Month			1	2	3	1st Qtr	4	5	6	2nd Qtr	7	8	9	3rd Qtr	10	11	12	4th Qtr	Annual
Slide no. for EQA		n	6																
		%	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
Specimen Quality	Good	n	6																
		%	100																
	Poor																		
Staining	Good	n	6																
		%	100																
	O																		
	U																		
Cleanliness	Good	n	6																
		%	100																
	Poor																		
Thickness	Good	n	5																
		%	83																
	Tk																		
	Tn		1																
Size	Good	n	5																
		%	83																
	S		1																
	B																		
Evenness	Good	n	5																
		%	83																
	Poor		1																

O: Over decolurization
U: Under decolurization

Tk: Too thick
Tn: Too thin

S: Too small
B: Too big

Example | National Tuberculosis Programme, Myanmar | Form (2)

Smear Slide Reading by Microscopy Center

Microscopy Center: Dagon Myo Thit (South) | Year: 2015

Month	1	2	3	1st Qtr	4	5	6	2nd Qtr	7	8	9	3rd Qtr	10	11	12	4th Qtr	Annual
Slide no.	6																
for QA	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
(-) by Mx	5																
(+) by Mx	1																
Correct	5																
HF (+)	0																
HF (-)	0																
LF (+)	0																
LF (-)	1																
QE	0																
Total * n	1																
Error %	17%	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )	( )

HF (+) = High False Positive = Major Error | LF (+) = Low False Positive = Minor Error | QE= Quantification Error = Minor Error

HF (-) = High False Negative = Major Error | LF (-) = Low False Negative = Minor Error

* Total error = Major error + Minor error | n = number

Example

National Tuberculosis Programme, Myanmar

External Quality Assessment

Smear Slide Reading (State/Region, QA Center)

Form (3)

State/ Region: Yangon Region

Month/ Quarter/ Year: January, 2015

	Microscopy Center	Slide for QA	Major Error		Minor Error			Major Error		No. of slides discussed
			HF(+)	HF (-)	LF(+)	LF(-)	QE	(n)	%	
1	Dagon Myo Thit (South)	6	0	0	0	1	0	0	0	1 (15-100-1)
2	Latha TB Dx Center	6	0	0	0	0	0	0	0	
3	Aung San, UTI	6	0	0	0	0	0	0	0	
4	Hlaingtharyar Health Center	6	0	0	0	0	0	0	0	
5	East District (Bahan)	6	0	0	0	0	0	0	0	
6	North Okkalapa Health Center	6	0	0	0	0	0	0	0	
7	Shwepyithar Health Center	6	0	0	0	0	0	0	0	
8	Dawbon Health Center	6	0	1	0	0	0	1	17%	1 (15-125-1)
9	Thaketa Health Center	6	0	3	0	0	0	3	50%	3 (15-21-1), (15-45-2), (15-93-1)
10	Thanlyin Health Center	6	0	0	0	0	0	0	0	
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
	Total	60	0	4	0	1	0	4	6.7%	

HF(+) = High False Positive = Major Error

HF(-) = High False Negative = Major Error

LF(+) = Low False Positive = Minor Error

LF(-) = Low False Negative = Minor Error

QE = Quantification Error = Minor Error

Example

National Tuberculosis Programme, Myanmar

External Quality Assessment

Smear Slide Preparation(State/Region, QA Center)

Form(4)

State/ Region: Yangon Region

Month/ Quarter/ Year : January 2015

	Microscopy Center	Slide for QA		Specimen Qty		Staining			Cleanliness		Thickness			Size			Evenness	
				Good	Poor	Good	O	U	Good	Poor	Good	Tk	Tn	Good	S	B	Good	Poor
1	Dagon MyoThit (South)	6	n	6		6			6		5		1	5	1		5	1
			%	100		100			100		83		17	83	17		83	17
2	Latha Dx Center	6	n	6		6			6		6			6			6	
			%	100		100			100		100			100			100	
3	Aung San, UTI	6	n	4	2	5		1	6		4		2	6			6	
			%	67	33	83		17	100		66		34	100			100	
4	Hlaing Tharyar Health Center	6	n	6		6			6		4		2	4	1	1	4	2
			%	100		100			100		66		34	66	17	17	66	34
5	East District (Bahan)	6	n	6		6			6		4		2	6			6	
			%	100		100			100		66		34	100			100	
6	North Okkalapa Health Center	6	n	6		6			6		6			4	2		6	
			%	100		100			100		100			66	34		100	
7	Shwepyithar Health Cente	6	n	6		6			6		5	1		5	1		5	1
			%	100		100			100		83	17		83	17		83	17
8	Dawbon Health Center	6	n	6		6			6		4		2	6			5	1
			%	100		100			100		67		33	100			83	17
9	Thaketa Health Center	6	n	6		6			6		5	1		3	3		6	
			%	100		100			100		83	17		50	50		100	
10	Thanlyin Health Center	6	n	6		6			6		4		2	48	8	4	0	6
			%	100		100			100		67		33	80	13	7	0	100
	Total	60	n	58	2	59		1	60		47	2	11	48	8	4	49	11
			%	97	3	98		2	100		78	3	19	80	13	7	82	18

O : Over decolourization
U: Under decolourization
Tk: Too thick
Tn: Too thin
S: Too small
B: Too big

Photo Record of: "TB Laboratory Evaluation Meeting and Introducing of EQA for Sputum Microscopy "

Photo Record of: "Workshop on Improvement of Quality Assurance System for AFB microscopy in Myanmar"

Photo Record of: National Annual Laboratory Meeting(2014)

REFERENCES

- AFB Microscopy " *Good Quality Smear Examination makes A Good Quality TB Control Programme* ." Akiko Fujiki.

- External Quality Assessment for AFB Smear Microscopy. APHL, CDC, IUATLD, KNCV, RIT, WHO, 2002, September.

- Quality Assurance of Sputum Microscopy in DOTS Programmes, Regional guidelines for Countries in the Western Pacific, WHO, WPRO, 2003.

- Quality Assurance for Sputum Smear Microscopy, Philippine National TB Programme, Department of Health, Republic of the Philippines.

- RNTCP Laboratory Network: Guidelines for Quality Assurance of smear microscopy for diagnosing tuberculosis .Contribution by Central TB Div., WHO, Tuberculosis Research Centre, Chennai & National Tuberculosis Institute, Bangalore. December 2003.

- TB CAP Toolbox, TB CAP Laboratory tools, TBCTA (CDC, ATS, FHI, MSH, KNCV, JATA, The Union, WHO), gli, USAID.

- Laboratory Diagnosis of Tuberculosis by Sputum Microscopy, The handbook Global edition publication of the Global Laboratory Initiative, a Working Group of the Stop TB Partnership 2013.