

Module 4: Managing Supplies for Sputum Smear Microscopy

Learning Objectives

At the end of this module, you will be able to

- List all supplies required for performance of smear microscopy.
- Explain use and importance of the stock book in maintaining adequate inventory.
- Calculate supplies based on smears examined during a specific period.
- Explain storage of supplies and shelf life requirements of stains.

Content Overview

- Supply list for smear microscopy
- Recordkeeping: Stock book use and importance
- Calculation of supplies to order
- Receipt of supplies
- Storage and shelf life of supplies

Supply Management Means...

Properly maintaining adequate supplies to ensure uninterrupted service



NTP Specific Customization

- Customize this slide according to NTP specific on
 - the carbol fuchsin stain concentration
 - device (loop or stick) used for smearing
 - use of frosted or unfrosted slides
 - method of waste decontamination

Ordering and Distribution of Supplies

- What to order?
- From where?
- How much?
- How often?
- How to assess correctness of order?
- What is the lead time/reserve quantity?

Basic Supplies Required for AFB Smear Microscopy

- Prepared stains or components
 - Basic Fuchsin
 - Phenol
 - Alcohol
 - Decolorizing agent
 - Methylene blue
 - Distilled water
- Immersion oil
- Lens/tissue paper
- Small equipment
- Disinfectant
- Soap
- Disposable sticks or loop
- Slides and storage boxes
- Slide marking device
- Spirit torch
- Sputum collection containers
- Request & report form
- AFB-microscopy register

Supply Management Involves...

- Performing a “stock count”
- Maintaining proper inventory records
- Determining how much to order
- Placing orders properly
- Inspecting and verifying supplies received
- Ensuring proper storage of stock

Stock Book

Item Name: _____

Unit _____

Physical count (Units)	Date physical count performed	Quantity (units) Requested	Date Requested	Quantity Received	Date Received	Total stock in hand

Perform a Stock Count

What is it?	Physically counting each item in the stock
When is it done?	Recommended at the end of each quarter
Who does it?	A designated person

All items must be accounted for. Everything that comes in and goes out must be recorded.

AFB Laboratory Performance and Stock Form

QUARTERLY REPORT

Quarter / Year

AFB LABORATORY PERFORMANCE AND STOCKS

CENTRE DISTRICT REGION

<u>Case detection</u>	Number of suspect patients examined during the quarter		Among those, number with at least 1 positive or scanty smear	
	Positives	Negatives	1-9/100 fields	Total
<u>Smears examined</u>				
Number of suspect smears examined during the quarter				
Number of follow-up smears examined during the quarter				
Total smears examined				

<u>Stocks left at the end of the quarter</u>			
Carbolfuchsin stain	millilitres	Sulphuric acid 25%	millilitres
Methylene blue stain	millilitres	Burning spirit	millilitres
Immersion oil	millilitres	Slides	pieces
.....		Sputumpots	pieces
.....	

Methods for Calculating Supplies

- Method 1: 10% Positive case rate
 - Not developed here
 - Refer to reference manuals (WHO/IUATLD)
- Method 2: Laboratory Quarterly Report - Smears examined and stock on hand

Calculated Quarterly Requirements for Peripheral Microscopy Center

MODULE 4

EXERCISE 1: CALCULATION OF QUARTERLY SUPPLY REQUIREMENTS FOR A MICROSCOPY CENTER

Quarterly Supply Requirements for a Microscopy Center							
Region:				Supply quarter:			
District:				Year:			
Center:							
Total smears examined in previous quarter (A)=							
Items	Quantity needed per smear (B)	Calculated requirements for one quarter (C) = AxB	Reserve quantity for one month (D) = C	Stock on hand (E)	Calculated request (F) = C+D-E	Actual request (rounded*)	Order unit
Sputum containers (pieces)							
Slides (pieces)							
Carbolfuchsin (mL)							
Destaining reagent (mL)							
Methylene blue (mL)							
Immersion oil (mL)							
Burning spirit (mL)							

Total Slides Examined Previous Quarter (A)

The value (A) equals the number of sputum examinations performed during the previous quarter

Examples of Items Required

- **Items**
 - Sputum containers
 - Slides
 - Carbol fuchsin
 - Destaining reagent
 - Methylene blue
 - Immersion oil
 - Burning spirit

Each of the consumables used for AFB microscopy and the unit of use

The Quantity Required for One Sputum Examination Is?

- Sputum containers
- Slides
- Carbol fuchsin
- Destaining reagent
- Methylene blue
- Immersion oil
- Burning spirit

The Quantity Required for One Sputum Examination (B) Is

Item Name	Quantity
Sputum containers	1 piece
Slides	1 piece
Carbol fuchsin	3 ml
Decolourising solution	5 ml
Immersion oil	0.05 ml
Burning spirit	1 ml
Methylene blue	3 ml

Calculation for One Quarter of Supply of an Item (C)

- The value (C) equals the quantity of an item required for one quarter
- Calculate (C) by multiplying the number of slides examined during a quarter (A) by the amount of the item needed for one examination (B), therefore:

$$A \times B = C$$

Example to Calculate One Quarter of Supply of Carbol Fuchsin (C)

- In the last quarter, you examined 400 sputum specimens (A).
- You need 3 ml of carbol fuchsin per examination (B), so how much carbol fuchsin will you need for the next quarter (C)?
- $A \times B = C$
- $400 \text{ slides} \times 3 \text{ ml/slide} = 1200 \text{ ml}$

Reserve Quantity (D)

- The value (D) equals a one quarter consumption quantity of an item that must be kept as a reserve
- The value (D) is equal to (C), the quantity of an item calculated for one quarter:

$$(C) = D$$

Stock on Hand (E)

- The value (E) equals the stock on hand
- Determine (E) by the an actual physical count of existing stock (inventory)

Calculated Quantity (F)

- The value (F) equals the quantity required for one quarter (C) plus the quantity required for one quarter reserve (D) less the stock on hand (E)
- Calculate (F) as follows:

$$(F) = C + D - E$$

Quantities Requested/ Issued

- Round up the calculated quantity to a quantity consistent with the unit of issue
- Example 1, if the calculated quantity of carbol fuchsin is 1824 ml, round up to 2 liters
- Example 2, if the calculated quantity of slides is 700, round up to 720 since the unit of issue is 72 slides per box (i.e., request 10 boxes)

Exercise #1: Calculate Quarterly Requirements for your Microscopy Center

- Use worksheet labeled exercise #1
- Work individually
- Use sample data provided on flipchart
- Use calculators provided
- Time allowed: 30 minutes

Exercise #1: Calculate Quarterly Requirements for your Microscopy Center

MODULE 4

EXERCISE 1: CALCULATION OF QUARTERLY SUPPLY REQUIREMENTS FOR A MICROSCOPY CENTER

Quarterly Supply Requirements for a Microscopy Center							
Region:				Supply quarter:			
District:				Year:			
Center:							
Total smears examined in previous quarter (A) = 500							
Items	Quantity needed per smear (B)	Calculated requirements for one quarter (C) = AxB	Reserve quantity for one month (D) = C	Stock on hand (E)	Calculated request (F) = C+D-E	Actual request (rounded*)	Order unit
Sputum containers (pieces)	1			58			Bag (1000 count)
Slides (pieces)	1			50			Box (72 slides)
Carbolfuchsin (mL)	3.0			200			Bottle (1 liter)
Destaining reagent (mL)	5.0			150			Bottle (1 liter)
Methylene blue (mL)	3.0			3500			Bottle (1 liter)
Immersion oil (mL)	0.05			10			Bottle (50 mL)
Burning spirit (mL)	1			100			Bottle (1 liter)

Exercise #1 Answer

Calculated Quarterly Requirements for Your Microscopy Center

MODULE 4 ANSWERS: EXERCISE 1

Quarterly Supply Requirements for a Microscopy Center							
Region:				Supply quarter:			
District:				Year:			
Center:							
Total smears examined in previous quarter (A)= 500							
Items	Quantity needed per smear (B)	Calculated requirements for one quarter (C) = AxB	Reserve quantity for one month (D) = C	Stock on hand (E)	Calculated request (F) = C+D-E	Actual request (rounded*)	Order unit
Sputum containers (pieces)	1	500	500	58	942	1	Bag (1000 count)
Slides (pieces)	1	500	500	50	950	14	Box (72 slides)
Carbolfuchsin (mL)	3.0	1500	1500	200	2800	3	Bottle (1 liter)
Destaining reagent (mL)	5.0	2500	2500	150	4850	5	Bottle (1 liter)
Methylene blue (mL)	3.0	1500	1500	3500	-500	0	Bottle (1 liter)
Immersion oil (mL)	0.05	25	25	10	40	2	Bottle (50 mL)
Burning spirit (mL)	1	500	500	100	900	1	Bottle (1 liter)

Calculated Quarterly Requirements for Peripheral Microscopy Center

MODULE 4

EXERCISE 2: CALCULATION OF QUARTERLY SUPPLY REQUIREMENTS FOR A MICROSCOPY CENTER

Quarterly Supply Requirements for a Microscopy Center								
Region:				Supply quarter:				
District				Year:				
Center								
Total smears examined in previous quarter (A)=								
Items	Quantity needed per smear (B)	Reagent quantity per liter (C)	Calculated requirements for one quarter (D)= AxBxC	Reserve quantity for one quarter (E)=D	Stock on hand (F)	Calculated request (G) = D+E-F	Actual request (rounded**)	Order unit
Sputum containers		N/A						
Slides		N/A						
Basic fuchsin*								
Phenol								
Sulfuric acid								
Methylene blue								
Denatured alcohol								
Burning spirit		N/A						
Immersion oil		N/A						

Total Slides Examined Previous Quarter (A)

The value (A) equals the number of sputum examinations performed during the previous quarter

Examples of Items Required

- **Items**
 - **Sputum containers**
 - **Slides**
 - **Carbol fuchsin**
 - **Destaining reagent**
 - **Methylene blue**
 - **Immersion oil**
 - **Burning spirit**

**Each of the consumables used for AFB
microscopy and the unit of use**

The Quantity Required for One Sputum Examination Is?

- Sputum containers
- Slides
- Carbol fuchsin
- Destaining reagent
- Methylene blue
- Immersion oil
- Burning spirit

The Quantity Required for One Sputum Examination (B) Is

Item Name	Quantity
Sputum containers	1 piece
Slides	1 piece
Carbol fuchsin	0.003 liters
Destaining reagent	0.005 liters
Methylene blue	0.003 liters
Immersion oil	0.00005 liters
Burning spirit	0.001 liters

The Reagent Quantity per Liter (C) Is

Reagent	Quantity per Liter
Basic Fuchsin	3 grams
Phenol	50 grams
Sulfuric acid	250 liters
Methylene Blue	3 grams
Denatured alcohol	0.1 liters

Calculation for One Quarter of Supply of an Item (D)

- The value (D) equals the quantity of an item required for one quarter
- Calculate (D) by multiplying the number of slides examined during a quarter (A) by the amount of the item needed for one examination (B) and by the reagent quantity per liter, therefore:

$$A \times B \times C = D$$

Example to Calculate One Quarter of Supply of Basic Fuchsin (D)

- In the last quarter, you examined 400 sputum specimens (A).
- You need 0.003 liters of carbol fuchsin per examination (B), and your concentration of basic fuchsin in the carbol fuchsin is 3 grams per liter (C), so how much basic fuchsin will you need for the next quarter (D)?
- $A \times B \times C = D$
- $400 \text{ slides} \times 0.003 \text{ liters/slide} \times 3 \text{ grams/liter} = 3.6 \text{ grams}$

Reserve Quantity (E)

- The value (E) equals a one quarter consumption quantity of an item that must be kept as a reserve
- The value (E) is equal to (D), the quantity of an item calculated for one quarter

$$(D) = E$$

Stock on Hand (F)

- The value (F) equals the stock on hand
- Determine (F) by the an actual physical count of existing stock (inventory)

Calculated Request (G)

- The value (G) equals the quantity required for one quarter (D) plus the quantity required for one quarter reserve (E) less the stock on hand (F)
- Calculate (G) as follows:

$$(G) = D + E - F$$

Quantities Requested/ Issued

- Round up the calculated quantity to a quantity consistent with the unit of issue
- Example 1, if the calculated quantity of basic fuchsin is 14 grams, round up to 1 bottle of 25 grams
- Example 2, if the calculated quantity of slides is 2300, round up to 2 boxes since the unit of issue is 1728 slides per box

Exercise #2: Calculate Quarterly Requirements for your Microscopy Center

- Use worksheet labeled exercise #2
- Work individually
- Use sample data provided on flipchart
- Use calculators provided
- Time allowed: 30 minutes

Exercise #2: Calculate Quarterly Requirements for your Microscopy Center

MODULE 4

EXERCISE 2: CALCULATION OF QUARTERLY SUPPLY REQUIREMENTS FOR A MICROSCOPY CENTER

Quarterly Supply Requirements for a Microscopy Center

Region:				Supply quarter:				
District				Year:				
Center								
Total smears examined in previous quarter (A)= 1200								
Items	Quantity needed per smear (B)	Reagent quantity per liter (C)	Calculated requirements for one quarter (D)= AxBxC	Reserve quantity for one quarter (E)=D	Stock on hand (F)	Calculated request (G) = D+E-F	Actual request (rounded**)	Order unit
Sputum containers		N/A			500 pcs			Bag (1000 count)
Slides	1 pc	N/A			432 pcs			Box (1728 slides)
Basic fuchsin*	0.003 Lt	3 g			0 g			Bottle (25g)
Phenol	0.003 Lt	50 g			100 g			Bottle (100 g)
Sulfuric acid	0.005 Lt	0.250 Lt			1 Lt			Bottle (1L)
Methylene blue	0.003 Lt	3 g			25 g			Bottle (25g)
Denatured alcohol	0.003 Lt	0.100 Lt			0.5 Lt			Bottle (500 mL)
Burning spirit	0.001 Lt	N/A			0.5 Lt			Canister (5 Lt)
Immersion oil	0.00005 Lt	N/A			.05 Lt			Bottle (50 mL)

Exercise #2 Answer

Calculated Quarterly Requirements for Your Microscopy Center

MODULE 4 ANSWERS: EXERCISE 2

Quarterly Supply Requirements for a Microscopy Center								
Region:				Supply quarter:				
District				Year:				
Center								
Total smears examined in previous quarter (A)= 1200								
Items	Quantity needed per smear (B)	Reagent quantity per liter (C)	Calculated requirements for one quarter (D)= AxBxC	Reserve quantity for one quarter (E)=D	Stock on hand (F)	Calculated request (G) = D+E-F	Actual request (rounded**)	Order unit
Sputum containers		N/A	1200 pcs	1200 pcs	500 pcs	1900 pcs	2	Bag (1000 count)
Slides	1 pc	N/A	1200 pcs	1200 pcs	432 pcs	1968 pcs	2	Box (1728 slides)
Basic fuchsin*	0.003 Lt	3 g	10.8 g	10.8 g	0 g	21.6 g	1	Bottle (25g)
Phenol	0.003 Lt	50 g	180 g	180 g	100 g	260 g	3	Bottle (100 g)
Sulfuric acid	0.005 Lt	0.250 Lt	1.5 Lt	1.5 Lt	1 Lt	2 Lt	2	Bottle (1L)
Methylene blue	0.003 Lt	3 g	10.8 g	10.8 g	25 g	-3.4 g	0	Bottle (25g)
Denatured alcohol	0.003 Lt	0.100 Lt	0.36 Lt	0.36 Lt	0.5 Lt	0.22 Lt	1	Bottle (500 mL)
Burning spirit	0.001 Lt	N/A	1.2 Lt	1.2 Lt	0.5 Lt	1.9 Lt	1	Canister (5 Lt)
Immersion oil	0.00005 Lt	N/A	0.06 Lt	0.06 Lt	.05 Lt	0.07 Lt	2	Bottle (50 mL)



Place Orders Properly

- Describe ordering system that is in place
- Provide specific instructions for placing orders
- Describe contingency plan when supplies are not available
 - National contingency plan
 - Site contingency plan
- What information should be fed back to central procurement or stores, e.g., updated consumption rates during scale up

Inspect & Verify the Delivery of Orders

Upon receipt:

- Verify contents of order received with requisition
- Check integrity of received supplies
- Date each item received
- Store new shipment behind existing shipment
- Create or update records

Ensure Proper Storage of Inventory

- Keep in a clean, dry, well-ventilated, and organized storage area
- Store according to supplier's instructions
- Place items on shelves
- Store away from direct sunlight
- Organize existing and new shipments by date received or prepared

Summary

- **What is supply management?**
- **Why is a physical stock count necessary?**
- **Why is it important to maintain inventory records?**
- **How do you calculate supplies required?**
- **Why must orders be inspected and verified?**
- **Why must supplies be stored properly?**