



# LECTURER'S GUIDE

**Three Credit Course on Supply Chain  
Management of Health Commodities**



**University of Health Sciences Lahore**  
**<http://www.uhs.edu.pk/>**

## **Acknowledgments**

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This supply chain management (SCM) curriculum will serve as a milestone towards expanding the supply chain management capacity within the public sector, and will subsequently work towards creating a cadre of supply chain professionals within Pakistan. With the Punjab Government, UHS, and USAID's support, a National Symposium on the introduction of this SCM course to the wider academic and public health community was held on July 12, 2017 at UHS in Lahore. In addition to this, UHS faculty training on the supply chain management course was also conducted at UHS during July 18-20, 2017, with an aim to enable faculty to independently conduct the course from Fall 2017.

Moreover, a workshop was recently held to explore the Supply and Demand for Supply Chain Management Human Resources on August 29, 2017 in Islamabad, and involved wide participation from the private sector, government institutions, NGOs, and academia. The outcomes and valuable feedback gained from this workshop will further be integrated into the development of a provincial Human Resource Capacity Development Strategy for SCM, which will go a long way towards expanding the supply chain management capacity within Punjab's public-sector.

With regards to the above achievements, we wish to thank the Government of Punjab, the University of Health Sciences, and the US Agency for International Development for their contributions to the development of this guide.

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## **Lecturer's Introduction to 3 Credit Course**

Dear Lecturer:

Welcome to the curriculum for the Three Credit Course for Supply Chain Management of Public Health Commodities. This letter will introduce you to some important elements of this course.

The University of Health Sciences is pleased to be offering this Three Credit course for the first time in conjunction with the USAID Global Health Supply Chain Program - Procurement and Supply Management. This will likely expand to a larger offering in time.

This curriculum is written following Adult Learning Theory principles which emphasize more interactive and participatory approaches than traditional teaching techniques. Many studies have shown that adults learn more effectively when they are engaged with the subject they are learning, work collaboratively, and are not just listening passively. Small group exercises are placed into the curriculum and Lecturers are encouraged to run these activities as written where ever possible.

Adults also are more motivated when what they are learning is meaningful and applicable to their needs. The curriculum not only provides basic principles for running a logistic system but includes elements that are Pakistan specific. Highlight these practical skills and knowledge areas when possible. There is still plenty of theory to provide the needed conceptual constructs.

One other point regarding adult learning, students do best when they can participate and express themselves fully. This means creating an environment where students feel safe and supported in their learning and inquiry. Responding positively to questions whenever possible and allowing students to answer questions from other students are just two ways to help establish such an environment. Encourage students to participate in the course for the benefit of their own learning.

Note that you will be working with at least two different types of students in this course. One will be younger students with little to no experience in the public health system. The other already work in the public health system. We suggest drawing on the knowledge of the experienced students to help the younger students understand how these concepts and principles are applied in reality and bring examples to life. The students who have worked in the public health system are an important resource that should be utilized.

Before leading this course the Lecturer should attend the introductory Certificate course at least twice and the corresponding Trainers of Lecturers session. They should also fully review this *Lecturer's Guide* and the supporting documents which include the *Logistics Handbook*, the companion *Student Workbook*, the *PowerPoint slides*, the *Guidelines for Storage of Essential Medicines* and other supporting documents that can be found in the Materials List within this document. Note, there are no handouts for this course. Everything is in the *Student Workbook*.

Unlike the Certificate course this course is competency-based.

The course includes a field visit in Session 12. Arrangements for this should be started as soon as the course begins so that three different facilities can be arranged to host this important part of the course. This will prevent any one facility from being overwhelmed by too many students and also ensure a solid learning experience for every student. Timing the visits so that they happen at the appropriate point in the course progression is important for keeping the continuity of the material.

For this course each major unit of learning is referred to as a Session and each section within is referred to as an Activity. This course has 17 different Sessions. Session 1 has five separate activities for instance. Lecturers are highly encouraged to read the Lecturer Preparation section at the beginning of each session well before leading each session.

Note that Synthesis Questions are presented at the end of each Session. These can be used to ensure students are grasping the key concepts of each session.

Finally please note that many of the course details are up to you the Lecturer. In Session 1, Activity 4 you will need to address with students such issues as grading, attendance and other course issues.

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# Course Materials List

This is a list of the materials the Lecturers will need to successfully run this course. Considering that each Lecturer has their own preference and way of doing things this is probably not a comprehensive list. However, these are the minimum elements that will be required based on the content of the curriculum. A smaller list of materials needed for each session will be provided but it does not repeat all the general items understood to run the course.

## Key Instructional materials – for each Lecturer – all hard copies:

*Lecturer's Guide*, (this book - *Word document*)  
*Student Workbook*, (*Word document*)  
*PowerPoint Slides* and  
*Overheads* for selected sessions  
*(Homework Options for 3 Credit Course (Word document) for 3 credit only)*  
*Logistics Handbook: A Practical Guide for the Supply Chain Management of Health Commodities*. Second Edition. USAID Global Health Supply Chain Program- Procurement and Supply Management  
*Guidelines for Storage of Essential Medicines and Other Health Commodities booklet*  
*Contraceptive Procurement Manual: Government of Pakistan*

## Key supporting materials:

Power point projector and surface for projector  
Supporting electrical cords and outlets  
Screen or blank wall to project slides on  
A black or a white board  
with appropriate chalk/markers and erasers  
SMART Board / Overhead projector  
Flip chart stand, flip chart paper and markers  
Tape to put flip charts on the walls  
Stationery items for students (if UHS provides them)  
pens, writing tablets, calculators, highlighters,  
Stationery items for Lecturers (as desired)  
Zip drives for sharing electronic copies of documents

## Documents that each student should have – hard copy

*Student Workbook*  
*Logistics Handbook*  
*Contraceptive Procurement Manual: Government of Pakistan*

## Reference Materials given in soft copies – For Lecturers and Students

1. *Path procurement capacity toolkit Version 2*
2. *Contraceptive Procurement Manual*
3. *Pakistan Public Procurement Rules 2004 (Urdu)*
4. *Quantification of Health Commodities: A Guide to Forecasting and Supply Planning for Procurement*. Arlington, Va.: USAID Global Health

Supply Chain Program- Procurement and Supply Management Task  
Order 1

5. *Pakistan Population Welfare Logistics Manual*
6. *Logistics Manual for Lady Health Workers Program*
7. *Pakistan Procurement Code 2004*

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## Course Acronym List

<b>3TC</b>	<b>Lamivudine</b>
<b>AIDS</b>	<b>Acquired Immunodeficiency Syndrome</b>
<b>AMC</b>	<b>Average Monthly Consumption (what we need to determine how much we should order)</b>
<b>ART</b>	<b>Antiretro Viral Therapy</b>
<b>ARV</b>	<b>Anti-Retroviral (Drugs)</b>
<b>AZT</b>	<b>Azido-Thymidine</b>
<b>BDS</b>	<b>Bid Data Sheet</b>
<b>BEC</b>	<b>Bid Evaluation Committee</b>
<b>BHU</b>	<b>Basic Health Unit</b>
<b>BOC</b>	<b>Bid Opening Committee</b>
<b>CPR</b>	<b>Contraceptive Prevalence Rate</b>
<b>CS</b>	<b>Commodity Security</b>
<b>CWH</b>	<b>Central Warehouse</b>
<b>CYP</b>	<b>Couple Year Protection (used in quantifying contraceptives)</b>
<b>D4T</b>	<b>Stavudine</b>
<b>DAR</b>	<b>Daily Activity Register for recording items given to patients (where dispensed-to-user data comes from)</b>
<b>DOH</b>	<b>Department of Health</b>
<b>DPIU</b>	<b>District Program Implementation Unit</b>
<b>DPWO</b>	<b>District Population Welfare Departments</b>
<b>EDO</b>	<b>Executive District Officer</b>
<b>EML</b>	<b>Essential Medicine List</b>
<b>EOP</b>	<b>Emergency Order Point</b>
<b>EPI</b>	<b>Expanded Program of Immunization</b>
<b>FEFO</b>	<b>First Expiry First Out – a method for stocking items</b>
<b>FLCF</b>	<b>First Level Care Facility</b>

<b>FP</b>	<b>Family Planning</b>
<b>HMIS</b>	<b>Health Management Information System</b>
<b>ICB</b>	<b>International Competitive Bidding</b>
<b>ICC</b>	<b>Inventory Control Card</b>
<b>ITB</b>	<b>Instructions To Bidders</b>
<b>IUD</b>	<b>Intrauterine Contraceptive Device</b>
<b>IV</b>	<b>Intravenous</b>
<b>LHW</b>	<b>Lady Health Worker</b>
<b>LIAT</b>	<b>Logistics Indicator Assessment Tool (quantitative)</b>
<b>LMIS</b>	<b>Logistics Management Information System</b>
<b>LSAT</b>	<b>Logistics System Assessment Tool (qualitative)</b>
<b>Max/Min</b>	<b>Maximum Minimum months of stock</b>
<b>M&amp;E</b>	<b>Monitoring and Evaluation</b>
<b>MOS</b>	<b>Months of Stock</b>
<b>PEPFAR</b>	<b>(U.S.) President's Emergency Plan for AIDS Relief</b>
<b>PMTCT</b>	<b>Prevention of Mother to Child Transmission (of HIV)</b>
<b>PPIU</b>	<b>Provincial Program Implementation Unit</b>
<b>PPR 2004</b>	<b>Public Procurement Rules 2004</b>
<b>PPRA</b>	<b>Public Procurement Regulatory Authority</b>
<b>PST</b>	<b>Pre-service training (this course can be considered PST)</b>
<b>PWD</b>	<b>Population Welfare Department</b>
<b>RFQ</b>	<b>Request for Quote</b>
<b>RH</b>	<b>Reproductive Health</b>
<b>RHC</b>	<b>Rural Health Center</b>
<b>SBD</b>	<b>Standard Bidding Documents</b>
<b>SDP</b>	<b>Service Delivery Point. Used to represent the following unless specified. Family Welfare Centers, Mobile Service Units, Reproductive Health Services, LHWs, Rural Health Centers, Tehsil Headquarter Hospitals, Basic Health Units, District HQ Hospital.</b>

<b>SOH</b>	<b>Stock on Hand</b>
<b>STGs</b>	<b>Standard Treatment Guidelines (if followed by Doctors, Pharmacists and Nurses this helps us in quantifying our projected stock needs)</b>
<b>TEC</b>	<b>Technical Evaluation Committee</b>
<b>THQ</b>	<b>Tehsil Headquarter Hospital</b>
<b>TMS</b>	<b>Transport Management System</b>
<b>UNFPA</b>	<b>United Nations Population Fund</b>
<b>UNICEF</b>	<b>United Nations Children's Fund</b>
<b>USAID</b>	<b>United States Agency for International Development</b>
<b>VCT</b>	<b>Voluntary Counseling and Testing</b>
<b>WRA</b>	<b>Women of Reproductive Age</b>

## 1. Introduction to the Course

### ..... Session Objectives:

By the end of the session students will be able to:

Identify the goals and objectives of the course

Find the course materials

Identify by name the other students in the course

**Time:** 40 minutes

### Materials:

The Logistics Handbook

Student Workbook

Student stationary needs – set out ahead of time

Flip chart and markers (needed for all sessions)

### Lecturer Preparation:

Review Lecturer notes before hand. Learn student background and experience and current job titles/responsibilities using the participant list.

### Learning Activities Summary:

Title	Type	Time
1. Course Goal and Objectives	Lecturette	10
2. Introduction to Logistics Handbook	Lecturette	10
3. Commodity Security Vignettes	Introduction	5
4. Course structure	Lecturette	15

### 1. Course Goals and Objectives – Lecturette – 10 minutes

Point out the materials students have in front of them - the **Student Workbook**, and Logistics Handbook. Explain that they should have these materials with them every day during the course.

Point out that the course **Goals and Objectives** can be found in their **Student Workbooks**. Ask students to open to this and review then. Ask them to follow along in their Workbooks. If time permits ask different students to each read an objective. Ask the students if they have any questions about these.

**Note:** The course goals and objectives are pasted at the end of this session.

### 2. The Logistics Handbook – Lecturette and Homework assignment – 5 minutes

Ensure that all students have a copy of **The Logistics Handbook, “A Practical Guide for the Supply Chain Management of Health Commodities”**. Tell the students that during the course the facilitators will be referring them to this book and other handouts for information and study.

Inform the students that a lot of the technical topics that appear in the handbook will be addressed by the course, but unfortunately not all chapters will be covered in great detail due to lack of time.

### **3. Commodity Security Vignettes Introduction – 5 minutes**

**Lecturer’s Note:** This brief exercise introduction is only necessary if the class includes students with experience working in the public health system.

Tell experienced students that you have a special request for them which is to share an experience that they’ve had working in the public health system. Ask all of them to turn into you the page in their **Student Workbook** under **Session 15** at the end of the Workbook titled: **Commodity Security Vignette**. Help them locate it by providing the page number. Ask them to complete this page, tear it out and hand it into you within the next two days. Explain that we will review these at the end of the course for an exercise that will benefit everyone.

**Note** - These students know from direct experience how the public health logistics system works and can help other students understand the concepts and principles that will be presented in this course. Please take advantage of their knowledge through the course. Utilize their experience for demonstrating or highlighting issues that are being covered. They may even point out that things work differently in the real world than how they are supposed to on paper. That is OK its all part of understanding how the public health logistics system works.

If there are no experienced students in the group this step can be skipped. There will be a case study can be used instead.

### **4. Course structure - 15 minutes**

Explain any necessary course structure related issues as needed such as:

- Attendance requirements
- Reading materials – required and recommended
- Requirements for passing
- Homework
- Test and Quizzes
- Where to get extra help or find additional resources

## **COURSE GOALS AND OBJECTIVES**

**GOALS:** To increase the participants' understanding of the fundamentals of logistics management and the relationship between supply chain logistics and commodity security

To strengthen the participants' ability to implement improvements to basic elements of their logistics systems

**OBJECTIVES:** By the end of the course, participants will be able to:

1. Describe the purpose of a logistics system, list the major activities of logistics management, and describe the relationships among these activities
2. Describe the concept of commodity security and the role of logistics in assuring commodity security
3. Define key logistics terms and concepts
4. Identify key public health logistics actors in Pakistan
5. List the main components of Pakistan's public health logistics system
6. Identify the basic elements of a logistics management information system (LMIS), analyze a LMIS, and make recommendations for improving a LMIS.
7. List the basic guidelines for proper storage to ensure health commodity quality
8. Assess health commodity stock status at different levels of a public health system
9. Define maximum-minimum ordering systems and determine appropriate order quantities using max/min inventory control procedures.
10. Define quantification and describe the steps in the quantification process.
11. Describe the purpose of Monitoring and Evaluation
12. Apply basic logistics principles to the management of a wide variety of health commodities, including contraceptives, HIV/AIDS products, Essential Drugs, and TB and malaria drugs.
13. Evaluate a health facility's logistics practices
14. Identify the basics components of procurement in relation to: public sector competitive bidding, contract performance monitoring and product delivery, and public sector procurement in Pakistan
15. Explain the concept of cold chain management and its significance

## 2. Setting the Context of the Course: Commodity Security

---

### Session Objectives:

By the end of the session students will be able to:

1. Explain the concept of commodity security as the framework for the course and its relationship to logistics

**Time:** 35 minutes

### Materials:

Power point projector  
Pointer for slides is helpful

### Presentation Slides:

1. Session Title
2. Definition of Commodity Security (RH)
3. Definition of Commodity Security (RH) with the words “choose”, “obtain”, and “use” highlighted
4. Definition of Commodity Security (Health)
5. Commodity Security Framework, animated to highlight the Logistics Functions and Commodity Security

### Lecturer Preparation:

Lecturer should review the PowerPoint presentation corresponding to this session in advance, to become familiar with its use and with the materials it includes.

Please note that Slide 3 is a repeat of Slide 2, but with the words “choose”, “obtain”, and “use” highlighted.

Slide 5 is animated; after introducing and describing the overall Commodity Security framework, subsequent clicks highlight the words “forecast”, “finance”, “procure”, and “deliver”.

### Learning Activity Summary:

Title	Type	Time
1. Introduction to the Day	Presentation	15
2. What is Commodity Security?	Brainstorm and Large Group Discussion	20

### Learning Activities:

#### 1) Introduction – Lecturette – 15 minutes

Display **Slide 1, Session Title**. Welcome students and guests to the first technical session of the course.

The Lecturer should share something of his/her background with the students. Then, allow the students to introduce themselves saying something relevant about themselves or why they are taking the course. Students will feel more comfortable to ask questions and participate if they know each other.

Tell the students that now that we have gotten to know each other we will begin the actual technical content of the course. Remind the students that we looked at the course schedule and got a general idea of the series of technical sessions that we will be following during the course.

Tell the students that during this first technical session we will begin to talk about the concept of “Commodity Security”. Tell the students that this is an important concept, and one that we are adopting as the overall theme for the course; in other words, we do logistics for a purpose, and that overall purpose is to achieve commodity security.

## **2) What is Commodity Security? – Brainstorm and Large Group Discussion – 20 minutes**

Defining Commodity Security:

Point out the title of the session, using **Slide 1: Session Title**. Ask students what we might mean by the term “Commodity Security.” Facilitate a brief brainstorm of some of their ideas.

Show **Slide 2: Definition of Commodity Security (RH)**. Explain that the concept of commodity security started in the area of reproductive health in relation to contraceptives. Review the definition and note key words.

Reproductive health commodity security exists when every person is able to choose, obtain, and use quality contraceptives and other essential reproductive health supplies whenever s/he needs them.

Show **Slide 3: Definition of Commodity Security (RH)**, which highlights the words “choose”, “obtain” and “use”. Ask students what each word means to them. Be sure to focus on a client rather than provider perspective.

For each of the three points, students may mention, or the facilitator can contribute as follows:

Choose:

- clients have access to a variety of products; the program distributes a selection of FP methods/brands
- clients have the ability to choose the one that is “best” for them, for example, it is inconvenient to come to the health center monthly for pills, so a woman chooses a three-month injectable

(Note: There will be some RH provider input, for example if a woman cannot use an injectable contraceptive for actual medical reasons, then the provider would not allow her to choose the injectable; but in normal situations, the client would have some level of choice. It is not up to the provider to decide the best FP method for the client.)

Obtain:

- clients can actually get the products they choose to use: if a program offers several methods, then all of the methods should be available at all times; a client should never be told “come back next month if you want pills”.

Use:

- clients should understand how to use the product safely

Show **Slide 4: Definition of Commodity Security (Health)** and explain that the concept is now applied to all essential health products.

Commodity security exists when every person is able to obtain and use quality essential health supplies whenever s/he needs them.

Ask the participant to notice what is different about the definitions of Commodity Security when applied to Health generally, as compared to Reproductive Health specifically.

Students should notice that choose is no longer a part of the definition.

Ask the students why this may be so. Students can respond, or the facilitator can contribute that in the context of medicine generally, the client has relatively less choice. The MOH is not in a position to provide every kind of pain reliever, or every kind of antibiotic, so it will select a more limited number of drugs for inclusion on the essential medicines list. Then, it is generally the doctor’s decision about which specific drug is required to treat the patient’s condition or which product is needed (the patient will not choose what size needle to use for a suture, for instance).

Emphasize the fact that the removal of the word choose from the definition of Commodity Security does not mean that we take away the patient’s choice in every circumstance. A successful reproductive

health program would still want to make a variety of products available, but for financial and medical reasons, this is not the case with health products in general.

Show **Slide 5: Commodity Security Framework**. Tell the students that this model identifies all of the elements that are required to achieve commodity security. Explain that this model provides a holistic view or big picture of the different elements that influence commodity security. The elements of Commodity Security are shown as interlinking rings of the circle and that each ring summarizes one set of actors or requirements for Commodity Security, some of which are also detailed in the boxes to the left and to the right of the circles.

Briefly explain each of the elements as follows: (some specific examples are given for each element; other examples can be provided by the facilitator or by the students) [Hint: Use a laser pointer or other means to indicate each portion of the framework as it is being introduced.]

- The first ring, Context, refers to the overall situation that exists in the country where commodity security is going to be achieved, including the political, policy, economic, social and health environments. If the ruling political party is against the idea of “family planning”, then it is unlikely that Commodity Security would ever be achieved for RH products; if the social environment is that people refuse to believe that AIDS is real, then it is unlikely that Commodity Security would be achieved for HIV/AIDS products needed to treat the disease.
- The next ring, Commitment, refers to the level of policy support and leadership, and includes commitment by all partners: government, donors, private sector, and NGO sector. If the government is not willing to make a commitment and devote specific efforts and resources to achieving Commodity Security, then CS will never be achieved.

The next ring includes three elements or conditions that must be present, once we have an environment that is favorable to achieving CS and a concurrent commitment to do so.

- There must be reliable sources of Capital (financial resources). Not only must there be a variety of funding sources (the government cannot meet all of the needs alone), but the funds must also be made available to support all of the requirements needed to achieve Commodity Security, including the purchase of the products and the infrastructure needed to manage them. Emphasize the fact that in the overall context of Commodity Security, we are not talking only about government and donor funding, but also household funding (the money that

individuals/families pay for products and services) and “third party” funding, such as insurance schemes or private sources of funds.

- There must also be Coordination among the various partners who are working together to achieve Commodity Security, and as indicated in the boxes, this include the public sector (government), as well as the private sector and donors. All of these groups must work together to ensure that they are not duplicating their efforts, and that limited resources are used to achieve the highest results possible.
- Finally, in order to achieve Commodity Security, the system must have the Capacity to implement the system; this includes the supply chain that will get the products where they are needed, service delivery that will give clients access to the services, and the human and technical capability that will support all elements of the system.

Mention that we have already seen in the examples that the three elements Capital, Coordination, and Capacity involve all of the partners and sectors that are indicated by the next ring: Commercial Sector, Public Sector, NGOs, and Social Marketing. In this framework, it is these sectors (actors) who mobilize their capital, coordination and capacity in order to bring services to the clients.

- At the center of the circle are the Clients. In the framework of CS, we also must ensure that we are meeting the needs of the clients and addressing specific issues that impact CS at the client level, such as access, communities, method choice, met and unmet need, ability and willingness to pay, and sources used.

Remind the students that the definition of Commodity Security is client focused. All of the efforts that we make in all of the areas that we have just reviewed are done with the purpose of making products (and the related services) available to the client.

Tell the students that the elements of Commodity Security are many, but that the course we are now beginning will only focus on logistics. Mention that within the overall framework, Logistics is essential to Commodity Security.

Provide the following explanation while showing the next animated slides, each of which focuses on one logistics element that is critical to achieving Commodity Security.

Logistics is essential to CS. A program is able to make progress toward commodity security when it can:

- FORECAST...accurately estimate commodity requirements
- FINANCE...obtain or organize adequate financial resources

- PROCURE...conduct timely and efficient procurement of products
- DELIVER...ensure reliable delivery to customers

Tell students they can find the **Commodity Security Framework**.in their **Student Workbooks**.

Ask the students if they have any questions of clarification and respond to any questions that are raised.

End the session by explaining that while this course is focused on logistics, we will from time to time come back to the issue of Commodity Security and relate what we are learning about logistics to the overall goal of achieving Commodity Security.

**Synthesis Questions:**

- 1) Why does the Commodity Security Framework help us understand?
- 2) Considering the Commodity Security diagram, what are the biggest issues for Pakistan?
- 3) If we can consistently obtain and use health commodities we have...(commodity security)

### 3. Introduction to Health Logistics Systems

.....  
**Session Objectives:**

By the end of the session students will be able to:

1. describe the purpose of a health logistics system
2. identify some of the major activities within logistics and the range of people who are involved in logistics activities
3. list the components of a logistics system and describe the interrelationships of these components as they relate to the logistics cycle
4. define pipeline, lead time, issues data, and dispensed-to-user data
5. describe allocation (push) and requisition (pull) distribution systems
6. Identify the main logistics actors in Pakistan and some of their roles – see content from Pak's Logistics Management Manual p74
7. List components of the Pakistan public health logistics system how these components work together to provide commodities to the public health system
8. Describe the Pakistan pipeline and established reporting systems within the LHW and DPW systems.

**Time:** 180 minutes – 2 hrs 40 minutes

**Materials:**

1. Prepared poster or flipchart with diagram showing restaurant-based logistics system (can also use presentation slide)
2. Student Guide with Cheaters Quiz

**Presentation Slides:**

1. Session Title
2. Restaurant
3. The Six Rights of a Logistics System
4. The Logistics Cycle (diagram)
5. Pipeline (title only) Click again for definition (showing the title and definition with one click only)
6. Basic In-Country Pipeline (diagram)
7. Lead Time (title only) Click again for definition (showing the title and definition with one click only)
8. Allocation (push) vs. Requisition (pull) (title only) Click again for definition (showing the title and definition with one click only)
9. Dispensed-to-User vs. Issues Data (title only) Click again for definition
10. Pakistan pipeline title slide
11. Contraceptive Pipeline
12. Contraceptive Pipeline Summary
13. How Contraceptives are Ordered
14. Pipeline for Health Commodities (LHW Program)
15. Job Descriptions for Logistics Staff

**Lecturer Preparation:**

Lecturer should review the PowerPoint presentation corresponding to this session in advance to become familiar with its use and with the materials it includes.

**Learning Activities Summary:**

Title	Type	Time
1. Purpose of a Logistics System	General Discussion	15
2. Activities of a Logistics System	Pair work & Discussion	40
3. The Logistics Cycle	Lecturette and Discussion	45
4. Key Terms	Interactive Lecturette	35
5. Pakistan System Pipeline, Reporting and Job Descriptions	Lecturette	30
6. Cheaters Quiz	Exercise	15

**Learning Activities:****1. Purpose of a Logistics System – General Discussion – 15 minutes**

Tell the students that we have just been discussing the concept of Commodity Security, and that we ended that discussion by identifying logistics as a key element in achieving Commodity Security.

Tell the students that we will now begin studying logistics systems. Mention that the primary focus of the entire course will be logistics systems that manage health commodities.

Tell the students that Health Commodities are often grouped into various categories. For instance, we can talk about “full supply commodities”, “non full supply commodities” and “consumables”.

Ask the students if they are familiar with the term “full supply commodities”. Ask a participant to explain what s/he understands by “full supply commodities”.

The participant can explain, or the facilitator can explain, that full supply commodities are those for which the supply is almost guaranteed, that the product will always be available without fail.

Ask the students to give some examples of programs that typically deal with full supply commodities. Students may respond:

Family Planning  
TB  
HIV/AIDS

## ART (Other)

Mention that these programs are in contrast to Essential Medicines programs, which frequently do not have the resources required to keep products in full supply at all times.

Mention that most of the concepts and principles that we will be looking at during the course are applicable to a logistics system that manages health commodities in full supply. While good logistics practices can be applied to all commodities, including non full supply, in this course the accent is put on the full supply commodities. We will see why this is the case as we look at some of the logistics practices that we will discuss.

Mention that during this, and all sessions of the course, students are welcome to take notes. At times they will be referred to pages in their Logistics Handbook where information can be found, or their Student Guides.

### **Restaurant as a logistics system**

Tell the students that we will begin our discussion of logistics by defining what a basic logistics system is and the purpose of a logistics system.

Comment that we can gain a good understanding of a logistics system by looking at something as simple as a restaurant. Show **Slide 2: Restaurant**.

Ask students in what way they think a restaurant is like a logistics system? Take a few comments from the students. If any students mention “central warehouse”, “transportation” or “service delivery point”, note the comment on flipchart. Otherwise, just affirm the comment made by the participant.

Comment that in a restaurant we can find the basic elements of any logistics system: the kitchen serves as the central warehouse, the waiters and waitresses are the transportation, and the tables are the service delivery points. (If applicable, remind the students which of these elements were provided by the students.)

Mention that here we already see the basic elements of a logistics system:

- the warehouse provides a place to store our products,
- transportation provides a means for getting products distributed, and
- the service delivery point provides a way to get products to the clients.

Ask the students to think again about our restaurant and its logistics system. Ask the students to imagine what the purpose of this logistics system is. The students should respond from among:

- to get food to the customer,
- to serve the customer,
- to fulfill the customers' expectations.

Tell the students that that is the purpose of any logistics system: to get products to the clients. Mention that we will now examine this in more detail.

Ask students to think back to the experiences that they have had eating in restaurants. Ask the students what kinds of expectations they had for their restaurant experience. (If no students respond appropriately, paraphrase the question and ask the students what criteria they would use to choose a restaurant; what makes a "good" restaurant.)

Note the participant responses on flipchart. Examples will probably include the following:

- good quality food
- fast and efficient service
- friendly service
- reasonable price
- food served within a reasonable length of time
- fresh/delicious food

## The Six Rights

Review the list and point out that the purpose of a restaurant logistics system is the same as any other logistics system, including a logistics system that manages health commodities.

The purpose of a logistics system can be summarized by the rule of the Six Rights. Show and review **Slide 3: The Purpose of a Logistics System**.

Note: Tell students that they can find this description of the purpose of a logistics system on page 4 of their Logistics Handbook.

Go back to the flipchart where the students' expectations of a restaurant were noted and relate each of those expectations to one of the Six Rights. Examples include:

- "Fresh food" would relate to "in the Right Condition,"
- "Food served within reasonable length of time" would relate to "at the Right Time."

Ask students if there are any items on their list of expectations that do not fit in the list of the Six Rights. All items should be subsumed under one of the Six Rights, or classified as not directly related to the purpose of a logistics system (for example, ensuring a “tidy” or “clean” restaurant is not one of the purposes of the logistics system for providing the food products).

## Right Cost

Remind the students that we learned earlier that many (most/all) of them have worked in health commodity systems. Ask if any of them have specifically worked in programs that receive donated products or products which are dispensed to the client without cost. Mention that this is oftentimes the case for family planning programs, where contraceptives are donated and given free to the clients, or (TB programs which give the treatment drugs to the clients without cost [need to find a real/correct example of a non-FP program that gives free to the clients]).

Ask students if the idea of “right cost” applies to logistics systems where commodities are donated and/or given to clients for free. Students should respond, or the facilitator can mention that cost is still a factor because there are still costs associated with delivering the product to the client (e.g., personnel, transportation, and storage).

Explain that achieving the Six Rights is the purpose of every logistics system, whether it supplies Coca-Cola, jeeps, condoms, Vitamin A capsules, or any other product.

The facilitator can also mention, or respond if a participant raises the question, that the Six Rights are even applicable for products that are not in full supply. The only difference is that for non full supply products, the Six Rights are met less frequently, usually because the “right quantity” cannot be supplied. However, all of the other rights would apply to those commodities that are available, in whatever quantity is available.

## 2 Activities of a Logistics System – Pair work and Discussion – 40 minutes

### Activity Introduction and Set up

Tell the students that we will now have a very brief activity to begin to get a general overview of the activities that are included within logistics and the people who carry out these activities. During the first part of this activity, we would like for you to work in pairs. Tell the students to take their **Student Workbook** with them and divide themselves into pairs (groups of two). (If there is an odd number of students, then form

one group of three, but no one should be working alone for this activity.)

After the students are sitting in their pairs, ask them to open their **Student Workbooks** to the page with **Logistics Activities**. Tell the students that each group will be given one or more logistics activity. The students are to work in their pairs and for each logistics activity, each person is to identify one person who may be responsible for that activity in a logistics system or country program. The person they identify could be at any level of the system, from the service delivery point all the way up to the manufacturer of the product. Tell the students that they will have only 5 minutes to do this task.

Verify that the students understand the assignment; then give each pair one or two activities from their Student Workbooks. The tasks can be identified by their numbers. Tell the students that each person in the pair should identify one person who may be responsible for each logistics activity that they are given.

### Processing the Activity

Tell the students that we will now quickly review the lists of activities and their ideas of the people who are involved in each of the logistics activities.

Using the master list of logistics activities as a guide (found at the end of this session), go from group to group and for each logistics activity, ask the students to name the person they identified as involved in that logistics activity.

Note: It is not necessary to get the ideas of all the students for each activity, but rather to get a sample from the pairs that worked on each logistics activity.

Once all logistics activities have been reviewed, ask the students for their observations. Observations may include from the following:

Activities:

- Each logistics stage/component involves several activities.
- Each logistics stage/component involves several people.

People (by job title):

- Some people may be involved in several logistics stages/components
- People may not have “logistics” in their job title, but they are involved in logistics.

Before ending this activity tell students we will be looking at logistics responsibilities within the Pakistan public health system later in this session.

### 3. The Logistics Cycle – Lecturette and Discussion – 45 minutes

#### Logistics Cycle

Tell the students that we have just had a brief introduction to some of the detailed activities that take place within logistics. During this next part of the session, we will take a more general view, to look at some of the major areas of activity within a logistics system.

Mention that for this, we will look at a system-wide and systematic view that has been developed over the years by international logistics experts. Display **Slide 4: The Logistics Cycle** (diagram). Tell the students that this is the framework that we will be using and is called the Logistics Cycle. Mention that we will be using and referring to this cycle during much of the course.

Comment that students may be familiar with other diagrams that show the components of a logistics system in similar ways, but that this is the one that we will be using. Comment that this cycle is applicable to logistics systems that manage health commodities as well as to those that manage a mix of products.

Tell the students that the Logistics Cycle can also be found on page 5 of the Logistics Handbook. Tell the students that we will now briefly review the major components of the Logistics Cycle, and other sessions during this course will focus in detail on some of these components.

#### Major Elements of the Logistics Cycle

For each component of the Logistics Cycle, ask the students what they think each component means or what it includes. The facilitator should complete their comments so that the following main points are mentioned during the discussion:

#### Serving Customers

Serving Customers is shown at the top of the cycle to show its importance: we do all of our work in logistics in order to serve the customer.

The decisions we make in the other components of the logistics cycle should focus on serving the customer as well. For example, we see a direct link between customer service and product selection; the products we obtain and distribute in our system should be chosen with the customer in mind.

“Customer” can include the final end user of the commodities that we are distributing in our system, as well as intermediate facilities in the supply chain (regional warehouses, district storage facilities, etc.).

If we can achieve the Six Rights, then we are serving the customers.

## Product Selection

Product selection is the first “action area” for our logistics system.

When we select the products that we intend to put into our system and distribute to the customer, we must take into account things like the capacity of our system: if we are selecting products that require cold chain, for example, then we must ensure that we have the facilities required to safely store and transport those products all the way to the customer.

We need to select the products that are appropriate given the program we are supporting and the disease patterns of the country, for example, but we must also balance those needs with things like cost and our ability to manage the products.

For example, if several products are available to respond to the health needs that we are trying to address, and some of those products require cold chain but others do not, we would want to take into account the ability of our system to manage cold chain products. If we don’t have that capacity, or don’t have the capacity to manage many cold chain products, then we would want to choose non-cold chain products when possible.

In a health logistics system, a national formulary and therapeutics committee, pharmaceutical board, board of physicians, or other government-appointed group may be responsible for product selection. Most countries have developed essential medical lists patterned on the WHO Model List.

During this course we will not focus on the area of product selection, as this topic is more appropriate for medical professionals. However, it is important that logisticians be involved in the product selection process. As we just said, we do not want, for example, to be putting drugs on the essential drugs list if our logistics system is not capable of handling those products. Note: For more information on the product selection process students should read the Product Selection chapter in the Handbook. Mention that facilitators will be glad to discuss this topic during breaks or at the end of each day.

## Quantification and Procurement

Quantification and Procurement are the actions that serve to get the products into our country or program (into our in-country logistics system).

Once we have selected the products that we intend to obtain and manage in our system, we must first determine the right quantities that will be needed to serve all of our customers (in a full supply system) and, for example, ensure adequate buffer stock to ensure an uninterrupted supply for the program. (In non full supply situations, we need to serve as many customers as possible.) We will have a session to introduce some basic elements of quantification later in this course.

Once we know the quantities that we need to meet our needs, then we must obtain those products from the manufacturer or the re-seller, that is, we must procure our goods. When doing procurement, we must take into account the capacity of our logistics system and pay close attention to things like the time it takes in order to get bids, place an order, and receive the goods. Additionally, procurement should follow a set of specific procedures that ensure an open and transparent process that supports the six rights.

As with product selection, logisticians should be involved in the procurement process in order to ensure, for example, that our logistics system will not be overloaded if a procurement is done for a quantity of goods that our system will not be able to manage.

Specific example: A procurement unit may decide to purchase a year's worth of supply and receive the entire shipment at once in order to save money on the procurement costs, while our storage and transport facilities do not have the capacity to handle those quantities, which can lead to expiry or damage and thus, wasted money. We will have a full session dedicated to procurement later on in the course.

## Inventory Management

Once the products have been procured and received in country, it is now the role of Inventory Management to store and distribute the products throughout the system.

Storage must be adequate to maintain the quality of our products and storage capacity must be adequate to manage all of the products in our system.

Transportation must also be secure and reliable, and it must be available on a regular basis.

During this course we will cover some of the basic principles of storage, but we will not be covering transportation, other than to refer

to it when necessary as it relates to selecting an inventory control system.

## LMIS

The LMIS is shown at the center of the cycle, and we consider it to be the engine which drives the logistics system. The LMIS is the means through which we gather and communicate the information that allows managers to make the decisions they need to make in order to ensure product availability and customer service. Every function in the logistics cycle needs accurate information in order to work. For example, without a properly functioning LMIS:

- We won't know which products are being accepted and used by our customers (which products to continue to select or stop selecting).
- We won't know if we are obtaining the right quantities at the national level to serve the country's needs.
- We won't know if warehouses are sitting empty or if products are piling up and not being distributed.

Because of its importance in logistics, we will spend a significant amount of time looking at LMIS during this course.

We will see that there are certain logistics data requirements that are applicable to all products that are being managed, and that for some product categories, such as HIV/AIDS commodities, there can be some additional data requirements as well.

The other activities found at the center of the Logistics Cycle are management support activities that are also essential to the functioning of the system as a whole.

## True Cycle

Emphasize that the process is a true cycle with the customers as a part of the cycle. Point out the directional clockwise arrows and mention that this reinforces the idea that decisions made at one point directly impact the next part of the cycle, and that the cycle is continuous. Point out the two-way arrows going to and from the center of the Cycle, and mention that this reflects what we said earlier: LMIS impacts all other actions in the logistics cycle.

## Heart of the Cycle

Ask students to look at the center of the cycle where LMIS is located and tell them that they will notice other activities that help drive and support the logistics cycle; these include:

- Organization and staffing – a logistics cycle can only work if well-trained, efficient staff monitor stock levels, place orders, and provide products to clients.

- Budget – allocation and management of finances directly affect all parts of the logistics cycle, including the quantities of products that can be procured, the amount of storage space that may be available, the number of vehicles that can be maintained, the number of staff working logistics. Mobilizing resources and securing a budget line item for health commodities and logistics activities is extremely important to essential to success.
- Supervision – supervising the staff who work within the logistics system keeps it running smoothly and helps to anticipate needed changes or respond to supply problems or human resource constraints.
- Monitoring and Evaluation – routine monitoring and periodic evaluation of the pipeline and logistics system activities help demonstrate how well the system is performing, the areas that can be improved as well as the system's impact on service provision.

### Quality Monitoring

Mention that Quality Monitoring is indicated around the entire logistics cycle. This is because all actions taking place within our cycle must be monitored to ensure that they are functioning properly. If not, then corrective measures must be taken. Quality monitoring refers to not only the quality of the product, but also to the quality of the work. We must make sure, for example, that:

- The data that we collect and use for decision making is of good quality.
- Between “Product Selection” and “Quantification and Procurement” – We are selecting the right, quality products for our programs. We are accurately predicting the quantities of products that we need and that we obtain them in an effective way.
- Between Quantification and Procurement and Inventory Management – Procurement decisions should be made based on the supply plan developed during quantification. Procurement documents should be accurate and complete. After arrival, procurement managers must verify the quality of health commodities before they enter the distribution system. The extent to which products need to be verified depends on factors such as who the supplier is and what the products are.

- Between “Inventory Management” and “Serving Customers” – The manner and facilities, in which products are received, stored, and distributed, should adhere to quality standards. The storage and transport facilities do not have a negative impact on the quality of the products themselves.
- Between “Serving Customers” and “Product Selection” – even after customers receive the product, program must continue to monitor the quality. Quality monitoring of both the product and the service is critical to the success of efforts to promote the appropriate use of products. Additionally customers should correctly use the products they receive and be satisfied with them and the service they received. This monitoring can inform decision makers about changes in the product selection and use for the next procurement cycle.

Based on our monitoring, we can take immediate corrective measures to correct any problems. Again, accurate information is a key element of our ability to monitor our logistics system.

## Policy Environment

Point out how the logistics cycle works within a policy environment. Different policies may affect the whole functioning of the logistics system, or a part of the system. Ask students to name a policy that would affect the logistics system. Examples can include the following:

Note: It is not necessary to go over every example, or in great detail; the examples listed here are intended to show the types of responses the students, or the facilitator can give.

- customer service: if certain new levels of health facility are being authorized to provide additional services, then the logistics system must be able to get those products to the expanded number of facilities, e.g., expanding the coverage of TB and Leprosy programs;
- product selection: it may be the government's policy to offer only 2 types of contraceptive pills, 1 low-dose and 1 mini, or the policy to offer as many types as the customers demand;
- forecasting: the HIV testing protocols will have a direct impact on how many screening, confirmatory and tie-breaking tests we would need;
- procurement: government policy might require the lowest unit cost, which would require receiving fewer but larger shipments to reduce shipping costs, while our warehouse space limitations would benefit from smaller but more frequent shipments;

- distribution: e.g., all essential drugs will be ordered by Sept. 31 of each year for the entire country;
- use: policy might say that new users of oral contraceptives can receive no more than 2 cycles of orals at a time, even if it is inconvenient for her in terms of transport, or that only certain groups of the population can qualify for free HIV testing;
- Fiscal and budget: these are often some of the most influential policies affecting a logistics system, whether related to securing funding for product procurement; or to pay for critical infrastructure.
- other: e.g., we want to reduce TFR by 1 by the year 2015.

Government regulations and procedures affect all elements of the logistics system. As noted, policies impact all aspects of the logistics cycle.

### Adaptability

Logistics systems must be designed to be flexible and adapt to constantly changing circumstances, such as changes in demand for a product, or changes in funding policies for logistics activities.

Explain that adaptability refers to the ability of the logistics system to successfully adapt to changes. For example, this is the capability to obtain necessary resources, either internally or externally, to supply growing demand, to introduce new products, etc.

Ask the students what the implication would be if we had to re-design our entire logistics system each time some small change occurred. (We would never have a final design for our system; no one would know what to do at any given time, etc.) .) So adaptability speaks to the logistics system's ability to successfully obtain the resources that are necessary to address changes.

Note: If a participant asks why manufacturing is not included on the cycle, reply that it is because few of the countries represented here have local manufacturing capability. Then ask students where they would include manufacturing in the cycle. (Between quantification and procurement when looking from the perspective of the country doing the procurement; outside but parallel to the cycle if looking from the perspective of the manufacturer.)

### Logistics Cycle applies to all products

Ask the students to look again at the Logistics Cycle, but this time to think specifically in terms of their country's system (vertical vs. integrated) or the program that they work with most closely. Ask them to comment whether any component of the Logistics Cycle is not

applicable to integrated logistics systems or to their program's commodities.

Specifically, ask students how "Product Selection" is different in a vertical system that manages only contraceptives and in a system that manages contraceptives and a variety of other commodities such as essential drugs. (Answer is that client's preference and choice is often considered when selecting contraceptives, whereas clients probably have little to no say in the types of antibiotics selected, for ART the availability might be a problem).

Discuss other components such as "Forecasting," "Pipeline Monitoring." Comment that while there may be slightly different ways of looking at these components in a vertical and integrated logistics system, although one component that certainly is the same is "Serving Customers" (client satisfaction as the goal of a health logistics system).

With the Logistics Cycle slide still being projected, remind students that there are several items we will cover during this course. We will look in great detail at LMIS and inventory management, and we will also spend some time on forecasting, system monitoring and assessment, storage, and of course all of this in the context of commodity security. Note that some of the other elements of the Logistics Cycle do not have specific sessions, but will be referred to from time to time throughout other course sessions.

Summarize the logistics cycle by noting that all components of the cycle are important and should work effectively if clients are to be satisfied with the services they receive. Customer service is the ultimate goal of any health logistics system.

### Why Logistics Matters

Tell students now that we have looked at the Logistics Cycle in great detail can they briefly describe what impact a logistics cycle (system) can have in public health. Why does logistics matter? After several comments from students summarize with the following:

Logistics increases program impact – Health programs cannot success unless the supply chain delivers a reliable, continuous supply of health commodities to its customers. With access to essential health commodities, more people are more likely to use health services – and thus improve their health status. Remember, "no product, no program"!

Logistics enhances quality of care – well-supplied health programs can provide superior service, while poorly supplied programs cannot. Likewise, well-supplied health workers can use their training and expertise fully, directly improving the quality of care for clients.

Logistics improves cost efficiency and effectiveness – an effective supply chain contributes to improved cost effectiveness in all parts of the program by: (1) reducing losses due to overstock, waste, expiry, damage, pilferage, and inefficiency; (2) protects other major program investments; and (3) maximizes the potential for cost recovery.

#### 4. Key Terms – Interactive Lecturette – 35 minutes

6 logistics terms

Comment that we will now cover some basic yet important logistics terms that we will use frequently during this course. Point out that these terms are explained on **pages 9 -13 in the Logistics Handbook**.

##### Pipeline

Show **Slide 5: Pipeline** (title only). Ask students if anyone knows what is meant by “pipeline”. If good answers are slow in coming, ask how water is carried to a kitchen in a house? Where does the water come from? How does it get to other houses?

Point out that a pipeline containing health commodities does not really have pipes and tanks, but it does have other parts. What are they? (Warehouses, trucks, intermediate facilities, etc.)

Click again to Show **Slide 5: Pipeline (definition)**

##### PIPELINE:

The pipeline is the entire chain of storage facilities and transportation links through which supplies move from the manufacturer to the consumer, including the port facilities, central warehouse, regional warehouses, district warehouses, all service delivery points and transport vehicles, including community-based distribution networks.

Reinforce the fact that the pipeline includes all of the storage facilities and the transportation at all levels of the system.

Show **Slide 6: Basic In-Country Supply Pipeline (diagram)**. Explain the different levels in the pipeline diagram and the relationships of the storage facilities:

- central level supplies the regional level,
- regional level supplies the district level
- (add for each element in the diagram).

Ask the students what other elements could be added to the pipeline diagram to make it more complete. Note that the diagram focuses only on the in-country pipeline. The donor or manufacturer could also be added, as could the receiving port facilities if products are commonly stored at the port for some time.

NOTE: Facilitator should take a moment and explain what SDPs are, and ask students which facilities in this diagram would be considered SDPs.

## Lead time

Tell the students that we have just seen an example pipeline. Ask the students to think about their in-country pipeline and to think how much time, in months, it takes to move stock between each level in their own system, from the time stocks are ordered from the supply facility until the time the stock is received and available for issuing or dispensing. Take a few examples from the students.

Explain that this amount of time is called lead time. Show and review **Slide 7: Lead Time (definition)**.

### LEAD TIME:

Lead time is the time interval between when new stock is ordered and when it is received and available for use.

Clarify the definition of lead time, especially “available for use” (port time, customs, etc.).

Tell the students that we will now look at one brief example for determining lead-time. Ask them to listen carefully.

A village clinic places an order, sending the form to the district warehouse. It takes one week for the district officer to approve the order and send it to the district warehouse. It then takes the warehouse staff two weeks to pick and pack the order, and to get approval to ship the products. It takes two days for the delivery vehicle to arrive at the clinic, and another three days for the clinic nurse to count the supplies and place them in the clinic storage cabinet to make them ready to dispense.

Ask the students what the total lead time would be in this example. The students should answer (or the facilitator can provide) that the total lead time in this example would be one month.

Explain how supplies move through the pipeline eventually reaching the consumer. The total of all the lead times between each supply level represents the minimum number of months it takes for supplies to move from the central warehouse to the service delivery point.

A logistics manager measures lead time and tries to reduce it.

## Allocation/Requisition or Push/pull

Point out to students that at each level of the supply system, someone must be responsible for determining the quantity of supplies to be issued.

Tell the students that there are two options: the person at the lower level makes the decision, or the person at the higher level makes the decision. Each type of system has a special name. Ask the students if they know what those names are. Take any participant responses and then show **Slide 8: Allocation vs. Requisition (Push vs. Pull)** (title only), and tell the students that the two systems are Allocation vs. Requisition.

Click again to **Show Slide 8: Definition of Allocation vs. Requisition (push/pull) System**, and read through the definition.

REQUISITION (PULL) SYSTEM:

In a requisition system, quantities to be issued are determined by personnel who receive the supplies.

ALLOCATION (PUSH) SYSTEM:

In an allocation system, quantities to be issued are determined by personnel who issue the supplies.

Emphasize that it is the person who determines the order that is the key to whether a system is “allocation” or “requisition.” If it is the lower level staff, then it is a requisition system; if it is the higher level staff, then it is an allocation system.

Give an example of eating in a restaurant and eating at home: When you go to a restaurant, the cook determines the quantity of each food item that you will receive. That is an Allocation system. When you eat at home, you can take as much or as little food as you want, depending on how hungry you are. That is a Requisition system. (The only difference might be that parents choose what quantity to give to the children; in that case, for the children it’s an Allocation system.

Emphasize again that the only difference between the two is “Who makes the decision?” In either system, the same data is required to make good decisions, and either system will always ensure enough supply, if the data is available to make the decision and if the supplies are in the system.

We will be looking at what is used between a few levels of the Pakistan system a little later in this session.

Advantages/Disadvantages:

Ask students if they can think of any advantages and disadvantages to either of these distribution systems. Participant answers (or facilitator comments) may include the following: (Note: Each type of system has

trade-offs; choosing one system for its “advantage” would imply other requirements.)

Requisition systems are decentralized, which may correspond with government initiatives, BUT it then requires trained staff at the lower levels (and that means training more people, which takes time and costs money).

Requisition systems place less burden on upper level staff, BUT it may then require service providers to spend more time doing commodity management and filling out forms than and then having less time to serve clients.

Allocation systems require fewer trained staff, BUT it then increases the workload of staff at the upper level (which is determining issue quantities for many facilities).

Note to the Lecturer: Beware of the following “perceived” advantages/disadvantages:

Allocation systems should only be used when there are not enough products to meet the needs: FALSE!! “Allocation” does not imply “ration.” When commodities are not in full supply, the higher level must determine how to fairly distribute what is available. This is called “rationing”. However, if a requisition system is already designed and is operating when the supply can has stock

Requisition systems require more data: FALSE!!! Requisition and Allocation systems both require the same data elements; the only difference is who does the calculation: staff at the lower level (requisition ) or staff at the higher level (allocation).

The facilitator should also note that there may be mixed systems: allocation between some levels in a system, but requisition between others. For example, a system might have requisition between central and district, but allocation between district and SDP.

The Lecturer can comment that one rarely mixes systems between the same two levels; it would be extremely rare to see allocation between some regions and their districts, but requisition between other regions and their districts. The only exception to this might be for different programs that use vertical systems, such as a vaccine program that uses allocation at all levels, but a reproductive health program in the same country that uses requisition at all levels.

Ask students what type of systems they use for managing their health commodities: allocation or requisition. At what levels is it allocation or requisition? Is it the same for all products? Do they know what types of distribution systems they have?

Tell students that on page 12 of the Logistics manual they will find Table 1-1 which is a quick summary of the discussion we just had on advantages and disadvantages of Allocation and Requisition.

Summarize this part of the session by saying that so far we have covered four of the key logistics terms: pipeline, lead-time, requisition system, and allocation system. Tell the students that we have two more terms to cover in this session.

Show **Slide 9: Dispensed-to-User vs. Issues Data** (title only), and tell the students that these last two terms are dispensed-to-user data and issues data. Tell the students that our definitions are not dictionary definitions, but rather definitions based on the way that the words are used in all types of logistics systems.

Show **Slide 9:and read the definitions.**

Dispensed-To-User-Data:

Information about the quantity of goods actually put in the hands of the clients or used by clients. (often shortened to “dispensed data.”)

Issues Data:

Information about the quantity of goods shipped from one level of the system to another.

Tell the students that based on our explanations of these terms we can note an important fact: only Service Delivery Points (SDPs) put goods in the hands of clients; therefore, only SDPs can generate dispensed-to-user data. When goods go from a truck to a warehouse, or a warehouse to a truck, you have issues data. The storage facility could be a warehouse, a depot, a storage closet, or whatever.

The Lecturer should emphasize that the difference between issues data and dispensed data is extremely important. Ask the students which type of data they would prefer to have to do planning for their system? For example, if one region in your country was issued 50,000 condoms last quarter, would it be a good idea to issue 50,000 for this quarter? The students should respond that the condoms may be simply piling up in the warehouses, and that it would be much more accurate to find out how many condoms were actually dispensed to users. If you used “issues data”, use it from the very lowest level possible.

## **5 Pakistan System Pipeline, Reporting and Job Descriptions - 30 minutes**

Tell students that by now they have learned the purpose and major elements of a health logistics system. At this stage it is important to learn the Pakistan’s health logistics system. Studying Pakistan’s

system not only makes us understand the logistics environment we are working with but also provides opportunities to identify weaknesses and rectify them wherever possible

Show title **Slide 10 ‘Pipeline and Reporting for Pakistan’s Logistics system’**. Ask students to recall what they learned from this session and identify their own roles in the pipeline. Write the different roles in the supply chain on a flipchart. Ask students to identify how these various supply and reporting roles are linked to each other. The students should be able to share their role in the supply chain based on their experience. Most of the students are likely to share experiences related to supplies and reporting at the district and sub-district level.

**Show slide 11; ‘Contraceptive pipeline’**. Tell students that the flowchart describes supply flow for all contraceptive commodities for all stakeholders. The flowchart incorporates recent policy changes regulating the flow of commodities from central to district level. Most of the contraceptives are procured internationally apart from small local procurements in the past by Lady Health Program for injectable and oral pills. The funding sources include government’s public sector development program (PSDP), USAID and UNFPA. All international procurements are usually shipped through sea and received at Karachi port. Once cleared, the commodities are transported and stored at Central Warehouse (CWH) & Supplies Karachi.

Tell students that the black arrows (pointed downwards) in flowchart indicate the flow of contraceptives while red arrows (pointed upwards) show the flow of orders or requisitions. Tell students that orders are received by Central Warehouse and copied to provincial health and population departments.

Show **slide 12. ‘Contraceptive pipeline – summary**. The flow of commodities is summarized in this slide. Ask one of the students to read the slide. Go back to the previous slide if needed to relate the summary with flowchart. Ask students if they have any role in receiving commodities from central warehouse. Tell students that in addition to flow of commodities the roles and responsibilities are also connected through this flowchart and any break or hurdle in this supply chain will ultimately affect the availability to client.

Show **slide 13. ‘How contraceptives are ordered**. Tell students that The Central Warehouse supplies contraceptives based on pull system.

Tell students that In order for pull system to work, the consumption data from all service delivery points has to be recorded. Tell students that all respective service delivery points of the departments of health and population record their consumption and report to districts. The reports by the service delivery points of health department are called First Level Care Facility (FLCF) reports.

Tell students that EDO Health and DPWO offices compile the total demand of their respective departments at district level through the SDP reports. The two departments calculate their demand based on integrated CLR-6. The demand of EDO is then shared with DPWO and DPWO compiles one integrated CLR-6 in order to send to CWH. The EDO also includes the demand of Lady Health Workers Program in addition to requirements from Basic Health Units, Rural Health Centres and Tehsil Headquarter Hospital.

In districts where Peoples Primary Healthcare Initiative (PPHI) manages BHUs, BHUs send their demand to the DPWO who forward it on to the CWH. Once CWH receives the integrated CLR-6 from each DPWO, it will ship the required quantities to DPWO of that particular district. DPWO will thus receive all required contraceptives for the district and will send required quantities (initially indicated in integrated CLR-6, as discussed above) to each of the FP service provider (DOH & PPHI).

Show **slide 14, Pipeline for Health Commodities LHW Program.**

Tell students that the flowchart describes the flow of health commodities and LMIS reports in the Lady Health Workers Program. Other programs in the Department of Health (Maternal Neonatal and Child Health, Tuberculosis Program etc.) also follow similar reporting and flow patterns with some variations.

Most of the times, the manufacturer or supplier is contracted to ship the commodities to District stores directly. For other districts commodities are sent to PPIUs or CWH for storage and onward distribution to districts because some districts have geographical proximity to PPIUs and CWH and are easily supplied through these storage facilities (PPIU, CWH). Once in the district store, the commodities are distributed to LHWs via First Level Care Facilities (FLCF).

LHWs report the consumption of health commodities in the monthly FLCF report which is developed at the FLCF level by the Incharge (physicians mostly) and submitted to District Health Office by the second week of every month.

The District prepares a summary of all reports and sends it to Province. The Provinces analyze the logistics data on regular basis to quantify and plan procurements and also sends feedback reports to Districts. The feedback could be informal during the monitoring visits or formally in the form of letters and communications.. The districts are supplied by PPIUs based on their orders.

Show **slide 15, 'Job descriptions for Logistics Staff'**. Tell students that flow charts gives an overview of various logistics related positions

and their reporting lines in public sector. Ask students to categorize various job responsibilities each staff has. They may say:

- Warehousing
- Ordering and receipt of commodities
- Distribution
- Reporting
- or others

List all these categories on flip charts. Ask students to list responsibilities under each category for all positions. Ask students to share their own job responsibilities or their knowledge of functions performed by various levels. Tell students that details of job descriptions are available in Student Workbook and they can go through it later.

Tell students to note that in their **Workbooks** there are two additional documents that help explain how commodities and LMIS reports move within the Pakistan Public Health system. They are **Contraceptive Supply and Reporting Flow** and the **Pipeline for Health Commodities for Lady Health Workers Program**. Both have flow charts and explanations included. Encourage students to review these when they can.

Next tell students that you have some questions for them. Encourage sharing of ideas from maximum number of students. These can be shown using **slide 16** if the Lecturer wishes.

Only provide the answers for each question once no new ideas are shared by students. The answers are given below.

**Question:** What is the level at which dispensing is taking place?

**Answer:** the dispensing takes place at service delivery points e.g. Lady Health Workers, BHUs, RHCs, THQs, FWC, MSUs etc.

**Question:** What are the levels where issuing of commodities is taking place

**Answer:** Commodities are issued from Central Warehouse, PPIUs and District stores

**Question:** identify whether the requisitioning process for contraceptives is 'push' or 'pull'

**Answer:** the contraceptives are requisitions through a pull mechanism whereby each department sends the requisition to CWH (via District Population Welfare Office) based on their recent consumption

Close the activity by telling students that for homework tonight they should read in **The Logistics Handbook Chapter 1, Introduction to Logistics, pages 1-16**.

## 6. Cheater's Quiz – 15 minutes

This activity can be presented in two ways, the regular version or the fast version, depending on availability of time. Answers are attached below. (An additional option would be to give the Cheater's Quiz as homework, telling the students to work together after class to answer all of the questions correctly.)

### Regular version

Ask students to open their **Workbook** to: **Cheater's Quiz** and explain these points:

- The quiz will not be returned to the lecturers. You do not have to put your name on it.
- The only rule is that you must cheat! Take five minutes to answer the questions, and then cheat with one of your neighbors to see if you can get all the answers correct.
- It is expected that most students will get a good grade on this quiz.

Five minutes after the quiz is given, remind students that they should begin cheating with a neighbor.

On an individual basis, encourage slower students to find neighbors to work with.

After nine minutes give a one-minute warning, after which you will ask for a volunteer to give the first answer.

At the end of the final minute, tell the students to stop where they are. Then ask for volunteers to answer each of the questions. Clarify points as needed so that everyone understands the correct answer.

When all of the questions have been answered correctly, ask how many cheaters got at least 80% correct, at least 90%, and if any got 100%.

### Fast version

Have students open their **Workbooks** to the Cheater's Quiz. Tell students they we will all cheat together to answer the questions in the quiz.

Go through the questions one by one and ask for a volunteer to answer each question. Clarify points as needed so that everyone understands the correct answer.

## Session Conclusion

Summarize by saying that in this session we have covered several basic concepts:

- the purpose of a logistics system, which is to achieve the Six Rights,
- the Logistics Cycle,
- pipeline,
- lead time,
- allocation systems vs. requisition systems,
- dispensed data vs. issues data
- elements of Pakistan's system

Comment that throughout this session students learned some the basic principles of logistics that apply to systems that manage products that are generally in full supply, such as contraceptives or TB drugs.

Note that later in the course we will discuss how some of these principles may not be applicable if products are in limited supply and must be rationed. In the next session we will proceed with a hands-on application of these terms. If you have any doubt about the meanings or use of these terms, please ask a Lecturer during the break.

### **Synthesis Questions**

For Lecturer to ensure key concepts are understood

1. Cite the purpose of a logistics system, which is to achieve the Six Rights.
2. Describe the components of the Logistics Cycle.
3. Define pipeline.
4. Define lead time.
5. Describe the difference between a push system and a pull system.
6. Describe the difference between dispensed data vs. issues data.

## **List of logistics activities for Activity #2**

1. Receive products at port of entry
2. Transport products by bicycle or on foot
3. Ensure products are clearly labelled
4. Perform customs clearance procedures
5. Determine size of packages
6. Dispense products to the client
7. Apply First-Expiry, First-Out
8. Organize the warehouse or storage facility
9. Pack/unpack cartons of products
10. Count the number of products available for use
11. Transport products by airplane or by ship
12. Perform quality testing
13. Enter information into records
14. Repackage products into smaller size containers
15. Complete a monthly/ quarterly logistics report
16. Follow proper storage guidelines
17. Ensure availability of adequate storage space
18. Transport products by truck
19. Update logistics records
20. Verify quantities received or issued
21. Complete an issue or receipt voucher
22. Procure raw materials
23. Produce products from raw materials
24. Conduct laboratory tests

**CHEATER'S QUIZ**  
**Answer Sheet**

1. Three (3) activities in the logistics cycle are \_\_\_\_\_,  
\_\_\_\_\_ and \_\_\_\_\_.  
*Choose from Serving Customers, Product Selection, Quantification, Procurement, Inventory Management (storage/distribution), Quality Monitoring, Maintaining the LMIS*
2. Where does Quality Monitoring fit in the Logistics Cycle?  
*Throughout the cycle*
3. Why are LMIS data gathered?  
\_\_\_\_\_.  
*To help managers make informed decisions to ensure product availability.*
4. How does a well functioning logistics system help the population and save the country money?  
\_\_\_\_\_  
  
*It improves health services by making products available to all who need them on a regular basis. It prevents stockouts. A well running system reduces waste through overstock, expiries, and damaged products. Can also reduce thefts of products.*
5. Name the 6 Rights of logistics.  

1. ___ QUANTITIES _____	4. ___ TIME _____
2. ___ GOODS _____	5. ___ CONDITION _____
3. ___ PLACE _____	6. ___ COST _____

Circle TRUE if the statement is true or FALSE if the statement is false:

6)	An example of lead time would be the three days it takes for your order to get to the regional warehouse. It also includes the time it takes to get to you and the time it takes to make it available for use.	TRUE	<b><u>FALSE</u></b>
7)	Dispensed-to-user data comes only from Service Delivery Points (SDPs) or Lady Health Workers.	<b><u>TRUE</u></b>	FALSE
8)	In a Demand or Request system, decision-making is centralized.	TRUE	<b><u>FALSE</u></b>
9)	A pipeline is all the storage facilities in a system. Also includes the transportation involved	<b><u>TRUE</u></b>	FALSE
10)	The pipeline for Health Commodities (other than contraceptives) for LHW program flows in this order: Central, PPIU, District Store, First Level, Lady Health Workers	<b><u>TRUE</u></b>	FALSE

## 4. Logistics Management Information Systems

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### Session Objectives:

By the end of the session students will be able to:

2. Describe the purpose of the logistics management information system
3. List essential data for logistics management
4. List 3 types of logistics forms and examples of each type
5. Describe the purpose of reporting and examples of different reporting systems
6. Assess Logistics Management Information System (LMIS) forms and Recommend changes if necessary
7. Identify data items that are specifically required to manage commodities other than RH and essential drugs
8. Relate the required program-specific data items to program-specific commodity and commodity management issues
9. Describe the purpose of feedback reports and identify types of information that would be useful in feedback reports

**Time:** 310 minutes (5 hrs and 10 minutes)

**Homework:** Before this session have student read Chapter 2 in the Logistics Handbook page 17-42

### Materials:

1. Flip chart, markers

### Flipcharts:

1. Graph of pipeline showing flow of commodities and information / types of data moving through the system – (see Activity 3)
2. “ Questions for Reports

### PowerPoint Slides:

1. Session Title Slide
2. 3 Essential Data Items
3. LMIS Forms Exercise (title slide)
4. Sample Form for Small Group Exercise: Supplies Ledger Card
5. Sample Form for Small Group Exercise: Form No. 6: ICR
6. Sample Form for Small Group Exercise: Inventory Control Card
7. Sample Form for Small Group Exercise: Bill of Lading
8. Sample Form for Small Group Exercise: Requisition Form
9. Sample Form for Small Group Exercise: Issue Voucher
10. Sample Form for Small Group Exercise: Receive Report
11. Sample Form for Small Group Exercise: Requisition and Issue Voucher
12. Sample Form for Small Group Exercise: 4-part Requisition and Issue Voucher

13. Sample Form for Small Group Exercise: 3-part Issue Voucher
14. Sample Form for Small Group Exercise: Family Planning Daily Tick Sheet (Dispensed to User Form)
15. Sample Form for Small Group Exercise: Daily Activity Form (Family Planning)
16. Quarterly Report & Request for Contraceptives
17. Pakistan LMIS Forms Title slide
18. Populations Welfare Department
19. PWD LMIS forms
20. Stock Register (CLR-5)
21. Description – Stock Register
22. Integrated Requisitioning - CLR-6
23. Description – Integrated CLR 6
24. District Contraceptive Stock Report (CLR-15)
25. Description - District Contraceptive Stock Report II (CLR-15)
26. Department of Health
27. Bin Card
28. Description – Bin Card
29. First Level Care Facility Monthly Report
30. FLCF - Continued

### Lecturer Preparation:

Review the PowerPoint presentation corresponding to this session in advance, to become familiar with the materials it includes.

Be familiar with Activity 2 and the LMIS forms used for that activity.

Create a 4-part **Requisition, Issues and Receipt Voucher** using four different colored pages to represent each part. See Requisition Issue and Receipt Voucher Demonstration in these Lecturer notes.

Student Preparation: Homework Assignment

If possible before this session ask students to read chapter two in the Logistics Handbook - Logistics Management Information Systems, pages 17 - 42.

### Learning Activities Summary

Title	Type	Time
1. Purpose of LMIS	Interactive Lecturette	20
2. Logistics Forms	Small Group Work & Discussion	110
3. Summary Reporting and Reporting Systems	Interactive Lecturette	60

4. Sample Pakistan LMIS forms	Lecturette	60
5. Feedback Reports	Brainstorm & Interactive Lecturette	60

## Learning Activities:

### 1. Purpose of LMIS – Interactive Lecturette – 20 minutes

Given what they know about public health logistics and their own experiences, ask students what they think is the purpose of a logistics management information system. Take responses and list on the board.

For those with experience ask:

- What kinds of information do they need to make decisions about supply availability?
- What kinds of information does one routinely need to make decisions to operate a logistics system? What data is needed?

Summarize answers by saying that the purpose of the logistics management information system, also known as LMIS, is not to generate paper, but it is the system of forms and reports that are used to collect, organize, and present logistics data gathered across all levels of the system. Ultimately, this logistics data is presented to improve management decisions that govern the logistics system.

Point out that the most frequent cause of information systems failures is that they do not aim at supporting specific decisions. The only information that should be gathered is information which supports the specific decisions which need to be made.

Go back to the list of data and ask students if there is any data they would need to make logistics decisions that is not included on the list. Add to the list. LMIS is different from a health management information system (HMIS). HMIS collect data about patient's health conditions or health services rendered whereas LMIS collects data about commodities.

### 3 essential data items

Go over each item and clarify if the data item is important for managing commodity flow. Summarize by showing **Slide 2: Three Essential Data Items**. Emphasize that these are the three MINIMAL and ESSENTIAL items needed to be collected to run any supply system. Note that these are found on page 19 of the Handbook:

1. Stock on Hand: Quantities of usable stock available at any level or at all levels of the system at a point in time.

2. Rate of Consumption: The average quantity of commodities dispensed to users during a particular time period.
3. Losses/Adjustments: Losses are the quantity of health commodities removed from the distribution system for any reason other than consumption by clients (e.g., losses, expiry, damage). Adjustments may include receipt or issue of supplies to/from one facility to another at the same level (e.g., a transfer) or a correction for an error in counting. Losses/adjustments may therefore be a negative or positive number.

Stress that every system, even in the commercial sector, has losses. They try to keep the rate as close as possible to 0%, but that is not consistently possible. Even Toyota, for example, with all their technology has a loss rate. They cannot have zero losses. And if you think of other examples, you know there have to be losses. Think for example, of a baker selling bread, or a petrol station where some fuel is spilled on the ground or a little is stolen. If a tailor makes clothing, some cloth is lost or some garments are not perfect.

Briefly discuss each. Especially note that losses/adjustments may be positive. Note that adjustments are used to avoid double-counting, such as when a clinic issues supplies to transfer to another clinic, these should not be counted under consumption.

Ask students if losses are always reported? Is that data easy to collect? Note that as logisticians we want to collect losses and adjustments because we want to have all the data on what happened to our commodities. From the program perspective, if you were the storekeeper would you want to report your losses? Probably not.

However, it needs to be encouraged and reinforced that reporting losses and adjustments is important; it just might be harder information to get 100% compliance on in reporting.

If it comes up, note that collecting data through the LMIS will allow us to calculate lead-time. Items like max/min levels and re-order intervals are part of the system design and are not, therefore, collected on forms or reports.

## **2. Logistics Forms – Small Group Work and Discussion – 110 minutes**

Introduce this section with a lecturette explaining that there are only three activities that happen to supplies within a logistics system, supplies are stored in inventory, supplies are moved between facilities, and supplies are dispensed to users. (Facilitator may wish to use 2 boxes to help visualize these activities.) Therefore, there must be three types of forms in the logistics MIS:

- stockkeeping forms
- transaction forms
- consumption forms

Notice that there is one type of form for each activity.

Write these on a flip chart. Note that the types can be found on page 19 of their Logistics Handbooks.

### Small Group Activity

Explain to students that they are now going to do an activity where they will have an opportunity to look at a number of examples of these forms. Break students up quickly into small convenient groups of four or five, usually near where they are already sitting as a group. In a few cases it may be useful to mix in some student with more experience so that more small groups have an experienced person. and ask them to sit together. Ask students to open their **Workbooks** to Session 4 **Exercise on Logistics Forms**, and go over the instructions found on the first page.

Explain to students they will have 45 minutes to complete their work and that they should do the tasks in the order they are presented in the exercise: begin by classifying ALL of the forms, then list the information that should be included in each type of form, and then make specific comments about the specific forms.

**Note:** The facilitator must keep special track of time; the students have only about 5 minutes for each of the forms.

After 45 minutes call time and tell the students that we will now review each of the LMIS forms that they examined, and that we will look at the forms by category: first we will look at the stockkeeping forms, then we will look at the transaction forms, and finally we will look at the consumption forms.

**Note:** The Lecturer also needs to keep track of time during these discussions as a lot of questions and discussions can come up. Five or ten minutes per form will usually be enough. If time is running out, then the facilitator should focus on only a few examples of the different forms; it would not be necessary to discuss every form in detail.

Have slides of the forms ready to show the class to ensure everyone is looking at the same form.

### Small Group Activity Discussion: Stockkeeping Forms

**Note:** A summary of points related to stockkeeping forms is included after the form-specific points listed here.

Before starting the discussion of the forms, ask students to name the type of data that is collected on stock-keeping forms. Write students' answers on the board.

Answers should include: Stock on Hand, Losses & Adjustments, and possibly Quantity to Order or Quantity on Order. Transactions such as receipts and issues could also be included. Then ask students to list the different types of stock-keeping forms. List their answers on the board. Mention that there can be different names for these forms from one system to another. Ask who knows what these stockkeeping forms are called in the Pakistani system. Hopefully students come up with the following:

Bin cards,  
inventory control cards or stock cards,  
stores ledgers.  
Stock Register

The names do not matter greatly, however, since they are all stockkeeping forms.

Ask for a group to volunteer to present its findings on the forms for the stockkeeping forms. Once the group has volunteered, begin the discussion by asking the group members to identify which forms from the set they examined are stockkeeping forms.

Students should respond:

- Supplies Ledger Card (HO1, pg. 2 ) (Slide 4)
- FORM NO. 6: ICR (HO1, pg. 3) (Slide 5)

Once the names of the stockkeeping forms have been identified, ask the group to present its findings for each of the stockkeeping forms. As each stockkeeping form is being discussed, show the form using the PowerPoint slide (or transparency version). For each form, students from the other groups can contribute their ideas once the original presenting group has given its findings.

Start by asking the students what essential logistics data should be found on any well designed stockkeeping form. Students should respond: stock on hand and losses/adjustments. Tell the students that we will now look at the specific forms and answer question #3 from the assignment.

Discussion points for the stockkeeping form should include:

**Supplies Ledger Card (HO1, pg. 2) (Slide 4)**

Good points:

- Contains the product identification information that identifies the product.
- Columns are clearly identified.
- Current stock on hand data is easy to find, in the “balances” column/quantity.

Areas to improve:

- There is no clear indication of losses/adjustments. It would be preferable to have a separate column, or even better two columns, for this purpose. Without the specific column, instructions would have to be given on how to note losses or other adjustments, for instance, by using the “receipts” column for positive adjustments and the “issues” column for negative adjustments. In this case, the “reference” column could contain a comment such as “transfer to [name of receiving facility]” or “loss due to expiry”.
- The columns for quantity are too small to be used easily, perhaps unless you are always managing less than 100 or so of the item.
- There is no need for “unit cost” and “total cost” from the logistics standpoint, nor does it make sense for the product manager/storekeeper to keep track of this information. It appears, however, that the country that uses this form actually does require financial information to be tracked on the stockkeeping form; notice that the name of the form is “Accounting Form (No. 64)”; however, tracking commodity cost/price information on a stockkeeping form is not generally recommended.
- “Balance carried forward” noted at the bottom of the card might be more appropriately put on the first line of the transaction area of the card.
- There is no column or space for signatures or initials, but note that some systems do fine without the signatures or initials each time a transaction is made.
- No space for writing any needed remarks/comments related to the transaction.

#### **FORM NO. 6: ICR (HO1, pg. 2) (Slide 5)**

Good points:

- The “Quantity Transferred/Returned/Destroyed” column accounts for most types of losses/adjustments.
- Columns are clearly identified.
- Current stock on hand data is easy to find, in the “balance on hand” column/usable.
- Adequate space to write the transaction information.

- Includes a space for signature and remarks.
- Clear link to the transaction form related to the transaction.
- Contains the product identification information that identifies the product.

Areas to improve:

- The widths of the columns where quantities are written are too narrow.
- Questionable value in tracking “Balance on Hand/Not Usable”, particularly on the same form as usable quantities.

### Summary discussion points related to Stockkeeping Forms

Summarize the discussion of stockkeeping forms by noting that stockkeeping forms are generally of two kinds:

- bin cards are stockkeeping forms which are generally kept one bin card per lot, batch or expiry date; bin cards are kept with the products on the storeroom shelves/pallets, and
- inventory control cards, which generally have one per commodity, are sometimes kept in ledger or book form, and may be kept in the product manager’s office

Note that smaller facilities will usually use only one type of stockkeeping form, a bin card or an inventory control card, whereas larger warehouses may use both bin cards (kept with the products) and inventory control cards (kept in the office).

Stockkeeping forms must contain at least the following data.

- the balance of stock on hand at any time
- losses and adjustments

Stockkeeping forms can also include information related to quantity to order for each product each time an order is placed (for pull systems), or quantity to allocate (for push systems)

**Note:** Quantity to order information is preferably expressed in terms of max/min levels and months of stock, less desirably in terms of units. However, if a max/min system is not being used, then the order quantity may be expressed in absolute quantities of products.

Be sure students understand what we mean by the terms “units” and “transactions.”

## Small Group Activity Discussion: Transaction forms

Note: A summary of points related to transaction forms is included after the form-specific points listed here.

Before starting the discussion of the forms, ask students to name the type of data that is collected on transaction forms. Write students' answers on a flipchart. Answers should include: quantity of product being ordered/shipped/received; authorization to issue, etc; other signatures, proof of receipt, dates, etc. Then ask students to list the different types of transaction forms. List their answers on a flipchart. Hopefully students come up with the following: Requisition and issue vouchers, issue vouchers, packing slips, delivery notes.

Ask for a group to volunteer to present its findings on the transaction forms. Once the group has volunteered, begin the discussion by asking the group members to identify which forms from the set they examined are transaction forms.

Students should respond:

- Scan Global Logistics (Slide 7)
- His Majesty's Government ... Requisition Form (Slide 8)
- His Majesty's Government ... Issue Voucher (Slide 9)
- His Majesty's Government ... Receive Report (Slide 10)
- Requisition and Issue Voucher (Slide 11)

Explain that we will be studying the 2<sup>nd</sup>, 4<sup>th</sup> and 5<sup>th</sup> of the forms, that is to say the Requisition Form, the Receive Report, and the Requisition and Issue Voucher.

Ask each group to present its findings for each of the transaction forms. As each transaction form is being discussed, show the form using the PowerPoint slide (or transparency version). For each form, students from the other groups can contribute their ideas once the original presenting group has given its findings.

Discussion for each specific transaction form should include:

### **His Majesty's Government ... Requisition Form (Slide 8)**

Good points:

- The form requires the information that is required for a requisition.
- The columns seem to provide enough space to write in the required information.
- The column headings are clearly marked.

Areas to improve:

- There is overlap with the “Supplied Quantities” column and the following Issue Voucher.
- The form could include drawn lines on which to write the information.
- There seems to be an excess number of signatures required to do the transaction.
- There is no way to verify if the requisition quantities are realistic or justified.

### **His Majesty’s Government ... Receive Report (Slide 10)**

Good points:

- The form requires the information that is required for a receipt.
- The columns seem to provide enough space to write in the required information.
- The column headings are clearly marked.

Areas to improve:

- It is unclear where the “rate” amount would come from; the issue voucher only notes the total cost.
- The form could include drawn lines on which to write the information.
- The form refers to a purchase order, yet we have only seen a Requisition Form and an Issue Voucher.

### **Requisition and Issues Voucher Slide (11)**

Good Points

- Has combined requisition and Issue to compare ordered with receipt
- Clear easy to read columns
- Information is well arranged on the form. Easy to follow where to start and end

Bad Points

- Unit Value and Total Value spaces are quite small
- May not need all the details at the bottom of the form like Property Officer/ Clerk
- “Purpose” column may not be necessary when requesting

## Summary discussion points related to Transaction Forms

Summarize the discussion of Transaction forms by noting that there are many types of transaction forms, including:

- packing slips
- receiving reports
- indent requests/requisitions
- Of course the specific name of a form may vary from one system to another. But the important question is, “Does it do what a transaction form is supposed to do?”

Transaction forms must contain at least the following data/information:

- quantity of commodity being ordered/shipped
- authorization to ship/receive commodity
- proof of receipt, usually by signing and dating the form

### Transaction Form Copies

Note that several copies need to be made of each transaction form so that each facility involved in the transaction can retain one. Even with increasing computerization at the higher levels of systems, much of the data starts out on hard copy and is first sent up on paper. In many systems, each portion of the transaction is tracked by a separate form; however, it is much better to use a single form with multiple copies to track a single transaction.

This strategy eliminates extra labor and reduces the chance for errors caused by copying the same information over and over from one form to the next. Using combined forms also allows you to track an entire transaction on a single piece of paper.

Explain that if combined forms are used for tracking transactions, the form is a little different for pull systems than for push systems; the Requisition and Issue Voucher is used for a pull system and an Issue Voucher is used for a push system.

Demonstrate how the two forms are used differently as noted below. Show who starts each and who gets the (carbon) copies.

### Requisition Issue and Receipt Voucher Demonstration

Show **Slide 12: Requisition, Issues and Receipt Voucher (RIRV)**  
Also have ready a printed 4-part version of the RIRV, with each part printed on a different color paper [see animated slide]. If possible, there should be two Facilitators to demonstrate the flow of the forms,

one facilitator to play the part of the lower level (ordering) facility, and the other to play the part of the higher level (issuing) facility. If there are two Facilitators, demonstrate the four steps below by handing the form(s) back and forth; if there is only one Facilitator, use a flip chart diagram with arrows between the two administrative levels drawn on the flip chart, and use tape to stick the form(s) on the appropriate facility at each step.

The steps are:

1. The requesting facility (lower level) fills out 4 copies with the amount requested. The facility keeps 1 copy in a confirmation file so that they can be sure the order eventually gets filled, and sends 3 copies to the higher level facility.
2. The issuing facility (higher level) fills out the three copies they get with the quantities issued. The issuing facility keeps 1 copy in a tickler file, and sends two copies to lower level facility with the commodities.
3. The lower level facility completes the 2 copies they receive with the amount received. The form is now complete. The facility keeps one copy of the completed form, and discards the tickler copy. The facility sends the remaining copy of the completed form back to the higher level facility. At the end of the transaction, both facilities have complete copies that show all steps of the transaction.

Remind the students that the RIRV is used in a pull system, and that the transaction begins at the lower level (ordering) facility.

### Small Group Activity Discussion: Consumption Forms

Note: A summary of points related to consumption forms is included after the form-specific points listed here.

Before jumping into the discussion of the forms, ask students to name the type of data that is collected on consumption forms. Write students' answers on a flipchart. Answers should include: quantity dispensed to user, time period/date, signatures, etc. What did the forms look like? What sort of data was on them? List their answers on a flipchart. Hopefully students come up with the following: daily activity registers/logs and tick/tally sheets.

Ask for a group to volunteer to present its findings on the packet of forms for the consumption forms. Once the group has volunteered, begin the discussion by asking the group members to identify which forms from the set they examined are consumption forms.

Students should respond:

- Daily Activity Register (HO 1, pg. (13) (Slide 18)
- Dispensed to User Record Daily Tick Sheet (Malawi Family Planning Tally sheet)

Ask the group to present its findings for each of the consumption forms. As each consumption form is being discussed, show the form using the PowerPoint slide (or transparency version). For each form, students from the other groups can contribute their ideas once the original presenting group has given its findings.

#### Daily Activity Register (Family Planning) (HO 1, pg. 13) (Slide 15)

Good points:

- Allows for collection of some service statistics without impeding collection of logistics data.
- Collects information on the brand and type of contraceptive
- Area for comments/remarks

Areas to improve:

- Adequate space to write daily or monthly totals but unclear from form if both are required.
- No space to write new products that might come into the system
- Small area for comments/remarks
- No specific area for initials of dispenser
- Unclear why are gloves formed but not other supplies such as needles, syringes, etc.

#### Dispensed to User Record

Good Points

- Simple columns – not crowded

Areas to improve:

- Small print
- Tick marks too close – easy to circle two at once
- Instructions at bottom hard to read

#### Summary discussion points related to Consumption Forms

Summarize the discussion of consumption forms by noting that consumption forms can include:

- daily activity registers
- tick sheets

Consumption forms must contain at least the following data.

- dispensed to user data

Remind the students of the importance of dispensed to user data for supply management, emphasizing that these data give us the best picture of use for forecasting contraceptive requirements and ordering new supply.

Remind the students as well that dispensed to user data can only come from the service delivery point, where the products are actually given to the clients.

### Relationship among forms

Once all of the various types of forms have been presented and discussed, point out that there is a relationship among the different types of logistics forms.

Explain that stockkeeping forms should be cross-checked against the daily activity register on a periodic basis, to ensure that quantities shown as taken out of inventory have in fact been dispensed to clients. Also show how the reference number from an IV or RIRV is transferred back onto the stockkeeping form.

A couple important discussion questions could be these:

If only transaction forms travel, where does the data come from to put on the transaction forms?

If a clinic distributes 15 different products, how many inventory keeping forms does it need to have?

Which kind of form do you think is easiest to explain to a new person?

Summarize by saying that these three types of forms are all you need to control the flow of health commodities, and that the three essential data items are what you need to ensure the Six Rights.

### 3. Reports, Summary Reporting and Reporting Systems – Interactive Lecturette – 60 minutes

#### 6 Rights of LMIS

After completing the presentation of the three types of forms and the discussion of the sample forms of each type, remind the students that the point of collecting all this data is not simply for the sake of collecting data, but because somebody needs it.

In fact, we can apply the Six Rights to the logistics management information system, too. Ask students to list the Six Rights. Then ask how they can be applied to LMIS. Note that we need the right information in the right quantity and the right quality (condition) to get to the right place at the right time.

Ask the students to comment about “the right cost.” In what way do we need to consider “cost” implications when designing and implementing an LMIS? The students can respond, or the facilitator can comment that we need to take into account at least the following factors:

- The LMIS should not be so difficult to manage that it takes an unreasonable amount of time; forms should be easy to understand, easy to complete, reduce the risk of introducing errors.
- The number of forms should be limited to what is actually needed; This reduces printing costs and ease-of-use, and it improves accuracy and makes training simpler and faster.

Ask students what we require in our overall LMIS, in addition to the forms, to get the data to the people who need it. Students should respond, or the facilitator can comment that the data is moved through a system of summary reporting. Ask students what data needs to be passed up the system (if necessary, refer back to the beginning of the session where we discussed the essential data for managing a logistics system). Answers should minimally include:

- stock on hand
- consumption data
- losses/adjustments

Mention that decision makers at each level require data to make different kinds of decisions. For instance, the central level or program level might use the data to determine long-term product requirements, whereas a district might use the data for monthly re-supply, or to redistribute products from overstocked to understocked facilities.

Show students an example of a summary report, **Slide 16: Quarterly Report and Request for Contraceptives**. Ask students the following:

This report is a combined report and request. What are the advantages or disadvantages of this?

- Advantages: Eliminates the need for a separate ordering form. This also helps supervisors since they can see directly if the order is in line with the consumption. It also helps encourage reporting.
- Disadvantages: Requires a separate transaction form for issuing.

What data is reported? Is it enough?

- Answer: The form only reports the essential data needed to run the logistics system. This makes the form easy to complete.

Look at the way in which the report is completed. This is a “self-balancing” form—that is, the form works mathematically. Why would you want to do this?

- Answer: This is a major advantage for reviewing forms for working with staff on supervisory visits. When the math works correctly, the order quantity is likely to be logical. Also, the beginning balance from this report should equal the ending balance from the last month.

The format allows this report to be used at all levels. What advantages does this offer?

- Answer: It saves on printing costs. It also is easier to supervise since it is the same as the form you know how to complete. Those who are promoted also are familiar with the report.

If time permits, show one or more of the participant LMIS reports and discuss each.

Ask students to open their **Workbook** to Session 4, **Logistics Forms and Reports** and note that this summarizes our discussion of forms and notes the data required on summary reports.

## Examination of Reports

Tell students that we are now going to look at some reports that are used in different countries so they can get a better understanding of their purpose and the data they contain.

Ask students to open up their **Student Workbooks** to the **LMIS Reports** section

Post the flip chart: Questions for Reports with the following data below and tell students that for each form we want to know:

- 1) Are all three essential data items found?
- 2) What other data items are found on the form and are they necessary?

3) Is the form easy to use?

4) What changes would you make if any to each report?

Give the students a minute or so to review each report then go through each and discuss with the group the above questions. The facilitator should question students for as much detail and clarification as possible with the time allowed being sure they understand the key elements needed in a report.

After all the reports have been processed be sure that the following points are covered:

- Program specific commodities may have specific LMIS/reporting requirements above the three essential logistic data items
- The three essential data items are still required, though the collection and reporting of the data may be slightly different (e.g. more details related to losses).
- An LMIS should always focus on data for decision making – if the data collected is not useful then it will only be a burden

## Reporting Systems

Tell the students that we have just seen examples of logistics report formats. Remind the students that the report itself is only one element of the reporting system. The other element is how those reports will move from the lower levels to the upper levels. Explain that there are several considerations when developing a reporting system that we will now discuss. These include (write on flip chart):

- Where reports are sent
- Aggregation of reported data
- Frequency of reporting

Explain to students that we will now consider these, but note that reporting systems are very specific to each country, as they must reflect the country's distribution system, program requirements, and other local situations, so what we will be discussing are some general considerations.

### Where reports are sent

Begin by drawing a pipeline of 3 levels: central warehouse, district warehouse, and clinics. Or, better yet, if the lecturer or students know what the various pipelines in Pakistan look like, draw one or more of

the Pakistan pipelines. Pakistan is a country that has different pipelines for different types of health products.

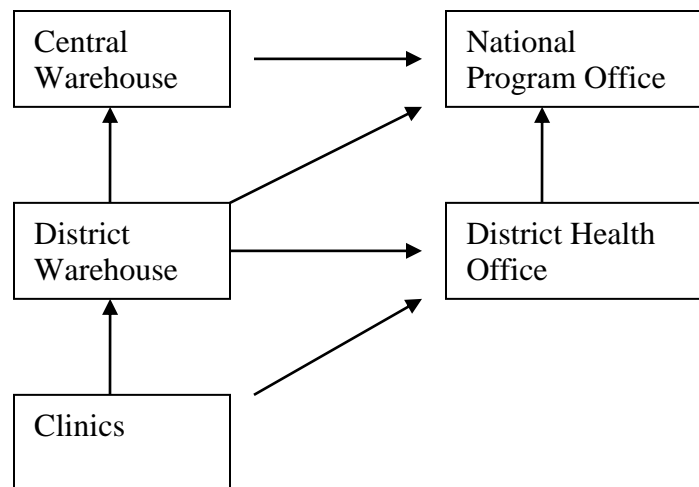
Ask students how the reports would normally flow in this pipeline or any pipeline. They should answer that the reports would normally flow from the clinics to the district and from the district to the central level. Draw arrows indicating the flow of reporting on the diagram.

Ask students who in a logistics system needs logistics data. They should answer anyone who makes logistics decisions.

Ask students who at the district level may need logistics data for decision-making, in addition to the district warehouse. Discuss the possibility that the district health authorities may need logistics data to supervise and monitor activities in the district

Go back to the diagram and add another unit to the district level. Draw an arrow from the clinics to the district health office. Ask if the district health office needs to have information about the stock in the district warehouse. Note that this is usually the case and draw an arrow from the district warehouse to the district health office.

Continue in the same manner with the central level discussing who needs logistics data and completing the diagram. In the end, the flip chart should look like this: (The diagram below is a simple and easy to understand one, but if it is possible, try to use one of the Pakistan pipelines, or both this simple one and the Pakistani one!)



Summarize that the important point is to determine who needs the logistics data and how they get the data – usually by receiving reports.

#### Aggregation of reported data

Briefly discuss the aggregation of data. Refer back to the pipeline diagram. Ask the students how data should be handled at the district

level: Should the district report only for its store, for the clinics it serves, or a combination of both?

Mention that while computerization is helping at the higher levels of some systems, the aggregation still has to be done by hand at some levels.

Ask the students how their answer to this question would affect the district's ability to report completely and on time. Note, for example:

- If the district reports only for itself, the district should be able to report on time and completely. Plus, the district form, if properly designed, will self-balance. But the district would only be able to report issues data.
- If the district reports only for its clinics, the district may have difficulty in receiving all reports on time all the time. However, if the district adds up the data for all the clinics, and their forms were self-balancing, the total will be self-balancing. You will get all consumption data.
- If the district reports for a combination of the district and the clinics, the district may have the same difficulty in receiving all reports on time all the time. When the data is aggregated, the district form might not self-balance, depending on how the items are added. (For example, the report could only include consumption or issues, but not both.)

Tell the students that the best solution is to submit either one report for the district and one aggregated report for all clinics, or, even better, one report for the district and a copy of each clinic's report. That way the central level can supervise the entire system.

Timeliness in reporting is important. If you are at the district level, should you submit reports on time, or wait for one clinic to report? You may want to submit all of the reports you have on time, and then submit the balance of reports when they are received or with the next month's reports. Note that not receiving a report should be a signal to provide supervision to non-reporting facilities to see what can be done to improve timeliness in reporting.

Tell students that here are some questions to ask oneself to determine if the data needs to be aggregated or not:

- How visible does the facility-level data need to be higher up in the system?  
What decisions need to be made at what levels and what detail of data is needed?
- What are the current tasks and work responsibilities of staff that will be required to compile the aggregated data?
- Will aggregating data be too much of a burden?

- Which levels have required tools to aggregate?

Remind students that aggregated data is needed at the National Level for forecasting; however disaggregated data is best in order to monitor the logistics system by level.

### Frequency of reporting

Ask students how frequently reports should be sent. Explain the frequency of reporting depends on how quickly decision makers need logistics data. Note that different levels in the system may have different reporting periods and that reports are commonly sent monthly, bi-monthly or quarterly.

Point out that we have talked about the advantages of combining reporting and ordering. Ask students what they need to take into consideration in this case when determining the reporting period. Discuss that monthly reporting and ordering means that distribution should be monthly and transport should be available to accommodate this frequency.

Insert frequency of Pakistan reporting for different levels/ programs

### Other considerations

If time and attention spans permit, ask students what their experiences with reporting systems have been:

- What kinds of problems have they encountered?
- Did they find a successful solution?
- Do any of the example systems shown above suggest an improvement or solution to the problem they encountered?

If students have no experience to offer, refer them back to the Six Rights as applied to reporting. Ask the students what kinds of problems they might encounter where one or more of the Six Rights are not being met? Students may answer, or the facilitator may comment:

- The wrong information being collected
- The right people not getting the information
- Wrong frequency of reporting
- Under-reporting or inconsistent reporting
- Unreliable quality
- Right data reported but in wrong level of detail
- Etc.

#### 4. Representative Pakistan LMIS Forms– Lecture – 60 minutes

**Note:** Some of these forms are also available in the Student Workbook

Tell students that we have now looked at individual examples of LMIS forms and reports, and we have talked a little bit about reporting systems. We have seen some of the characteristics that make LMIS more or less easy to use and how reports can move within a system in order to help ensure that decision-makers have the data they need to make good decisions.

Tell the students that for this next activity they will have the opportunity to look at and analyze some of the forms used in Pakistan's public health logistics system.

Show title **slide 17**. Tell students that after understanding how the LMIS works and going through examples from other parts of the world, it will be important to understand Pakistan's LMIS forms. Ask students to recall what they learned from the earlier session on pipeline and reporting flow. The LMIS is depicted as the engine of supply chain management system. Pakistan has separate paper based LMIS systems for the Department of Health and the Population Welfare Department. The Population Welfare Department (PWD) only deals with contraceptives while Department of Health has other health commodities in addition to contraceptives.

Show **slide 18, 'Population Welfare Department'**. Tell students that we will discuss PWD forms in this section.

Show **slide 19, 'PWD LMIS forms'**. Tell students that we have chosen three basic forms from the PWD LMIS. Students can go through other forms available in 'Ministry of Population Welfare Logistics Manual' if they are interested. These three basic forms are

- Stock register: CLR-5
- Requisitioning form: CLR-6
- District Contraceptive Stock Report: CLR-15

Show **slide 20, 'Stock register (CLR-5)'**. Ask students to have a look at the stock register and identify what data is collected in this form. Ask students what experience they might have of working with this register. Encourage students to point out deficiencies if any.

Show **slide 21, 'Description – Stock Register'**. Tell students that the register is maintained by all warehouses and stores i.e. central and provincial warehouses, district stores, family welfare center stores and RHS-A centers.

The Stock Register is used to form stock transactions at a specific level. It holds the information from where the shipments are received and to where they are going along with the names of consignee. The storekeepers can thus refer back to it in case of any discrepancies.

The form also contains the signature and remarks of the person receiving or issuing the contraceptives. The Balance column (7)' indicates the balance brought forward from the previous register and the result of regular entries thereafter.

Tell students that If they wish they may refer to the this and other PWD forms in their **Student Workbook** in the page titled '**Population Welfare Department LMIS forms**'. The stock register is shown along with a brief introduction to it.

Show **slide 22, 'Integrated Requisitioning – CLR-6'**. Ask students to go through the various rows in integrated CLR-6. Tell students that row A-1 forms consumption at all the facilities for respective stakeholders. A-2 and A-3 give stock at the end of last quarter in district store and service delivery points respectively. A-4 is the total stock (sum of A-2 and A-3). The desired stock for two quarters is usually the twice that of consumption for the recent quarter (A-5)

Show **slide 23, 'Description – Integrated CLR-6'**. Tell students that this form is being used by all district level public sector Family Planning Service Providers (DPWO, DOH & LHW, PPHI) for requesting contraceptives from Central Warehouse. The new integrated CLR-6 is introduced in 2012 and it compiles requests from department of health and population at district level. This form indicates the stock status and consumption during the month and indicates the quantity requested for each contraceptive being used.

Show **slide 24, 'District Contraceptive Stock Report (CLR-15)'**. Tell students that District Contraceptive Report summarizes consumption data occurring at district level. From the report, one can figure out the quantities which were received by district and the quantities issued to service delivery points. Ask students to focus on the far left column titled "District Store" and tell them that it has the following basic indicators in separate rows (for part 1 which is for district store)

1. Opening balance
2. Received from CWH
3. Issued to field
4. Closing balance
  - a. District store
  - b. Field
5. Total
  - a. Expired stock
  - b. Untraceable stock

Each column is labelled for a commodity, and thus information on each commodity is captured in its specified column.

Show **slide 25, 'Description-District Contraceptive Stock Report (CLR-15) Part II**. Tell students that the report has two parts. Part-I related to the stock status at the District Store and Part-II indicates the stock and sales status at

various categories of the field operational units. The commodities issued from district store should be the same as received by field level. The commodities issued from field levels (indicated as sold in the form) are used as a proxy for consumption where 'dispense to user' data is not available.

This section is completed by the field and it has following indicators

1. Opening balance
2. Received from district store
3. Sold (as commodities are sold at facilities at nominal prices)
4. Closing balance

Each column is labelled at the top with a commodity and information on that commodity is formed in it.

Show **slide 26, 'Department of Health'**. Tell students that in this section they will discuss forms used by Department of Health (Lady Health Workers Program).'

Show **slide 27, 'Bin card'**. Ask students if they have used Bin cards in their routine work. Ask anyone of those who has experience to describe what it is and how it is filled. Tell students that one bin card is used for each commodity. The left most Date column is used to form date of any transaction.

The column labelled 'Quantity' will indicate quantities received or issued (noted in respective sub-columns). The balance is calculated by addition / subtraction from the opening balance.

Receipt: The commodities received from provincial or central warehouse depending upon the warehouse level

Issued: issued to service delivery points or the district stores depending upon the warehouse level

Have students open their **Workbook** to **LHW LMIS Forms Bin Card** and review the procedures with them for completing the Bin Card.

Show **slide 28, 'Description – Bin card'**. Tell students that bin card indicates the balance of an item available in stock; it must be used for all levels of storage facilities. They are only as good as how often they are updated however. Ask students to relate the example from the description given in earlier slide

- Show **slide 29, 'First level care facility (FLCF) report'**. Tell students that the FLCF report is prepared at the service delivery points (BHU, RHC) and sent to Districts within first week of the month. This FLCF report contains quantities received at the facility from DPIU. The report also provides quantities of commodities issued to LHWs or dispensed to clients directly from the facility. Quantities received from DPIU

- Quantities distributed to LHWs

Show **slide 30, FLCF - Continued**

- Present / current stock. This is calculated by adding any quantities received during the month to the previous months closing balance and deducting the amount issued to LHWs from the total.
- Days out of stock; the indicator reports the number of days a facility was stocked out of a particular commodity

Explain that these were a few of the LMIS forms used by the PWD and the LHW systems. Tell students that these systems, and the LMIS forms they use, are evolving and likely to change as new efficiencies are developed.

Here are examples of useful discussion questions that can be adapted to each group of students according to their needs and how well they have mastered the forms so far. The answers are in brackets?

1. Which form would be the easiest for a new person to understand and use? [probably the inventory control card, such as a stock card or bin card]
2. Which for is the most challenging mathematically? Why?[transaction forms, since the other two types have just addition and subtraction]
3. Which form(s) would never be computerized? [Probably the stock card and bid card.
4. Which form(s) have data on them that is aggregated? [all of them do, in so far as the data from the stock cards and consumption forms is put on the transaction form that is sent up to be eventually be aggregated.]
5. If you were visiting a store room, what form would you want to study closely? [stock card or bin card. There are no consumption forms or transaction forms in a store room.]
6. Which column on any of the forms is likely to have the most mathematical errors? [some discussion here, but it is probably the Quantity to Order column on the transaction form, since it requires the most calculations.]

## 5. Feedback Reports – Brainstorm and Interactive Lecturette – 60minutes

### Introduction

Tell the students that we have spent time now looking at summary reports and reporting systems, but that there is one additional element that we want to see in our LMIS and that we have not seen so far.

Ask the students to think back about the reports that we have seen already. Ask them to identify what the flow of those reports is. The students should respond that the reports flow from the lower levels up to the higher levels in the system. Ask the students to recall what the purpose of those reports is. The students should respond that the

purpose of those reports is to get data and information to decision makers for decision making.

### Feedback reports

Tell the students that there is another kind of report that should be found in an LMIS: feedback reports.

Ask the students what they understand by the term “feedback”. Students should answer, or the facilitator can comment that feedback is information given to someone that is based on information that they have received.

Tell the students that in this context, we can think of feedback reports in several ways:

- reports that present an analysis of the data that is sent up the system and which central level managers use;
- reports that are sent back to lower level personnel for their use;
- reports that are exchanged among central level partners.

Then ask students to discuss the purpose of feedback reports. Students can respond, or the facilitator can comment that feedback reports can:

- help managers make operational decisions, to monitor the performance of the system, and to manage the system;
- help lower level personnel know how the system is working at their level, to motivate them to improve performance, and to indicate any problems in the reports sent or stock levels.

Ask students to brainstorm what kinds of information they, as central level managers, would like to have in feedback reports. Note their answers on the board. Their answers should include at least:

- stock situation (related to max-min levels) by level
- stockouts by level
- timeliness/completeness/accuracy of reporting by facility
- receipts versus issues
- facility performance in terms of contraceptives dispensed

For each kind of information that the students identify, ask them how managers would use the information and what actions they would take based on the information.

Then ask students to brainstorm what information should be sent to reporting facilities in feedback reports. These may include:

- stock situation
- timeliness/completeness/accuracy of report
- facility performance in service and logistics compared to other similar facilities
- information, such as stock situation compared to established max-min, for one level to supervise the next level

For each kind of information that the students identify, ask them how the staff at the lower levels would use the information and what actions they would take based on the information.

Before starting the next activity tell students that a helpful resource for improving the quality of LMIS data is available in their Logistics Handbook on pg 41 within the blue box. Here they will find a summary of specific steps that can be taken to improve data: collection, reporting, monitoring, aggregation, analysis and automation.

### **Sample Feedback Reports**

Tell the students that we will now look briefly at some examples of feedback reports. Divide the students into groups of six, and tell them that each group will look at ONE sample feedback report and make observations. Note that depending on the number of students, there may be instances when two groups will study the same report, and that is OK.

Have students open their **Workbooks** to **Sample Feedback Reports**, and tell the students to take 10 minutes to look through their assigned report and think about the kinds of information that is included in the report and how the report is formatted.

At the end of the 10 minutes, go from group to group and ask each group to make a few observations.

Important points to highlight for each of the types of report:

#### Philippines Feedback Report:

- Information about reporting rates: useful as a general performance indicator; reminds facilities to report; higher levels can make adjustments for missing data
- Information about stockouts at the higher levels: allows lower levels to plan or seek to get products elsewhere

- Stockouts at the facility level: lets higher level staff know about stockouts and stockout trends; reminds lower level facilities to place emergency orders
- Reporting errors/inconsistencies: signals possible need for on-the-job training; correcting the mistakes results in better data accuracy
- Information on reporting delays: reminds facilities of the importance of on-time reporting

#### Excerpts from Bangladesh Feedback Report

Note: From the Table of Contents (Index) we can see that the full report is over 33 pages long; this is an extensive report and the sample in the **Student Workbook** only includes some sample pages from the report.

- Action list: clearly states what the situation is and what action to take (does not rely on the ability of the person receiving the report to interpret the information and decide what to do)
- Receipts/Distribution list: gives a global view of “performance” measured by quantities distributed; also allows each facility to know that they are contributing to that overall result
- “Best” and “Worst” performers, Congratulations/Unsatisfactory: the best performing facility is known by all who read the report; listing the “worst” might work as a motivational tool, but only by embarrassing the facility into improving its performance
- List of non-reporting facilities: reminds facilities to report; allows managers to see globally which facilities are not reporting; allows for adjustments in received data
- Stock status: informs upper levels of the situation and perhaps to initiate action; informs lower level facilities if products may be in short supply, so they can take other action to get products

Ask the students which of the feedback information found in the reports they would consider to be most important or crucial, i.e., if their system was not able to produce all of the information shown in all of these reports (and few systems can), which information would they want as a priority. Ask the students to identify a few key decisions that would require information on a regular basis through feedback reports.

Close this part of the session by emphasizing that:

- all logistics systems require a summary reporting system in some form for decision making (health commodities go down, information goes up);
- the design of the reporting system will have to be tailored to local needs;

- for reporting to be effective, there must be some feedback to the reporters;
- the six rights of the logistics system can and should be applied to the LMIS as well.

Close by having students read from their **Workbook - Management Decision Making**. Remind students that the goal of public health logistics is to ensure the six rights. All decisions seek to ensure these. As you learn more about the principles of logistics and the LMIS in Pakistan you will be able to better evaluate how the public health system in Pakistan does at making these important decisions and at ensuring commodity security for all who depend on the public health system. Is the system designed to support good decision making? Do decision makers get the information they need to make these decisions?

### **Synthesis Questions**

1. What is the purpose of a Logistics Management Information System (LMIS)?
2. What are the three essential data items that need to be collected to run any supply system? (stock on hand, rate of consumption, losses/adjustments)
3. What are the three types of records used in LMIS? (stock keeping, transaction, consumption)
4. What is the difference between Records and Reports in a LMIS?
5. What are the minimum data elements required in Stock Keeping Records? (The balance of stock on hand at any time and losses/adjustments)
6. What are the six rights of LMIS?
7. What is the Stock register form (CLR-5) used for in the Pakistan system?

## 5. Health Commodity Storage and Distribution

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### **Session Objectives:**

By the end of the session students will be able to:

1. List the guidelines for the proper storage of health commodities including HIV/AIDS commodities
2. Resolve selected product-related problems commonly found in warehouses or clinics
3. Identify special storage considerations for program-specific commodities
4. Conduct a visual inspection of a warehouse according to the guidelines and principles of proper storage
5. Identify through visual inspection common quality problems
6. Calculate storage space requirements.
7. Identify the basic steps of health care waste management
8. Name elements needed to design and manage a distribution system

**Time:** 195 minutes

### **Materials:**

1. Logistics Handbook
2. Student Workbook
3. Guidelines for Storage of Essential Medicines and Other Health Commodities booklet (distribute one to each participant)
4. Guidelines for Warehousing Health Commodities (one copy as a reference only)
5. Transport Management: A Self-Learning Guide for Local Transport Managers of Public Health Services (one copy as a reference only)
6. ARV Fact Sheets (one copy as a reference only)
7. HIV Test Kits Fact Sheets (one copy as a reference only)
8. Contraceptive Fact Sheets (one copy as a reference only)

### **PowerPoint Slides:**

1. Session Title
2. Purpose of Storage
3. Shelf Life
4. Formula to Calculate Storage Space Requirements
5. Steps to Calculate Storage Space Requirements
6. Maintaining a Distribution System - Operations Management.
7. Maintaining a Distribution System - Health/Safety and Human Resources.
8. Maintaining a Distribution System - Policy and Policy Development.

### **Prepared board or flipchart:**

Questions for “Low cost/no cost Strategies” activity

### **Lecturer Preparation:**

Measure the class room and calculate the number of square meters; this information can be used in the Calculating Storage Space Requirements activity.

Lecturer should be familiar with the Guidelines for the Storage of Essential Medicines Scavenger Hunt and its answers

Write up on flip chart questions listed in Activity 3 “Questions for low cost/no cost strategies”

Lecturer should review the PowerPoint presentation corresponding to this session in advance, to become familiar with its use and with the materials it includes.

Lecturer’s Note: If you will have students that are working in the public health system you may consider providing them with copies of Guidelines for Proper Storage of Health Commodities. These can be put up at their storage facilities to help ensure better storage practices. A copy of this can be found at the end of these notes.

### Learning Activities Summary

Title	Type	Time
1. Introduction to the Session: The Purpose of Storage	Lecturette	10
2. Shelf Life	Lecturette	10
3. Storage Guidelines(can also be used as a homework assignment)	Large group discussion & Individual work	45
4. Special Considerations for Program-specific Products	Large Group Discussion & Small Group Exercise	15
5. Routine Visual Inspection	Large Group Discussion & Pairs Exercise	45
6. Calculating Space Requirements	Lecturette & Large Group Exercise	45
7. Two Elements of Distribution	Group Discussion	20
8. Session Summary	Lecturette	5

### Learning Activities:

#### 1) Introduction to the Session: The Purpose of Storage – Lecturette – 10 minutes

Introduce the session by telling products are stored at every level within the pipeline, with every player responsible for product storage.

Ask the students what they think the purpose of storage is. Take a few of their answers, then Display **Slide 2: Purpose of Storage** and summarize by saying that the two major purposes of storage are to:

- protect the quality of the product and its packaging throughout the supply chain
- make the product available for distribution

Recap by saying that storage ensures that the physical integrity and safety of products and their packaging until they are dispensed to clients and that they are stored for most efficient distribution. In order to accomplish this there are some key storage activities which include:

- Material receiving and incoming inspection – this activity occurs during the unloading of vehicles and includes visual inspection of delivered packages to insure nothing was damaged in transit.
- Put away – this process includes moving products from where they are received and assigning them to their designated storage area.
- Picking and packing – to fill shipping requests, products must be located, pulled from inventory, and prepared for shipment. This activity also requires correct labeling.
- To guarantee good shipping accuracy, the list of products and their quantities must be checked against shipping orders and then arranged and secured within the vehicle correctly to avoid transit damage.

Mention to the students that much of the content of this session can be found in Chapter 8 of The Logistics Handbook.

## 2. Shelf Life – Lecturette – 10 minutes

Tell the students that one of the most serious effects of poor storage is a reduction in commodity shelf life. Ask students what is meant by shelf life and take a few of their ideas. Show **Slide 3**: Shelf Life and review the definition that is presented.

Shelf life is the length of time from manufacturing date to the final date a product can be safely used, or the length of time that product can be stored without affecting its usability, safety, purity, or potency assuming a proper storage conditions .

Emphasize the last point which is the focus of this session.

Link the ideas given by the students with the “formal” definition presented on the slide.

Explain that each commodity has a specified shelf life and that similar products may have different shelf lives if they are produced by different manufacturers. Ask students if they know how shelf life is determined by the manufacturer. Discuss and summarize that the manufacturer conducts time and quality studies, conducted over usually years exposing the product to typical storage conditions.

It is not uncommon for a new product to come on the market with a shorter shelf life and for that to increase as the manufacturer gets more information through studies. Point out that while each manufacturer specifies the shelf lives of the products it produces, some countries may have policies that affect shelf lives.

Ask students if they know of any products in Pakistan where the shelf life used is different than the shelf life set by the manufacturer. Ask the students why a country might have a policy which changes the effective shelf life of a product. Students can respond, or the facilitator can mention that when manufacturers set the shelf life of a product, they make certain assumptions related to the conditions under which the product will be stored or shipped, such as temperature, humidity and the like.

If a country knows that the conditions in that country would make it difficult to adhere to the manufacturer's assumptions, then they may make a policy to reduce the shelf life, from four years to three-and-a-half years, for example.

In Bangladesh the manufacturer shelf life of condoms is shortened by one year by the MOH because of the local high temperatures and humidity.

Note that it is extremely rare for a country to designate a shelf life longer than the one determined by the manufacturer, although this can be the case at times. If this is the case, then the country must have the capacity to test the products to ensure that the products are still potent and safe.

In some instances when a program has significant quantities of product which is about to expire, the program can contact the manufacturer and inquire about an extension on shelf life. The manufacturer will need the lot and batch numbers and may be able to extend the shelf life based on product studies.

Tell the students that we are now going to discuss some details about storage, so that we will have some ideas about how to properly store products, both to make them available for distribution and to maintain the product quality (i.e., fulfil the purpose of storage).

### **3. Storage Guidelines – Large group discussion and Individual work – 45 minutes**

## Brainstorming

Ask students to suggest what they would include on a list of general guidelines for appropriate storage of drug products. Write their suggestions on a flipchart. Tell the students that we will now do a short activity to familiarize ourselves with additional guidelines related to proper storage.

## Scavenger Hunt

Distribute one copy of the **Guidelines for Storage of Essential Medicines and Other Health Commodities** booklet to each participant and explain that the USAID Global Health Supply Chain Program- Procurement and Supply Management has published these guidelines. Note that the information found in the publication has been generalized so that it can be applicable in as many countries and for as many products as possible. Tell students that we will do a quick exercise so that they can become familiar with the overall contents of the booklet as well as some of the guidelines themselves.

Ask students to open their **Workbook** to **Guidelines for the Storage of Essential Medicines Scavenger Hunt**.

Tell students that they will have 15 minutes to find the information noted on the handout and write the page number on which they found the answer. Emphasize that they do NOT need to copy the entire answer to the question, but only the number of the page on which they found the answer.

Note: Answers to this exercise are posted at the end of these Lecturer's notes.

After 15 minutes, call time and for each question, ask students to give their "page number" answers.

## Basic Guidelines

Mention to the students that the detailed guidelines that are provided in this booklet are applicable at all levels of the system, whether we are talking about a large central-level warehouse or a small storage area in a health clinic. The guidelines in the booklet cover areas related to policy as well as basic information about considerations to take into account when constructing a storage facility. Tell the students that we will now spend a little more time looking specifically at some of the day to day considerations related to storage.

Ask students to open up their **Logistics Handbooks** to **Guidelines for Proper Storage of Health Commodities** p. 116. (These guidelines can be found at the end of the session.) If available, and applicable to

the students in the class, distribute copies of these as well. See Lecturer's Note at the beginning of this session.

Tell the students that this resource summarizes some of the elements that are included in the booklet, and that it serves as a more day-to-day reminder of simple things that can be done, at any level facility, in order to contribute to improved commodity storage. Mention that this sheet can be posted in the storage facility to serve as an on-going reminder and resource.

Tell the students that we will now continue our discussions of proper storage, but this time focusing on simple ways that we can make small improvements in storage but which will have a positive impact on maintaining proper storage conditions and help to maintain product quality.

### **Low-cost/No-cost Strategies for Improving Storage Conditions**

**Lecturer's Note:** Students with no working experience may be challenged by this exercise. The Lecturer can determine if the exercise would be beneficial. Reviewing the storage principles and applying the questions below however will still provide reflection and insight to the subject matter. If there are students with working experience consider pairing them with those who do not.

Tell the students to sit in pairs and to go through the list of storage guidelines in the **Logistics Handbook** or on sheet you provided.

Show the prepared list of questions on the board or flipchart: Questions for "Low cost/no cost Strategies", and tell the students that for each of the guidelines their task is to determine:

- Is this a policy or facility level decision/action?
- For each of the facility level guidelines, can the guideline be followed or implemented at no cost?
- If the implementation of the guideline involves cost, can it be done at low cost? How?

Tell the students that they will have 10 minutes to work.

Note: The pairs can be divided so that half of the pairs start working from the top of the list, while the other half starts working from the bottom of the list. This will help ensure that all of the guidelines are covered during the 10 minutes.

At the end of the 10 minutes, go through each of the items in the Guidelines for Proper Storage and have the students provide the answers that they came up with. Discuss briefly as needed for clarification.

Summarize the discussion by reinforcing the ideas that:

- some solutions may be very expensive, require physical or structural changes
- other solutions are within the storekeeper's ability, are low cost or no cost at all, and can help in prolonging the shelf life of commodities.

#### **4. Special Considerations for Program-specific Products – Large Group Discussion and Small Group Activity– 15 minutes**

##### Introduction

Tell students that we have been discussing storage-related issues in the context of health commodities generally. Tell the students that we will now be taking a short time to look at storage in the particular context of program-specific commodities. Tell the students that we saw the same general concept applied in the context of LMIS: there are certain data elements that are required for managing any product, with some particular requirements based on the specific type of commodities being managed. We will see if this is also true when we are working in the area of storage.

If there are any students who have working experience in the class ask them to raise their hands if they have worked with any program-specific commodities (TB, vaccines, HIV/AIDS, etc.). Ask them to remind the group of their program/product category. Tell these students that you would like their input as we discuss a few points.

Ask students if they can think of any products that might have special storage needs and what those needs might be. Ask the students to brainstorm and list their ideas on the board.

Ask if anyone can:

give a specific issue related to this product

give an example of when this constraint led to supply chain/commodity availability problems?

Be sure the following points are covered:

- Security (locking rooms, cabinets, shelves): For example, the value of ARVs in terms of cost as well as life-saving potential creates an incentive for mismanagement and pilferage. Having secure storage facilities could prove to be a challenge especially for those at lower levels in the system, which may not have any lockable cabinets or drawers. Narcotics might also need special security.

- Cold chain: For example, products such as vaccines must be stored in refrigerators or cold boxes. Other products require “cool” storage; not in a refrigerator or freezer, but at a temperature that is lower than what is generally found in a warehouse. Yet other products require freezing. The cold chain must be maintained during both storage and transportation. As countries try to expand the types of services that are offered to more distant health facilities, cold chain requirements will have to be met, yet the smaller/more remote facilities may not have access to cold chain equipment.

Another consideration is that in some countries the cold chain belongs to the EPI program, and has limited capacity (or willingness) to host a growing volume of test kits required to scale up VCT for growing PMTCT, prevention, and ART programs.

- Disposal of expired products: For example, if certain drugs or HIV test kits are being donated by a manufacturer, and these commodities expire before they are used, they could be required to produce a certification of proper disposal before more donations are given.
- Short shelf lives: For example, condoms generally have a shelf life of four years. For HIV test kits, however, shelf lives can range from only 6 months to 18 months. For ARVs, the average shelf lives range from 12 to 18 months.
- Different shelf life for different products in a kit: For example, some HIV test kits may have chase buffer that has a shelf life shorter than the shelf life of the test strip.

## **5. Routine Visual Inspection – Large Group Discussion and Small Group Exercise – 45 minutes**

### **Introduction**

Tell the students that we have been discussing storage in the context of wanting to maintain the quality of the products that we are storing and distributing. Tell the students that we will now cover another topic related to maintaining the quality of the products that we distribute: visual inspection. Mention that visual inspection is only one element of an overall process of quality assurance.

Ask students when quality assurance should start. The participant response should be in the procurement process. Point out that proper packaging and labeling are essential to assuring product quality. During the procurement process the purchaser should request that the manufacturer label the product so that storage requirements and expiry dates are clearly indicated on outer and inner packaging.

Remind the students again that we will now briefly discuss visual inspection, as a part of the quality assurance process.

### When to inspect

Ask students when one should conduct a visual inspection of commodity products. Take their responses.

Now ask student to open their **Workbook** to the document titled **When to Conduct a Site Visit**. As stated in the Workbook, responses can include:

- a. every time products are received from the manufacturer (usually at the central level)
- b. each time the warehouse or clinic receives supplies
- c. when conducting a physical inventory dispensing products to a client
- d. when issuing products from one level to another
- e. when investigating complaints
- f. when supplies are about to expire
- g. when supplies show signs of damage
- h. when products have been kept under improper storage conditions

Summarize by saying that we should do visual inspection each time we come in contact with the products (physical inventory, issuing, receiving) or each time we suspect that there is a problem with the quality of our products.

There are two types of damage: mechanical or physical and chemical. Mechanical is often caused by physical stress when loaded, off-loaded, stacked, or exposure to rain, dust and so forth. Chemical is caused by expiration, exposure to sun, mixture with other materials.

### What to look for in a routine visual inspection

Ask students what they should be looking for in a visual inspection. Note their answers on the board and add to them as required. Answers may include:

#### Mechanical or Physical:

- package and product integrity: check for damage to packaging (tears, perforations, water or oil leakage, e.g., lubricated condoms) and products (such as broken or crumbled pills or tablets, torn packets of condoms, etc.)
- manufacturing defects (such as incomplete supply, missing or illegible identification information)

- labeling (make sure that products are labeled with date of manufacture or expiration, lot number and manufacturer's name)
- missing contents of e.g., a “kit” (such as a bottle of chase buffer missing from an HIV test kit; litmus paper missing from a lab kit)
- presence of foreign matter inside unit package

#### Chemical

- Color, smell, consistency changes

### Pairs Exercise: What To Do When You See a Problem

Tell the students that we will now do a short activity to reinforce some of the ideas that we have been discussing about visual inspection. Ask students to sit in pairs.

Ask students to open up their **Workbooks** to the page titled **Product-related Problems**. Assign each pair a problem. Tell the students to discuss the problem that is assigned to them and propose what to do about it.

Tell the students that they will have 5 minutes to discuss and then we will look together at their answers.

At the end of the 5 minutes, ask students to read the problem that they were given and tell us what they propose to do about it. Check with other students to see if they agree with the solution or if they had a similar problem and different solution. Refer to the solutions in Table on Common Product Quality Problems in Logistics Handbook page 119. Or see which participant can locate the page first.

Note the list of what to look for in the left-hand column of the Handbook. Remind students that this list is not exhaustive, but it does provide some strategies that can work. Also note that similar problems can be found with products of any category and that similar actions can be taken in response.

What can be done to minimize problems?

Ask students what the warehouse manager or person in charge of commodities at the warehouse or service delivery point can do to minimize the consequences of storage problems discussed in the previous activity.

Answers should focus on:

- routinely monitor/check the quality of the products received, and
- periodically check the stock shelves.

## Disposal

Tell the students that despite our best attempts to maintain good storage conditions, we may find that we have unusable products in our system. Ask the students what would have to be done with these products. Students should respond that the products would have to be destroyed or otherwise disposed of.

Ask the students how they might go about disposing of unusable products. Students might mention strategies such as burying the products in the ground, burning the products, returning the products to the facility that supplied them or other possible strategies.

Mention to the students that we ourselves cannot tell facilities what to do with their unusable products, but rather we must encourage the facilities to adhere to whatever guidelines are in place in the country.

Ask students what they can do as logistics practitioners if there is not a disposal policy in place in the country. Students should respond that they can encourage the appropriate authorities to develop and implement such guidelines.

Summarize this part of the session by commenting that storage conditions vary from country to country and that the guidelines that we have reviewed in this session were developed for use in most situations. Adapting guidelines to meet local needs is acceptable, but the basic purpose of storage guidelines is the same: to maximize their shelf life by protecting the quality and integrity of products while at the same time making them available to users.

Add Pakistan Disposal rules here as they exist

## **6. Calculating Space Requirements – Lecturette and Exercise – 45 minutes**

Tell students that during this final part of the session we will be discussing the final topic that we will cover related to storage, specifically determining the space requirements for the products that we store.

Ask students why it is important to be able to determine the amount of space that we have or need. Take a few participant ideas and summarize by mentioning that the amount of storage capacity that we have will help to determine the quantities of products that can be received at one time; we cannot receive a volume of products that would result in having to store products that require more space than we have available.

Storage space requirements will also inform vehicle requirements for product pick-up or delivery. We would be able to determine, for example, what size vehicles we would need or how many trips would be made using a vehicle we have of a particular capacity.

Remind the students that there is additional information related to storage and warehouse design in the Guide that they received.

We will now go through an example of determining storage space requirements, just to see what is involved and what we need to take into account. Tell the students that as we go through the principles involved, we will develop the formula for calculating storage space requirements.

What we need to know about our products

Ask the students what information a program or warehouse manager would need to know about a product that is going to be received in order to determine the storage space requirements.

Solicit answers from students and write the “correct” answers on flipchart in the order noted below. Students’ answers can include from among the following:

- How many units of the product will we be receiving?
- How many units come in a carton?
- How many cartons will we be receiving?
- How big is a carton? How tall/wide/long is a carton?

Note the following elements on flipchart as students give the related ideas:

# of units of the product being received  
Number of units per carton  
Size of each carton

Summarize by saying that what you need to know is:

- the quantity of the product you will be receiving,
- how many of each product fit in a carton, and
- how big that carton is.

Explain that a "box" is commonly used to refer to an inner box, while a "carton" is the outer packaging that contains a number of boxes.

Tell the students that with just that information, we can calculate the volume of the shipment/products: condoms, ARVs, vaccines, bed nets, or any product.

### Eliminating stacking height

Remind the students that the difference between volume needed and floor space needed is calculated by eliminating the height from the equation. Since the maximum height is 2.5 m, the actual height of the boxes is not important, because we will stack only up to 2.5 m. Remind students that the 2.5 m limit is applicable for most products; very heavy products would have to be handled differently.

Add the following element to the flipchart that was started during the previous discussion:

Maximum carton stack height

### Handling space

Ask students if once we know how much space the boxes will require, is that the size of the storeroom? Ask students to think about the rules of proper storage we have discussed earlier before answering. Specifically, the information on the yellow guideline sheet makes it clear that at least 30 cm on all sides will be necessary.

A rule of thumb is to allow at least 100 percent additional space for handling since space is needed to carry boxes in and out and to stack them so that expiration dates are visible.

Add the following element to the flipchart that was started during the previous discussion:

Handling space

### Formula

Now show the **Slide 4: Formula to Calculate Storage Space Requirements** and quickly review it, relating the information in the formula with what students had answered during the previous discussion. Note: **Slide 5:** is the written out process to Calculate Storage Space, use this if participant have trouble reading the formula. Ask students to refer to **Table 8-3, How to Calculate Floor Space** in **The Logistics Handbook** – page 121. The elements in the slide should match the one developed with students; the slide adds the numerical elements.

Refer students to the ARV, HIV Test Kits, and Contraceptive Fact Sheets. Note that the Fact Sheets contain the carton sizes and packaging information for contraceptive products shipped by a number

of donors. Mention that packaging information for other products is available elsewhere: from the manufacturer, from the donor, from the wholesaler. Mention also that a country may be able to negotiate carton sizes (number of units per carton) with the manufacturer.

### Guided exercise

Now tell the students that we will now do a quick example of determining storage space requirements and we will use the receipt of 120,000 bed nets as our example.

Write “120,000 bed nets” on the flipchart and then have the students walk you through the calculations, following the formula.

- 120,000 BED NETS (130x180x150cm, LLIN, polyester)
- DIVIDED BY 12 BED NETS PER BALE
- EQUALS 10,000 BALES
- MULTIPLIED BY 0.0235 CUBIC METERS PER BALE
- EQUALS 235 CUBIC METERS
- DIVIDED BY 2.5 METERS MAXIMUM BALE STACK HEIGHT
- EQUALS 94 SQUARE METERS
- PLUS 100% FOR HANDLING SPACE
- EQUALS 188 SQUARE METERS

Remind the students that they can use the square root function on the calculator to calculate the dimensions of the room needed to store this quantity of bed nets; in this case they would be given the dimensions for a square room. Enter 188, then hit the square root button. For 188 m<sup>2</sup>, a square room would be 13.7 m on a side. But since we know that  $19 \times 10 = 190$ , we can also estimate the room size that way.

If time permits, ask the students to estimate the size of the training room. Inform the students that the training room is x meters by y meters, making z square meters. Relate the size of the room to the size of the space needed to store 120,000 bed nets and mention that the storage of bed nets, and other “high volume/high quantity” products poses a major challenge to many countries.

Emphasize that these calculations are rough estimates of space requirements. Stress that these estimates must be taken into consideration when making future program plans if adequate warehousing space is to be assured.

## 7. Two Elements of Distribution – Group Discussion - 25 minutes

Tell students that we will now take a brief look at some of the key elements of distribution. Explain that we are talking about the process of moving products from the central level down to the clinics or hospitals where it is dispensed. We all know that distribution is a key step in the logistics cycle but we often don't look at it very carefully if it's not part of our daily job.

Explain that there are two main components that we want to look at. One is the design of the system and the other is the management of that system once it is designed.

### Distribution Design

Tell students we want to think about what we would need to establish a transportation network for our country – what elements would go into designing one.

Ask students to imagine that they have been asked to be the new Distribution Manager for their country's health care logistics system. What things would they want to know about their country's current system in order to set up or design their ideal system?

Take answers and put them on the board. Provide hints to help them identify these key areas and the information we would want to know within each area. Try not to just give the answers. Responses should include:

- Demand for products. Ask students what types of things we would want to know about our demand. Issues we want answers for include demand for the whole system, for each level, for each facility type, and for each facility
- Location and distance of facilities from their supplying facility – how many supplying facilities do we have, are more projected to be built?
- Fleet details – Ask students what types of things we would want to know about the fleet we have. Questions include: how many vehicles we have, their capacity, condition, and availability
- Staff capacity – how big and well trained is the staff, are all positions filled, which are hardest positions to keep?
- Transportation budget – shrinking, holding steady, expanding?

- Types of products being transported – any special needs products?
- Trends - in diseases, movements in population, preferences for types of treatments etc?

Explain that these are the basic elements that we need to know in order to design a distribution system to meet a country's needs. These will get us started.

Tell students that designing a distribution system is a complex process that includes carefully considering many variables like cold chain needs, commodity integration and other issues. When designing a distribution system we can use sophisticated computer modeling and GPS components to establish optimum solutions. It is a complex task to do it well and we can only touch on a few elements here.

Ask students to open their Workbooks to the document titled **Distribution System - From logistics Manual of Lady Health Workers Program.**

Explain that this is an outline of the distribution system for the Lady Health Workers Program which moves family planning and related commodities around the country.

Explain that there are some important details here that explain how and when products are distributed. It is important to establish basic procedures like this so everyone knows not only how the commodities move, but what to do and when to do it. As systems develop procedures become more detailed and complex. This is just an outline for the program. Detailed job descriptions and job aids are added to such a form to round out the complete system often found in documents called Standard Operating Procedures.

Ask the students how distribution plans are made in this system. See point 7.5 for the answer. Ask students if they can see why these requisition forms must be completed accurately with the best possible data. Emphasize again that getting data from the lowest to the highest levels is critical for getting enough stock ordered for the whole system.

#### Transportation (Distribution) Management

Explain that even when a careful distribution plan is designed however it requires a management plan to keep it going.

Ask students if they have heard of the term Transportation Management System or TMS.

For those who have ask if they can name some of the elements needed to keep a distribution system going

If no one has ask them what they might imagine goes into establishing a transportation management system. What are some of the main issues that must be considered to maintain a well-functioning distribution system?

Take answers. Be sure the following are included:

- Operations management
- Fleet management
- Human resources
- Performance monitoring as well as others

Explain that it is not the scope of this curriculum to go into detail about distribution design or management but it is important to get an understanding of what is involved in keeping a system running, especially for those of us who don't work directly in this area of logistics. The better we understand how the whole system operates the better we can do our jobs to ensure that the system works at its most efficient level. As we know, when one link is broken much of the system is affected.

Let's take a closer look to get a better appreciation for what is involved in managing and keeping a distribution system going.

Explain that according to Transport Management: A Self-Learning Guide for Local Transport Managers of Public Health Services which can be found at [www.deliver.jsi.com](http://www.deliver.jsi.com) elements that go into managing a distribution system include:

- Administration
- Operations Management
- Financial Management
- Fleet Management
- Health/Safety and Human Resources
- Policy and Policy Development

Ask students what type of indicators might be used for tracking the performance of a distribution system. Answers can include:

Accuracy of products distributed  
Reliability and timeliness of deliveries  
Frequency of deliveries  
Ability to respond to emergency orders  
Condition of products  
Condition of vehicles  
Etc

Let's take a look at a few of these elements briefly. Show **Slide 6: Maintaining a Distribution System - Operations Management**. Explain that these next three slides are from a Transport Assessment Tool found in the above mentioned resource. Take a minute to review the elements of this slide. Mention that these are just some of the issues under operations management that are considered.

Next show **Slide 7: Maintaining a Distribution System - Health/Safety and Human Resources**. Take a minute to review the elements of this slide. Remind students that this is part of an assessment tool and is used to help management think through all the elements needed to establish and maintain a properly functioning distribution system. We say "establish" because often until we conduct an assessment we are not aware of the need for some components and only create them after conducting an assessment. Ask if there is anything else they might add to the list.

Last show **Slide 8: Maintaining a Distribution System - Policy and Policy Development**. Review the elements of this slide. Explain that distribution is much more than just moving vehicles and commodities around. It also includes establishing policies and procedures. Creating working policies especially documented ones helps ensure that work is done consistently and ensures greater accountability.

Take any comments from the students before closing this activity. Remind them that this is just a very simplified quick look at two components of distribution.

Tell students that if they are interested in learning more they can reference the brief section 8.6 in the **Logistics Handbook** or, for a more thorough exploration of the topic, refer to **Transport Management: A Self-Learning Guide for Local Transport Managers of Public Health Services** which can be found at [www.deliver.jsi.com](http://www.deliver.jsi.com).

## **8. Summary Session – 5 - Minutes**

Tell students that during this session we looked at a lot of material in regards to storage and distribution. Remind students that they can always refer to their Logistics Handbook section 8 to review the materials.

Ask students if they have any questions on any of the material covered during the session. After answering their questions, mention that they can find other information related to warehouse planning in the **Guidelines for Warehousing Health Commodities** that we have already seen.

## **Synthesis Questions**

1. What role does storage play in achieving the Six Rights?
2. Define shelf life (see Activity 2)
3. Name five different guidelines for proper storage (see list below)
4. Describe some measures that can be taken at low cost to improve storage conditions.
5. Give four times when we should do a physical inspection of our products (see Activity 5)
6. What type of record is updated when conducting a physical inventory? (stock cards)

## **GUIDELINES FOR PROPER STORAGE OF HEALTH COMMODITIES**

- Clean and disinfect storeroom regularly.
- Store supplies in a dry, well-lit, and well-ventilated storeroom, out of direct sunlight.
- Secure the storeroom from water penetration.
- Ensure that fire safety equipment is available and accessible, and that personnel are trained to use it.
- Store condoms and other latex products away from electric motors and fluorescent lights.
- Maintain cold storage, including a cold chain, for commodities that require it.
- Keep narcotics and other controlled substances in a locked place.
- Store flammable products separately using appropriate safety precautions.
- Stack cartons at least 10 cm (4 in) off the floor, 30 cm (1 ft) away from the walls and other stacks, and no more than 2.5 m (8 ft) high.
- Store medical supplies separately, away from insecticides, chemicals, old files, office supplies, and other materials.
- Arrange cartons so that arrows point up, and ensure that identification labels, expiry dates, and manufacturing dates are visible.
- Store supplies in a manner accessible for FEFO, counting, and general management.
- Separate and dispose of damaged or expired products without delay.

**Answer Sheet**  
**Guidelines for the Storage of Essential Medicines**  
**Scavenger Hunt**

1. Name two data elements that are required on stock records and two that are optional. Page 32
2. Which term best describes storage of products at between 8 and 15 degrees Celsius (45 to 59 degrees Fahrenheit)? Page 63
3. Identify two techniques for cyclic physical inventory. Page 36
4. What is the minimum width for a passageway between shelves and racks? How far away from the wall should shelves be placed? Page 77
5. Name 4 types of disposal methods. Which method is ideal? Which method would be appropriate to use in a very resource limited setting? Page 86
6. Identify three indicators of quality problems for sterile products. Page 42
7. Identify three specific steps that should be taken to guard against pests. Page 52
8. Name 3 methods for arranging medicines/products in the storeroom. Name one that is more appropriate for a large facility that manages many products and one that is more appropriate for a small facility that manages a limited number of products. Page 20
9. Name three specific reasons for requiring special storage/handling of HIV/AIDS products (ARVs in particular). Page 23
10. If using refrigerators for cold storage, what is a measure you can take to protect cold chain items in the event of a power failure? Page 62
11. Name two specific steps that should be taken to guard against humidity. Page 57
12. What is a sharps container? Where should it be kept? Page 92
13. In what situations are pallets most useful? What are 2 types of pallet lifters? Page 78

## 6. Assessing Stock Status

### ..... Session Objectives:

**By the end of the session students will be able to:**

1. Explain what it means to assess stock status
2. Explain why we assess stock status
3. Assess stock status at different levels of the system

**Time:** 140 minutes plus 30 minutes homework processing the next day

### **Materials:**

Calculators

Student Workbooks

1. Exercise 1 and ICC for Microgynon
2. Table A, Nurse's Desk Drawer Inventory, and Daily Activity Registers
3. Exercise 1 Answer Sheet
4. Exercise 2, Assessing Stock Status at the District Level
5. Exercise 2 Answer Sheet
6. Homework Exercise
7. Homework Answer Sheet

### **Prepared board or flipcharts:**

1. General Formula to Calculate Months of Stock

### **PowerPoint Slides:**

1. Session Title
2. General Formula to Calculate Months of Stock
3. Cycles of Lo-Femenal Dispensed
4. Pieces of Condoms Dispensed

### **Overhead Transparencies:**

For the convenience of the Lecturers paper versions of the first four overheads are available at the end of this session's notes

1. Microgynon Table exercise
2. Doxycycline Table exercise
3. Condom Table for homework exercise
4. Erythromycin Tables for homework exercise
5. Exercise 1 Answer Sheet
6. Exercise 2 Answer Sheet
7. Homework Answer Sheet

### **Lecturer Preparation:**

Prepare boards or flip charts for Activity 1.

The PowerPoint presentation is included with the session as a reference only; the transparencies can be project on flipchart paper tape to the wall by opening the Word Document. The Facilitator can then write on the flipchart paper.

### Learning Activities Summary

Title	Type	Time
1. Introduction to the Concept of Assessing Stock Status	Lecturette	50
2. Assessing Stock Status at the Clinic Level	Individual Exercise	35
3. Assessing Stock Status at the District Level	Individual Exercise	35
4. Discussion of Exercise & Conclusions	Large Group Discussion	15
5. Homework	Exercise	5 assign / 30 process

### Learning Activities:

#### **1. Introduction to the Concept of Assessing Stock Status – Lecturette – 50 minutes**

##### Introduction: Coke Example

Introduce the session by telling the students that we will now look at another session that focuses on the technical aspects of logistics system operations. We will spend some time discussing and practicing assessing stock status.

Tell the students that we will begin by using a practical example from daily life. Tell the students to think about Coca-Cola.

Tell the students to assume that you have 96 bottles of Coca-Cola (which equals 4 cases of 24 bottles per case). (The facilitator could also use 100 aspirin, 30 bowls of rice, or any other item that is convenient to put it in real terms for students.)

Ask the students to think what it means to have 96 bottles of Coca-Cola. If students reply that it simply means that we know we have 96 bottles of Coke available to consume explain that in this case, we know the absolute number of bottles of Coke that we have.

Ask the students again to think what it means to have 96 bottles of Coca-Cola. Ask if it means I have a lot of Coke, a little Coke, or just enough Coke? Allow a few students to respond.

Ask the students if knowing the absolute number of products available is the most useful piece of information for commodity management.

Take a few responses. Then ask the students what information might be more useful for commodity management. Students may respond, or the facilitator can explain that it would be more useful to know how long the quantity I have will last in time. In other words, we want to compare our absolute quantity of 96 bottles to a measurement of time, to answer the question "How long will it last?"

Explain that this would be a way to analyze our stock in relative terms, amount of Coke, relative to how long it will last. After all, 96 bottles would be a lot if I only drank one bottle each day, but very few if I were the supplier of Coke to all the hotels in a city, since the number of Cokes I drink per day is much smaller than the number used in all the hotels in a city.

Explain that in logistics management one of our main concerns is how much product we have available to dispense to users. In addition, we are much more interested in knowing this in relative terms, to know how long our stock will last.

Remind the students that to know how much stock is available, logistics managers must assess their stock status on a regular basis. In assessing stock status we turn data and numbers into information we can use for determining how long our stock will last. That is what we will be looking at in this session.

### Physical inventories

Tell the students that we briefly talked about our stock of Coke in absolute terms: 96 bottles of Coke on hand. Ask the students how we would determine our stock level in absolute terms. Students can respond, or the facilitator can explain that stock status in absolute terms can be determined by doing a physical inventory. Ask students to turn to page 44 in their Logistics Handbooks. Ask one participant to read the definition of a physical inventory in the gray box at the bottom of the page.

"A physical inventory is the process of counting by hand the total number of units of each commodity in your store or health facility at any given time."

Then ask another participant to turn to page 122 and read the gray box – the purpose of a physical inventory:

"A physical inventory count is used to compare actual stock on hand for each commodity with the amount recorded on the stock card".

Conducting a physical inventory allows you to confirm how much stock you have on hand whether or not your stock cards are completed correctly. Physical inventories also allow us to inspect our products to ensure that they are in good condition and being stored correctly

Conducting physical inventories can be difficult for large facilities because there are so many products to count. There are methods however for making physical inventories easier.

Ask students if they are aware of any such methods and take their answers.

Explain that three such methods are:

Cycle counting – this involves counting a portion of the products every month. By the end of the year all the products will have been counted. This method keeps the storage facility open year round without shutting down.

Ven analysis (vital, essential or non-essential) – This counts the most vital and essential items more often. All products in the facility are categorized as one of these and inventoried as such.

ABC analysis – This method divides the products by three categories based on their monetary value. Likewise they could be categorized based on frequency of issues and receipts where the products with the highest volume get counted the most frequent. Both variations help a stores manager determine which products should get the most attention and be inventoried most frequently.

Emphasize that physical inventories:

- should be conducted at least once a year for large facilities and more often for smaller ones – typically once a month for service delivery points
- should be done more frequently than once a year if discrepancies between actual balance on hand and the balance listed on the stock records are frequently found.

Next, remind the students that earlier we had said that doing an assessment of stock status in absolute terms, that is, by counting the number of items, is of limited value for knowing if actual quantities on hand are more than, just enough, or less than what is needed.

Tell the students that whereas we can simply count the number of items to know the stock status in absolute terms, we need to do some calculations know our stock status in relative terms; we need to know and analyze both our inventory data and our consumption data.

Write the relationship on the board as follows, and tell the students that this is the calculation we would need to do.

## **Amount we have ÷ amount we use = how long it will last**

Tell the students that in logistics, we prefer to express the “how long it will last” in numbers of months, since it is a convenient measure. Add the details in parentheses to the formula on the flipchart:

$$\begin{array}{ccccc} \text{Amount we} & & \text{Amount we} & & \\ \text{have} & \div & \text{use} & = & \text{How long it will last} \\ \text{(NOW)} & & \text{(each month)} & & \text{(in numbers of} \\ & & & & \text{months)} \end{array}$$

Show the prepared board or flip chart - The General Formula to Calculate Months of Stock, and compare it to what you have just written on the board. Describe how the numerator and the denominator are determined. Point out how the formula on the prepared flip chart and the one on the other flip chart are essentially the same.

### **Show slide 2 General Formula to Calculate Months of Stock on Hand**

Numerator: Stock on Hand

Ask students where information on Stock On Hand (numerator) can come from. They should reply: a physical inventory or from stock records (i.e. inventory control cards, bin cards, store ledgers), or, in the case of higher levels in the distribution system, from stock reports.

Mention that stocks in transit present a particular challenge. They are not “on hand” at either the issuing facility, and they are not “on hand” at the receiving facility, yet they are present within “the system.”

Ask the students how they might take into account stocks in transit if they are the commodity manager at the higher level issuing facility. Students may respond, or the facilitator can mention that the higher level facility would not re-issue a quantity that had already shipped, or they might reduce an issue quantity if a shipped quantity has not been recorded as received at the time the next order was placed. To ensure that products have not been lost, the issuing facility should contact the delivery staff and the receiving facility to verify the status of the shipment.

Ask the students how they might take into account stocks in transit if they are the commodity manager at the lower level receiving facility. Students may respond, or the facilitator can mention that:

- in cases where the lower level facility is assessing its stock status and an expected shipment has not been received, or
- in cases where the lower level facility is about to place an emergency order,

... it would be a good idea to contact the issuing facility to inquire if any stocks have recently been issued. If stocks have been recently issued, then the facility might include that quantity in its stock on hand. They would then not need to re-order a product that is already in transit, nor would they place an emergency order when none was needed,

Also mention that the impact of stock in transit is mostly of concern when large quantities of stock are involved or emergency orders are involved. In any case, stocks in transit should be counted once (not twice or not at all).

#### Denominator: Average Monthly Consumption

Call the students' attention to the denominator in the equation: "how much we use." Ask the students where this number might come from. Students may reply "the current month's consumption", "the previous month's consumption", "and the month before" This data comes from consumption records (i.e. daily activity registers, tally sheets, etc.).

Tell the students that the preferred method is to use an average figure for consumption. This will help us to avoid basing our calculation (and assessment of stock status) on a single month's consumption, which could be more or less than the average. In either case, using a single month's consumption could give us a false impression of our stock status: it might make it seem that we have too much or too little. (Obviously, this is not the case when we only have one month's data.)

Tell the students that to ensure that our stock status calculation is accurate we use an average consumption, and it is just a simple average. Ask students how we calculate a simple average. Students should respond that it is the sum of a set of numbers, divided by how many numbers that were summed.

Explain to the students that we use the term "Average Monthly Consumption" or "AMC." We generally do not say "average monthly dispensed" or "average monthly usage" although these are all the same. "Use" is somewhat vague, but when we use it we mean, "used by the client."

#### Calculating a simple month of stock on hand:

Show students prepared board or flip chart: General Formula to Calculate Months of Stock and Overhead 1: Cycles of Lo-Femenal Dispensed.

Explain to the students that for this example, we will assume that over the last three months, the numbers of cycles of Lo-Femenal that we distributed each month were as shown:

## Cycles of Lo-Femenal Dispensed

April 1250

May 1261

June 1252

You may wish to show **Slide 3 Lo-Femenal Dispensed** – or simply write these numbers on the board.

Ask students to take a minute to determine the average monthly consumption. After the students have had time to do the calculation, ask for the correct answer. The answer should be 1254.33 (= 3763/3). Fill in the answer in the correct space in the formula on the board.

Ask students if any other commodity could replace Lo Femenal. Ask them to give you an example. Students should respond that this formula would apply to any commodity for which you were determining the average monthly consumption using three months of data.

### Rounding AMC and MOS

Call the students' attention to their original answer for the AMC for Lo Femenal: 1254.33. Ask the students if we can accept this as our final answer for AMC for Lo Femenal. The students can respond, or the facilitator can explain that since you can not have parts of cycles, or other products, the AMC calculations should be rounded to the nearest whole number using standard practice rounding rules. Explain that in standard rounding rules, if the number is 0.5 or above you should round up to the next whole number; if the number is 0.4 or below, you should round down. Ask the students to give the rounded number for the Lo Femenal example. The students should respond that the answer is 1254.

Tell students that in July this particular clinic had 3000 cycles of pills in stock. Fill this number into the formula and tell the students to apply the formula to determine the months of stock on hand.

$$\frac{3000 \text{ cycles of pills}}{1254 \text{ AMC}} = 2.39 \text{ or } 2.4 \text{ months of stock}$$

Take the participant's response and complete the calculation on the flipchart; the response given by the students may be 2.39 months of stock or 2.4 months of stock. Explain to the students that in calculating months of stock, we round the calculation to one point after the decimal so that in this example, we would round 2.39 to 2.4.

Ask students what it means to have 2.4 months of pills on hand. Students should respond that it means that, based on the most recent past usage, we expect to have enough pills on hand for the next 2.4 months. Comment that this would be based on an assumption that

consumption will remain approximately the same as our recent average.

Remind the students that earlier we had said that the relative quantity (months of stock on hand) is a more useful number than the absolute quantity of stock on hand (3,000 cycles for the example of Lo Femenal). Ask the students which number they would prefer to have as commodity managers: 3,000 cycles of Lo Femenal on hand, or 2.4 months of stock on hand. Students should respond the latter.

Tell the students that we will now do another example calculation of months of stock on hand.

Show students the monthly usage rates for condoms and the current stock level of 6000 pieces on Overhead 2: Pieces of Condoms Dispensed.

#### Pieces of condoms Dispensed

April 1293

May 1567

June 1772

You may wish to show **Slide 4 Condoms Dispensed** – or simply write these numbers on the board

The students should calculate an AMC of  $4632/3 = 1544$  condoms. Using this AMC, the students should calculate months of stock as:  $6000/1544 = 3.9$  (Note 3.88 is rounded up to 3.9)

Ask students to explain what having 3.9 months of condoms means. The answer should be, like above, that we expect these condoms, based on past usage figures, to last for 3.9 months.

Tell students that when they are determining months of stock on hand, they need to do this determination for each product they stock. As in doing a physical inventory, stocks in transit should be taken into account at the destination point. (see earlier comment).

Always use an average

The facilitator can repeat again here for emphasis that we never want to use just one month of data in the MOS calculations, because there is ALWAYS some variation from month to month. These variations need to be smoothed out. If we do not use an average, the stock status calculations will yield inconsistent results. It will also cause problems with max-min calculations, which we will see during an upcoming session.

The facilitator should also mention that, except for a few cases we will see in a few minutes, we are always using the most recent three months' data when calculating our averages and when determining our stock status.

#### Stock status of regimen vs. stock status of drug

Tell students that we have just been talking about assessing stock status, but for products that are essentially used "one at a time." Tell the students to think now about ARVs, HIV tests and other groups of commodities. Ask the students what we know about ARVs and how that might require a special consideration when assessing stock status.

Students may respond that for some ARVs, single dose drugs in particular, we need to have all three of the products in order to treat the patient. Ask the students what impact this will have when assessing stock status. Students should respond, or the facilitator can mention that for such products, in this case ARVs, we need to have all three, so if we see 3.4 months of stock of 3TC, 3.3 months of stock of d4T, and 1.4 months of stock of AZT. Students should respond that it really means we have at most 1.4 months of stock of the drug regimen; the other 3.4/3.3 months of stock of the other two drugs is misleading; we cannot actually treat patients for those extra months, since we would run out of the AZT.

Mention the importance of how this kind of information can be moved up the system and be used for decision making.

#### Stock status of test vs. stock status of test kit

Mention that a similar occurrence would be found, for example, in a VCT program uses a test kit where the chase buffer and the tests are not bundled together into one unit, but are separate pieces within a test kit. Ask the students if a health facility has a stock of 100 HIV test strips, and enough chase buffer for 50 tests, what the stock status is of HIV tests at that facility. Without the chase buffer, the other 50 tests are useless, so how many months of stock of HIV tests does that facility really have?

#### When to assess stock status

Ask students how often they think we should be assessing stock status. The students can respond, or the facilitator can mention that stock status should be assessed:

1. Regularly, generally according to how often products are being ordered.
2. Mention that for new programs, we might choose to assess stock status more frequently, to ensure that rapid increases in

consumption are not missed and so that stocks can be replenished before stockout.

3. Monthly – even if you only report or order quarterly, you should assess stock status more often to ensure that you are not at risk of a Stockout.
4. During quantification exercise.

Note that in programs that manage a large number of items, such as integrated family planning and health programs, it may not be practical to assess all products on a monthly or even quarterly basis. In programs like these, it may be best to classify the products by how quickly they are distributed or used, and to assess the stock status of those products that move most quickly every month, those that move less quickly every quarter, and those that move the slowest even less frequently.

#### Effect of stockouts

Ask students to consider the situation where there have been stockouts of a product. Ask the students what effect that might have on their analysis of the data. There may be a month or more where none of the product was dispensed because of stockouts, or providers rationed distribution trying to avoid a stock out. Ask the students what they could do then to determine the average monthly consumption. Discuss the appropriateness of not using that month, but using the most recent 3 months data not affected by stockouts.

#### Adjusting Data for Incomplete Reporting

Tell students that suppose we are working at the district level and all of our clinics have not reported their consumption for the quarter. How would we know what these figures are? If we don't have the time to wait for them what else could we do to get an accurate estimate of their consumption?

If the students don't offer any response explain that we use the consumption data that we do have and adjust it for the missing data. To adjust the data we use the following formula: (put on board)

$$\frac{\text{Sum of all consumption reported}}{\text{Percentage of reports received}} = \text{Estimated total consumption}$$

Give an example to reinforce the point. Tell students that suppose they have consumption of 2,000 units of a commodity across the facilities

they are collecting data from but only 7 of the 10 facilities have reported for this quarter. This gives us a 70% reporting rate. Applying the formula we have...

$2000 \div 0.70 = 2,857$  estimated total consumption for all facilities. We can then plug this number into our formula for estimating AMC.

Tell students that this assumes that reporting and non-reporting facilities are roughly equal in their consumption

However, ask what we should do if the facilities not reporting are unrepresentative of those that have reported. What should we do in this situation to establish a reasonable estimate of our consumption? Reply that then we can make an additional adjustment using the formula below

$$\frac{\text{Sum of all consumption reported}}{\text{Percentage of consumption represented by those reporting}} = \text{Estimated consumption for period}$$

Say for example that our consumption for product X was 5000 units for the quarter and the facilities that did report were mostly urban with very little coming from the rural areas. These reporting represent about 60% of our consumption.

In this case we can adjust reported consumption data to reflect the percentage of total consumption that the reporting facilities do represent. We use the formula below to do this.

$$5000 \div 60\% = 8,333 \text{ total adjusted consumption}$$

#### Adjusting Data for Stock Outs

Ask students how we would assess stock status when we have experienced stock outs, rationing, or hoarding during the reporting period. Acknowledge that these all can happen and when they do it is useful to have a way to determine what our true consumption would have been

Explain that there is a simple formula for this as well. We can use the formula below to find the average of what would have been consumed for the period in question. To do this we take:

$$\frac{\text{Sum of consumption in other (n) periods}}{\text{Number of periods (n)}} = \text{Estimated consumption for period in which stock out occurs}$$

If for example we find that our consumption for the last three good months of accurate data was 3600 units we apply it to the formula this way:

$3600 \div 3 \text{ months} = 1200$  estimated consumption for the period in which there was a stock out or questionable data

Explain that we would make a calculation like this for two reasons – 1) for determining actual resupply quantities for a facility and 2) for estimating consumption for an entire program as when assessing national stock status.

Remind students that it is always important to document any adjustments that are made to the data – how exactly the data is changed the and why. It may be important in the future to revisit the assumptions made and we will want to remember what we did. It is always best to keep detailed notes of calculations made. We will be able to build upon them for future estimates and explain our reasoning to anyone who asks.

### Adjusting Stock-On-Hand data

Next tell students that we want to consider how to adjust our stock on hand when all reports are not received. We can do this in two ways. The first is adjusting stock on hand by percentage reporting. We do this by dividing the quantity of stock on hand by the percentage of reports received.

$$\frac{\text{Sum of all SOH reported}}{\% \text{ of reports received}} = \text{Estimated SOH at end of the period}$$

This formula can be used when the reporting facilities are generally representative of all the facilities.

However, when those reporting are not representative of our typical facility then we can adjust stock on hand by percentage represented. Explain that for this we take the total SOH reported and divide that by percentage of SOH represented by those reporting. This will give us our estimated SOH at the end of the period.

Sum of all SOH reported

= Estimated SOH at end of the period

% of SOH represented by  
those reporting

Remind students that as we did with consumption data it is necessary to record all our adjustments, calculations, and the reasoning behind them. Again these calculations are not for facility level people to do but for those wishing to assess stock status at the upper levels of a system.

### Seasonal variations

Remind the students that we have suggested they use a three-month average for AMC and stock status, and that we should generally use the three most recent months of data. We have seen, however, that when we have experienced a stockout during the three most recent months, we should discard that month's data and use the most recent normal month's data.

Ask students if they can think of any other instances when we would not use the most recent three month's data. Students may respond, or the facilitator can mention that when a product is clearly associated with a seasonal consumption pattern then we would not use the most recent three months' data.

Explain, for example, that the consumption of anti-malarial drugs increases greatly (compared to the "average") during malaria season. If we were to use the three months just before malaria season to determine our months of stock, then we would be greatly underestimating MOS, and our order quantities would likely be much less than what will be needed. Equally, we would not need to order large quantities of anti-malarial drugs towards the end of the season, when our three-month average would be very high, but consumption would be expected to decrease considerably at the end of the season.

For situations such as the malaria example, we would need to take into account seasonal factors.

## **2. Assessing Stock Status at the Clinic Level – Individual Exercise– 35 minutes**

Tell the students that they will now do an exercise where they will assess the stock status for several contraceptives in a clinic. The task

is to practice determining AMC and MOS for each of the previous three months using available data. Tell students that they will need several pages in their Workbook for this next exercise. They should open up their **Student Workbook** to: **Assessing Stock Status At Clinic Level Exercise 1** and on the following pages they will find documents titled **Inventory Control Cards for Microgynon** and: **Table A and Daily Activity Registers (DARs)**. Write these three documents on the board with their associated page numbers so students know what to look for. The goal of Exercise 1 is to calculate the number of months of stock on hand for all months for Microgynon. Students will complete the gray sections of the table on the first page of the exercise.

Explain to students that they will need to use the Daily Activity Registers (DARs) from each month to determine the consumption rate. Note that this is a large clinic that distributes supplies from its storeroom by box to the nurses, who dispense the contraceptives from their desk drawers. Tell the students that to determine the stock on hand they should take data from the Inventory Control Card (ICC) and from Table A, which is included in the exercise and which indicates how much stock is in the clinic nurses' drawers. Demonstrate how to calculate the stock on hand by adding a figure from the ICC to the appropriate figure from Table A for the time period chosen.

Note the columns on the exercise sheet that students are expected to complete and make sure students understand what information they should put in each.

Tell the students that they will have 15 minutes to complete the exercise.

Be sure students have calculators and facilitators to help them complete the exercise. Remind students that some of the DARs are more than one page. Remind students to round the average monthly use to the nearest whole number and the months of stock to one number after the decimal point.

NOTE TO FACILITATORS: Facilitators should watch and correct early those students not using the correct stock data. This is calculated by adding the stock on hand from the ICC with the amount in the nurse's drawers, Table A. Not having the correct answer from the beginning will only confuse and frustrate them.

After 15 minutes call time and ask students to help you complete **Overhead 1: Microgynon Table**, from the exercise. Go over the exercise answers and how they are determined. First ensure that all students are using the correct stock on hand figures for each month. (Stock on hand should come from adding the ICC balances to the drawer balances.) Then ask them for each month's dispensed to user totals. Clear up any problems or questions.

Next show them **Overhead 1B Answer for Exercise 1**. Ask students to keep Handout 2, the Daily Activity Registers and Table A, noting that they will need to use it again in a homework exercise.

**3. Assessing Stock Status at the District Level – Individual Exercise – 35 minutes**

Ask students to open their **Workbook** to **Exercise 2, Assessing Stock Status at the District Level**. Tell the students that the purpose of this exercise is to provide them with an opportunity to practice assessing stock status at the clinic level and the district level. It has been designed to have students complete the calculations for one product during the session, and for one product as homework. This exercise consists of 10 pages.

Briefly discuss how to assess stock status at the district level. Note that the methodology is the same. Discuss both the sources of the numerator and the denominator in the assessment at the district level.

Tell the students that they will have 20 minutes to complete this exercise.

After 20 minutes, call time and ask students to help you complete **Overhead 4: Doxycycline Tables**, from the exercise.

Go over the exercise answers and how they are determined. Show **Overhead 4B: Exercise 2 Answers**, if needed.

**4. Discussion of Activities and Conclusion – Large Group Discussion – 15 minutes**

Summarize the session by asking students the following questions related to the exercise:

- What are the conclusions that can be drawn from the exercise. What do the results tell us? They suggest to us how long our current supplies will last, assuming consumption is about average over the next several months.
- What would happen, however, if we had used the wrong calculation? What if, for pills, we had calculated that we had 7 months of stock on hand instead of only 5? What would that have meant about our orders? You may have decided that there was no need to place an order, when you really should have.
- Thinking back to the simulation, would you have placed an order if you had a 5-month maximum stock level, and you calculated that you had 5.3 months of stock? In this case, you

might not, while in fact, consumption was rapidly increasing, something you may have discovered the hard way if you did not recalculate your maximum stock level.

Review assessing stock status at the district warehouse. Ask how you would do it at a regional warehouse? Once again show prepared board or flip chart - General Formula to Calculate Months of Stock on Hand, and explain that the same formula is used at all levels. Note how the dispensed-to-user data is aggregated and then used in calculating the average monthly use for the different levels.

Summarize by saying that in order to make our logistics system work well, not only do we have to assess our stock, but we have to know what to do with our results, and how assessing stock will affect our ordering. Logistics systems operate under different sets of rules governing what conclusions we can draw after assessing our stock, and we will be discussing one of these, the maximum-minimum inventory control system, in another session during this course.

#### **5. Homework – Exercise – 5 minutes to assign, 30 minutes to process (the following day)**

Distribute the homework assignment, **Handout 6: Homework Exercise**. Explain to students that it is similar to the exercises they just completed, using the same data sources, and that they should work on it, individually, this evening. Tell students that they should complete the exercise and bring it with them tomorrow morning when they will discuss the answers.

**The next time students meet**, work through homework exercise math as previously, remembering that inventory information should be taken from the ICCs and the desk drawer quantities for Exercise 1, and from the reports and ICC for Exercise 2.

Process the homework using **Overhead 5: Condoms Table and Overhead 6: Erythromycin Tables**.

For both exercises, discuss the implications of the number of months of stock on hand for each product. This discussion should be used to feed into the Max-Min session, and Facilitators should consider this when listening to how deep the discussion goes. Remind students that the rules regarding reorder will be discussed in the Max-Min session.

#### **Synthesis Questions**

1. How do we determine how long our stock will last? What is the formula for calculating the “Months of Stock” on hand?

Amount we have ÷ Amount we use = How long it will last  
(NOW) (each month) (in numbers of months)

2. Where in the LMIS forms are we getting the variables in the “numerator” and “denominator”? (Numerator: Stock on Hand and Denominator: Average Monthly Consumption)
3. When should we assess stock status? (see Activity 1)

**ASSESSING STOCK STATUS  
EXERCISE 1 ANSWER SHEET**

Date	Microgynon			
	Stock on Hand	Consumption this month	Average Monthly Consumption	Months of Stock on Hand
May 31, 2006	403	44	44	9.2
June 30, 2006	343	60	52	6.6
July 31 , 2006	271	72	59	4.6

**ASSESSING STOCK STATUS  
EXERCISE 2 ANSWER SHEET**

**Doxycycline**

Date	<b><i>Enukweni</i></b>		AMC for Feb. 28:	MOS for Feb. 28:
	Stock on Hand	Consumption in this month		
Dec. 31, 2006		115	110	2.0
Jan. 31, 2007		105		
Feb. 28, 2007	215	110		

Date	<b>Gowa</b>		AMC for Feb. 28:	MOS for Feb. 28:
	Stock on Hand	Consumption in this month		
Dec. 31, 2006		150	147	1.8
Jan. 31, 2007		147		
Feb. 28, 2007	271	144		

Date	<b><i>Karonga</i></b>		AMC for Feb. 28:	MOS for Feb. 28:
	Stock on Hand	Consumption in this month		
Dec. 31, 2006		80	85	1.9
Jan. 31, 2007		85		
Feb. 28, 2007	160	90		

Date	<b><i>Mzimba District</i></b>				
	Stock on Hand (District pharmacy)	Stock on Hand (Clinics)	Consumpti on this month		
Dec. 31, 2006			345	<b>AMC</b> for Feb. 28 342	
Jan. 31, 2007			337	<b>MOS</b> for Feb. 28 (District Only)	<b>MOS</b> for Feb. 28 (District + Clinic)
Feb. 28, 2007	2085	646	344	6.1	8.0

**ASSESSING STOCK STATUS  
HOMEWORK EXERCISES  
ANSWER SHEET**

Exercise 1

Date	<b><i>Condoms</i></b>			
	Stock on Hand	Consumption this month	Average Monthly Consumption	Months of Stock on Hand
May 31, 2006	2616	144	144	18.2
June 30, 2006	2508	108	126	19.9
July 31, 2006	2408	100	117	20.6

## Exercise 2

## Erythromycin

Date	Enukweni	
	Stock on Hand	Consumption this month
Dec. 31, 2006		125
Jan. 31, 2007		120
Feb. 28, 2007	245	125

AMC for Feb. 28:	MOS for Feb. 28:
123	2.0

Date	Gowa	
	Stock on Hand	Consumption this month
Dec. 31, 2006		120
Jan. 31, 2007		115
Feb. 28, 2007	225	110

AMC for Feb. 28:	MOS for Feb. 28:
115	2.0

Date	Karonga	
	Stock on Hand	Consumption this month
Dec. 31, 2006		90
Jan. 31, 2007		110
Feb. 28, 2007	170	115

AMC for Feb. 28:	MOS for Feb. 28:
105	1.6

Date	Mzimba District			
	Stock on Hand (District pharmacy)	Stock on Hand (Clinics)	Consumption this month	
Dec. 31, 2006			335	
Jan. 31, 2007			345	
Feb. 28, 2007	1770	640	350	
			AMC for Feb. 28: 343	
			MOS for Feb. 28: (District Only)	MOS for Feb. 28: (District + Clinic)
			5.2	7.0

## 7. Maximum-Minimum Inventory Control Systems

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**Note:** Remind experienced students to hand in their Commodity Security Vignettes. The Lecturer will need to review them and choose 3 or 4 examples to discuss before starting Session 15. See notes in that session for more details.

### Session Objectives:

By the end of the session students will be able to:

1. Define the meaning of the terms Maximum (months of stock and quantity), Minimum (months of stock and quantity), Review Period, Lead Time, Safety Stock, and Emergency Order Point
2. State the storekeeper's decision rule for the Forced Order version of Max-Min
3. Determine order/supply quantities using the Forced Order version of Maximum-Minimum inventory control procedures
4. Set Maximum and Minimum stock levels for the Forced Order version of Max/Min and the Emergency Order Point
5. List advantages and disadvantages of using Maximum-Minimum inventory control

**Time:** 190 minutes or 3 hours and 10 minutes

### Materials:

four boxes of condoms (If condoms are not available, use similar items that are clearly visible to students, possibly boxes of matches or sweets, or even empty cartons of the same size.)

A pitcher of water and glasses to explain the delivery truck (or lorry) system.

### Prepared board/flipchart:

Fuel Gauge drawing

### Power Point Slides:

1. Session Title
2. Purpose of an Inventory Control System
3. Key Terms
4. Storekeeper's Decision Rule (Forced Ordering Version)
5. Forced Ordering
6. Storekeeper's Decision Rule (Forced Ordering Version with Emergency Order Point)
7. Forced Ordering with EOP
8. Setting Max-Min Levels
9. Determining your Lead time and Lead time stock

10. Set the Review Period
11. Set the Safety Stock
12. Formula for Setting Minimum Stock Level (Forced Ordering and Continuous Review Versions)
13. Formula for Setting Maximum Stock Level (All Versions)
14. Formula for Emergency Order Point

### **Lecturer Preparation:**

The facilitator should review the PowerPoint presentation corresponding to this session in advance, to become familiar with its content and with the materials it includes.

Activities 4 and 6 should be reviewed carefully before presenting.

Prepare a table or space at the front of the room large enough to hold 4 boxes of condoms for the demonstration of max-min.

### **Participant Preparation: Homework Assignment**

Before this session ask students to read Chapter 4: Maximum-Minimum Inventory Control Systems, pages 55-76, in The Logistics Handbook.

An additional homework item is to read Chapter 10 on Logistics System Design in the Logistics Handbook

### **Learning Activities Summary**

Title	Type	Time
1. Purpose of Inventory Control	Lecturette	10
2. Introduction to Max-Min	Interactive Lecturette	15
3. Determining How Much to Order or Issue	Lecturette	5
4. Determining When to Place an Order or Issue Storekeeper's Decision Rules	Interactive Lecturette	40
5. Using Max-Min	Worksheet & Exercise	30
6 The Six Steps for Setting Minimum and Maximum Stock Levels and Emergency Order Point	Interactive Lecturette	65
7. Final System Design Considerations Needed	Exercise and Discussion	15
8. Advantages and Challenges of Max-Min and Session Conclusion	Summary and Conclusion	10

## Learning Activities:

### 1. Purpose of Inventory Control – Lecturette – 10 minutes

Introduce the session by noting that in the last few days of the course and today we covered such concepts as LMIS, storage principles, and assessing stock status. Tell the students that we will now apply some of those concepts in studying another important topic: inventory control systems.

Tell the students that we will begin by taking a look at the purpose of an inventory control system.

Display **Slide 2: Purpose of an Inventory Control System** (or prepared flip chart):

#### Purpose of an Inventory Control System

- To determine when stock should be ordered/issued
- To determine how much stock should be ordered/issued
- To maintain an appropriate stock level of all products, avoiding shortages and oversupply.

Note that this information is found on page 55 in the Logistics Handbook.

Tell the students that we can apply these principles to some inventory control systems in daily life.

#### Fuel Gauge Example

Refer the students back to the purposes of inventory control listed on the slide or flip chart and show the Fuel Gauge on the board or prepared flip chart.

Ask the students to identify the drawing. Students should reply that it is a fuel gauge from an automobile. Ask the students if they could consider the fuel gauge on a car, truck or lorry to be a type of inventory control system. For clarification, ask the students if the fuel gauge serves the three purposes of inventory control that we have defined.

Ask the students to explain how the fuel gauge represents an inventory control system. Students should respond, or the facilitator can mention that:

- Fuel should be added no later than the time the needle reaches the “low fuel” indicator (the red line on the gauge or a light on the dashboard)

- Fuel should certainly be added before the needle reaches “Empty.”
- What is the maximum level of the fuel gauge?
- We should add a quantity that does not exceed “Full” (each individual would have to determine exactly how much they will add: just enough to go beyond the “low fuel” indicator, enough to fill the tank, or something in between)
- The amount of fuel in the tank should vary between “Full” and “Empty.”

## Home Inventory Control

Ask the students to think about their own home. Ask the students if they have a system in their home for keeping a stock of staples like sugar, flour or milk. Ask the students to briefly describe their home inventory control system: when to order, how much to order, avoiding shortages or over supply.

Ask the students if their system always works or if they ever experience stockouts. Ask the students if they ever change their system and, if so, why.

Summarize this part of the discussion by saying that we will study a certain type of inventory control system which has been used worldwide to serve all three purposes well, not only for health commodities, but for many kinds of commercial products.

## 2. Introduction to Max-Min – Interactive Lecturette – 15 minutes

Note to the Facilitators: For the sake of clarity, use the verb “set” to describe what the designer does to establish Max/Min levels and the word “calculate” for what the storekeeper does to determine order quantities.

First, we’ll discuss some key terms. Display **Slide 3: Key Terms** and also tell the students to follow along on page 56 in their Logistics Handbook.

- Max stock level/max quantity – the max stock level is the level of stock above which inventory levels should not rise. It is set as “number of months of stock” and it indicates how long supplies will last. [Facilitator – draw comparison to fuel or kitchen example.]

- Min stock level/min quantity – this is the level of stock at which actions to replenish inventory should take place. Also, should be expressed in months of stock.
- Review period – this is the time scheduled to examine stock levels and determine if additional stock is needed.
- Review period stock – this is the amount of stock that is dispensed during the review period.
- Safety stock level – this is an additional buffer, cushion or reserve stock kept on hand to protect against stockouts caused by delayed deliveries, increased demand etc.
- Lead time stock level – this is the level of stock used between the time new stock is ordered and when it is received and available for use.
- Emergency Order Point (EOP) – this is the level of stock that triggers and immediate emergency order. It can be reached at any point and must be lower than the minimum.

Tell the students that we will now look at an inventory control system that is called a Maximum-Minimum inventory control system or Max-Min for short. This type of system maintains inventory or products between a high, or max, and low, or min, level to ensure that there is never a stock out or expiry/wastage. Each system is designed to prevent stockouts but differs from each other based on when the storekeeper makes a decision to reorder new supplies.

Mention that this system and variations of it are always recommended for programs with full supply availability, for example family planning, TB, and AIDS prevention programs, and that Max-Min procedures are appropriate for managing any type of product. Of course, many products in a system, even most products, are not in full supply. How many full supply products there are will vary by system according to the resources available and the priorities set by decision makers. Aspirin and bandages, for example, are often not in full supply. Max/Min does not work for them.

Tell the students that we will discuss three slightly different versions of Max-Min and note their names on blackboard or flip chart:

### **3 Versions of Max-Min Inventory Control Systems**

- Forced Ordering version – This version is the most important and is used in the great majority of systems for health products in the public sector. It is the version you will study

most in this course. The trigger for ordering is the end of the review period

- Continuous Review version – This version is sometimes used for retail products in the commercial sector. The trigger for ordering is when the facility reaches the minimum level. It requires continuous surveillance of stock levels, with no regular order period and orders being placed any time during a month.
- Standard version – This version is also used for some retail products in the commercial sector. The name “Standard” is a little misleading. It is only standard because the amount you order must be a standard amount, such as one carton. the trigger for ordering is the end of the review period for stocks that are at or below minimum

We will also learn the advantages and disadvantages of each version. Tell students that these are explained on page 57 of the Logistics Handbook.

### **Design vs. Operate**

Tell the students that we will be talking about how Max-Min works, but also how you go about designing a Max-Min system (**confirm if true**). As we will see, you need to understand quite a few concepts in order to set up a Max-Min system initially. Once you have made these design decisions, however, field, clinic, and warehouse staff can operate the Max-Min system without knowing any of the theory you are going to learn today. They only have to understand a single, simple decision rule, and a very small number of calculations in order to decide how much of each commodity to order or issue.

Explain that the basic idea of Max-Min is that two stock levels are set for each facility or type of facility. Ask students what these stock levels are. The students or the facilitator can respond that the two stock levels are the Maximum Stock Level (Max) and the Minimum Stock Level (Min). Tell the students that once the system designers have set the Max and Min, the storekeeper then follows the decision rule to ensure that the stock balance at the facility generally stays somewhere between Max and Min.

Remind the students that we will talk about when to order, the decision rule and the storekeeper's calculations, and then about how you set Max, Min, and the other policies that the system requires.

### **3. Determining How Much to Order or Issue –Lecturette 5 minutes**

No matter which Max/Min inventory control system is used, the formula for calculating the order (or issue quantity) is the same. Whether the system is an allocation (push) or requisition (pull) system, the formula for determining the right amount to order or issue it is straight forward. This formula is:

$$\text{Order or issue quantity} = \text{max stock quantity} - \text{stock on hand}$$

Explain to students that in this formula “max stock quantity” is the average monthly consumption multiplied by the number of months set for the maximum stock level. Likewise the “average monthly consumption” is the average amount of products dispensed to patients in the last three typical months (or determined time period). More will be explained on this later and in the Logistics Handbook.

#### **4. Determining When to Place an Order or Issue - Storekeeper's Decision Rule – Interactive Lecturette – 40 minutes**

Tell the students that the first thing we will look at will be the storekeeper decision rules for Max/Min.

The Storekeeper decision rule determines the trigger for planning an order.

Tell the students that once we are familiar with how Max/Min operates, we will then see how it is designed. Remind the students that the decision rule is what makes it easy for the commodity manager to follow the Max/Min system and ensure that commodities are always available for full supply products, and that the decision rule is different for each version of Max/Min. Of course Max/Min works only for products that are in full supply in the country, with enough to fill orders from all over the country. “Full supply” products are usually a limited number of high priority products. These vary by country. Typical examples are contraceptives, vaccines, sometimes antibiotics, and condoms for the prevention of HIV/AIDs.

#### **System 1: Forced Ordering Version of Max-Min**

##### **Design Rule**

Tell the students that in a Forced Ordering Max-Min system, stocks on hand are reviewed on a fixed Review Period. Note this term on the flip chart and be consistent in using this term. (Be careful not to confuse the terms “review period” and “order interval.”)

Explain that in a forced order system, an order is placed which would bring the stock balance for each commodity up to an established level called the Maximum at the end of a pre-established Review Period.

Show **Slide 4: Storekeeper's Decision Rule for Forced Ordering** and state that the storekeeper's decision rule is simply this:

Review all stock levels at the end of each Review Period. Order or issue enough stock to bring stock levels up to Max.

Show the example on the slide and explain that if you have established a Max of 6 months and a Min of 3 months in a clinic which orders products quarterly, the rule would be:

Review all stock levels at the end of each quarter. Order enough stock to bring the stock levels up to 6 months.

The facilitator should note that Max, Min, and all the other numbers we are going to discuss are always stated in terms of months of stock, just like when we are assessing stock status. This means how much is used during an average month. You will learn that it is important to take an average of typical recent months to get the average. For example, if the average monthly consumption is 120 for a product, and the Max is six months, that means 720 would be the max for that product. There will be a more detailed explanation of this later.

Ask students why this might be the case. The students can respond, or the facilitator can mention, that we care less about the absolute quantities of product and we care more about how long they will last. As consumption rises or falls, the maximum and minimum stock quantities will also rise and fall, ensuring that we always have enough stock available, i.e., enough to last 3 months or enough to last 6 months, etc.

Return to the decision rule that has been presented. Tell the students to review the decision rule and then ask, for this rule, what the storekeeper uses Min for. The students should respond, or the facilitator can mention that the storekeeper does not use Min. In a forced-ordering max-min system, storekeepers do not worry about maintaining a Min stock level because they always take action at the end of the Review Period and always order enough supplies to bring the commodity back up to the pre-established Max Level.

Display **Slide 5: Forced Ordering** and point out to students that the level fell below Min, but the storekeeper does not know it, since they do not need to know this information since the Review Period and not a Min Level then is the trigger for ordering. Mention, however, that the system designer and supervisors need to know what the Min is, as you will soon see.

Show **Slide 6: Storekeeper's Rule - Forced Ordering Version with Emergency Order Point**, which states the following:

Review all stock levels at the end of each Review Period. Order or issue enough stocks to bring the stock levels up to Max.

If the stock level for any item falls below the Emergency Order Point before the end of the Review Period, place an emergency order.

Explain that storekeepers must be careful not to run out of stock. Therefore, in addition to applying the decision rule for ordering, they are given an Emergency Order Point (EOP). If a product reaches the determined EOP, then the storekeeper knows that she or he must order immediately that product.

Show the example on the slide and explain that for this example, if you had established a Review Period of 3 months, a Max of 6 months, a Min of 3 months, and an Emergency Order Point of 1 month the application of the decision rule would be:

Review all stock levels at the end of the quarter. Order (or issue, in a push system) enough stocks to bring the stock levels up to 6 months. If the stock level for any items falls below 1 month at any time, place an emergency order.

Thus regularly assessing stock is essential. The results of stock status assessment alert the storekeeper to the need to place an emergency order for any item that has reached the EOP. Display **Slide 7: Forced Ordering with EOP** and show that students how the stock level reaches the EOP before the end of the review period so and order is placed up to the Max level.

Inform the students that this decision rule is found on page 59 of their Handbooks.

### **Forced Ordering – Advantages and Challenges**

Ask students to brainstorm advantages to Forced Ordering. List their responses which should include:

- Very simple decision rule – order to max at the end of every review period; no need for constant stock assessment
- Because orders are placed at regular intervals, transportation can be scheduled for specific times which make ensuring transport easier

- Every facility orders or is resupplied at the end of every review period
- Can control/monitor the submission of reports (all facilities should be reporting/ordering every review period).

Ask students to brainstorm challenges to Forced Ordering. List their responses which should include:

- Some orders for small quantities of some products (you always order everything, even if you've used only a little of your stock).

### **Forced Ordering – Condom Box Clinic**

Tell the students that we will now demonstrate the application of the decision rule for Forced Order Version of Max-Min with the Emergency Order Point.

The facilitator then sets up a hypothetical clinic and uses actual boxes of condoms to demonstrate how the system would work. [The clinic can just be a spot on a table big enough to hold three boxes of condoms. The spot should be in a place where you can leave it set up for the remainder of this session, as it will be used repeatedly throughout the rest of the session.] If boxes of condoms are not really available, then some other item can be used, such as boxes of matches, sweets, cardboard boxes of the same size, or any consumable product that students can see easily.

The facilitator places two boxes of condoms (200 condoms) in the make-believe clinic, and points out that each box contains 100 condoms. Tell the students that the Maximum is 3 months stock on hand and the Emergency Order Point is 1 month. (Note these on a flip chart: 3 months max, 1 month Emergency Order.)

Ask the students what the Max and Emergency Order quantities would be if the average monthly consumption is 100. The students should say that the Maximum is 300 condoms and the Emergency Order Point is 100 condoms. Ask the students if an emergency order is needed. The students should respond that an emergency order is not needed; the clinic has not yet reached the emergency order point.

Then tell the students that the Review Period is monthly, and that it is now the end of the month. Ask the students how much to order. The students should respond that the order quantity should be 100 condoms or one box.

### **Forced Ordering – Delivery Truck (or Lorry) Variation:**

Pakistan uses a uses Forced Ordering for their health commodities logistics system.

The facilitator should explain that there is a variation of Forced Ordering Max-Min that is variously called the Delivery Truck, Bread Truck, or Topping Up system. (Explain as necessary that a truck is a lorry, or just use the word lorry.)

Demonstrate how the Delivery Truck system works using a pitcher of water and a full glass of water. Explain that top of the glass represents the maximum stock level and that we want to return our stock level up to the max at each review period. Drink from the glass and ask the students what the drinking represents. The students should respond that it represents the dispensed to users at the service delivery point during the review periods. Then take the pitcher and explain that the pitcher represents the delivery truck in the Delivery Truck Variation of Forced Ordering. The truck arrives at the facility at the end of the review period. Then refill the glass with water from the pitcher. Explain that this is the re-supply. Explain that this is a form of Max-Min that private industry uses to stock warehouses or distribution points.

Summarize by saying that the Delivery Truck Variation of Forced Ordering is simply this: the delivery truck visits each facility at the end of each review period, say monthly or quarterly, looks to see how much stock is on hand, and tops the facility up to its Max.

Delivery truck systems can be either pull or push systems. In the former, the truck arrives, and the storekeeper completes the report/transaction record and orders from the truck. In the latter, the supervisor on the truck calculates the quantity to be issued and issues it from the truck.

This system is in use at lower level facilities in the Philippines, Tanzania, and Kenya.

Mention that while the application of the Delivery Truck Variation of Forced Ordering is slightly different, the decision rule for the Delivery Truck Variation is exactly the same as with the “normal” variation of Forced Ordering: at the end of the Review Period, the stock levels of all products are reviewed and re-stocked up to Max.

The difference between a regular forced-ordering system and a delivery truck system is the way that deliveries are made. The only difference is that the calculations are done when the truck arrives, which is still at the end of the review period, and not when sending in a form at the end of the review period.

### **Delivery Truck Variation of Forced Ordering – Advantages and Challenges:**

Ask students to brainstorm advantages to the Delivery Truck Variation of Forced Ordering. List their responses which should include:

- Min (and Max) will be lower, because Lead Time is 0
- You can put expired or damaged product back on the truck to be taken for disposal (if that's how disposal procedures work)
- You can collect your LMIS reports on the spot to take back, and help local staff complete them if they are having trouble
- Training requirements are much less significant
- If a supervisor goes along with the truck you can accomplish many other supervisory and training activities at the same time as commodities are being delivered. And, you'll know that the supervisor actually went.

Ask students to brainstorm challenges to the Delivery Truck Variation of Forced Ordering. List their responses which should include:

- If the delivery schedule is unreliable, Safety Stocks will have to be set higher (but of course this is true in any system)
- If the truck breaks down the whole system breaks down, so the emergency order procedures should include some kind of backup transportation scheme.
- Sufficient number of staff must be available in the office to complete logistics mgmt. and other duties while team leaders are away making deliveries.
- The system may require larger trucks as trucks must carry more stock than they will deliver.

### **System 2: Continuous Review Max-Min**

Explain to students that while Continuous Review is a different version of Max/Min, but it is rarely applied for health products in the public sector and will not be covered in much detail. Explanations and examples of Continuous Review are in the Logistics Handbook.

### **System 3 - Standard Version of Max-Min**

Explain to students that the third version of Max/Min is also seldom used for health products in the public sector, but information on it is available in the Logistics Handbook.

Stress that the name Standard does not mean that the system itself is standard. It just means that the amount you may order is standard. This means, for example, that you may order a certain antibiotic (if it is

in full supply nationally) only in quantities of 500 units, if the system was designed so that was the “standard” quantity for the antibiotic. You would not be able to order 200 units or 1000. In some systems, this simplifies the mathematical calculations and is effective.

## **Recap of the Forced Order Decision Rule**

Forced Ordering - Ask students what usually causes you to place an order in a Forced Ordering system; what the trigger is for placing a routine order. The students should respond that in Forced Ordering you place an order based on what the date is, on the review period. (Students may also add that they would also place an order at the Emergency Order Point.) Summarize by saying that the date is the trigger, except in emergency ordering situations.

## **5. Using Max-Min – Worksheet & Exercise – 30 min**

**Note:** the answers for this exercise are also provided at the end of this session’s training notes.

Ask students to open their **Student Workbooks** to Session 7 and the page titled **Forced Ordering – Maximum-Minimum Inventory Control Exercise 1**. Before starting be sure students are clear about the steps and the end result of calculating the order or issue quantity. For this exercise ask students to first calculate average monthly quantity dispensed and let facilitator know when done.

Allow students to work and review the exercise checking answers. Ask students if they have any questions. Show slide **1: Answers to Forced Ordering Max Min**.

Summarize by asking students why we keep going to all this trouble to convert back and forth from number of months of stock to quantities. Answer is that as consumption changes, the length of time a particular quantity of product will last also changes, so if you want to keep enough products on hand to last a particular amount of time, you have to keep redoing the conversion.

Tell the students that when we first talked about using Max/Min systems, we said that we set all stock levels in Months of Stock. Ask the students what our reason was for using Months of Stock. The students should respond that it allows our maximum and minimum stock quantities to adjust according to our consumption.

## **6. The Six Steps for Setting Minimum and Maximum Stock Levels and Emergency Order Point – Interactive Lecturette – 65 minutes**

## Introduction

Invite students to follow along in their Handbooks starting on page 64.

Tell the students that we have now seen the decision rules for all versions and variations of the Max/Min systems that we will cover. We will now look at how these systems are designed. We will investigate how designers determine the appropriate stock levels for Forced Order.

Emphasize that the students need to know this in order to design the system, but the storekeepers and clinicians don't need to know anything except the decision rule and how to do the calculation as we have done with our condom clinic examples.

Remind the students that in a Max/Min system, the idea is simply that the stock balance should generally fluctuate between Max and Min, though in fact the balance does go below Min, as you will see.

### **Note that:**

- Min is set at a level high enough to ensure that the facility never runs out of stock, and that it rarely has to place an emergency order, which is likely to be expensive or at least time-consuming.
- Max is set low enough to ensure that the stock all fits in the storeroom and that it doesn't sit there so long that it expires before it can be used.

Our goal is to avoid stock outs and to do it economically and efficiently as possible. Of course Max/Min can function only when a product is in full supply nationally or at least in the particular programme it is used in. For example, if there are not enough vaccines coming into a country or being produced there, then a Max/Min system cannot magically create enough vaccines to distribute everywhere.

But for the priority products that a country has committed to have in full supply, either by donations from donors or from direct purchase, then a Max/Min system works very effectively to keep all sites supplies and avoid stock outs. It gets the products to the people who need them.

Show again the **Slide 6** with Storekeeper's Decision Rule (Forced Ordering Version with Emergency Order Point), and the hypothetical clinic with the 200 condoms in it set up on the table.

Tell the students that when we design the inventory control system, we will follow the following steps as seen on Show **Slide 8: Setting Max-Min Levels**. Review these steps.

### Step 1 Determine Our Lead Time

Show **Slide 9: Step 1: Determine Lead Time**

Ask students what Lead Time is again and get a few answers. The students should respond that Lead Time is; the time between when stock is ordered or issued and when it is delivered and available for use". It is one of the most important determinations for a system designer to calculate.

Ask students next what "Lead Time Stock" is. Students should respond that it is the number of months of stock used after an order is placed (or issue determined) and before you receive the new order. Put another way it is the number of months of stock used after an order is placed or an issue is determined.

Tell students that when calculating the lead time stock level they will want to adhere to the following principles:

- Lead time should be the average of the lead time levels for the past 2 or 3 review periods for the average facility
- If there was a stock out in the previous 3 months, that month should be disregarded and an earlier month substituted in
- If in doubt, assume a longer lead time to account for all scenarios
- Lead time needs to be determined for each level of the pipeline.
- Account for differences between rural and urban facilities by determining lead time for each if there is significant differences

Mention that Max-Min works better where Lead Time is less than the Review Period. When Lead Time is greater than the Review Period, then stocks ordered previously will still be in transit when it is time to place the current order. Mention that this is not a problem if you have a system where you can be sure that all orders will be filled all of the time, but in systems that don't work as well, you can't be sure if you can count on eventually receiving your previous order or not.

### Lead Time in Delivery Truck Variation of Forced Ordering

Ask the students what special situation is found in the Delivery Truck Variation of Forced Ordering. The students should respond that Lead Time is 0 since the products are delivered on the spot.

### Step 2 Set the Review Period

Show **Slide 10 Set the Review Period** and invite students to follow along on page 65.

Ask students what a Review Period is. Take responses and clarify that we define it as the routine interval of time between assessments of stock levels to determine if additional stock is needed.

Explain that it is not always possible to set the review period as they may already be established based on existing review or reporting periods. When designing a max-min system though, it is best to use reporting periods as review periods. Linking the two will help ensure that reports are made. If facilities receive new products each time they provide a report it is powerful incentive for them to complete and send them in.

Suggest that it is best to set review periods at the frequency that we want orders processed. Making, filling, and delivering orders takes resources so we don't want to over tax our capacity by having frequent review periods yet we don't want to make our pipeline too long and require large amounts of inventory by having them too infrequently either. Of course each level in the system will have their own review period for resupply.

Tell the students that in most logistics systems, the review period is either monthly or quarterly and that it coincides with the reporting schedule for the LMIS. Mention that at lower levels, the review period is often monthly, since we usually want lower level facilities to hold less stock, meaning that it would need to be replenished more frequently. Once we know the Review Period, we can set the "Review Period Stock." Tell students that if we want the facility to generally be at or near their Min at the end of the Review Period, then the storekeeper has to order (or be issued) at least enough at the beginning to cover the amount which he/she will dispense/issue during the period. Remind the students that is what we mean by "Review Period Stock Level" the amount that the facility is likely to issue or dispense in a "normal" period.

Remind the students that we are still always working in terms of months of stock rather than absolute quantities for all figures, including the Review Period Stock Level.

### Step 3 Set the Safety Stock

Ask students what is meant by Safety Stock. Students should respond that Safety Stock is simply a buffer against uncertainty. Ask what are the reasons that your stock situation is likely to turn out differently than you expect. Answers should include:

- Demand greater or less than you expected
- Delivery delays
- Stock shortages at the supplying facility
- New program with uncertain demand
- Theft, expiry, product loss

So, Safety Stock is the buffer, cushion, or reserve stock kept on hand to protect against stockouts caused by delayed deliveries or markedly increased demand. This definition works for systems that have full supply.

### Determining Safety Stock

Invite students to turn to page 66.

Remember, safety stock is the buffer, cushion, or reserve stock kept on hand to protect against stockouts that are caused by delay in deliveries, increased consumption, or product losses.

Refer to **Slide 11** with the formula:

Formula:

Safety stock [greater than or equal to]  $\frac{1}{2}$  review period

As a general guideline the Safety Stock level should be equal to at least half of the Review Period Stock Level. You can use this as a starting point if you don't have any better information to work with.

Remind the students that the Review Period Stock Level is just the amount that the facility is likely to issue or dispense in a "normal" Review Period.

Emphasize that setting the Safety Stock level is one of the most important decisions the system designer must make. Ask the students how the safety stock level should be set if you are very uncertain of either demand or distribution system performance. The students can respond, or the facilitator can explain that in a context of high uncertainty or with a new program, the safety stock level must be higher. Once set, the system is monitored and the level can be lowered. You will want to monitor because setting it higher increases the quantities stored which has cost and storage considerations and increases the risk of expiry.

Then ask the students how the safety stock level can be set if demand is stable and the logistics system functions well. The students should respond that the safety stock level can then be set lower.

Summarize this discussion by repeating that the safety stock level is directly proportional to the level of uncertainty in the system.

Ask the students what they would do in a situation with a new system where they do not know how the system will function or what demand will be. The students should respond that it is better to make the safety stock level higher, and then monitor system performance closely to see whether you guessed right or not.

Explain that in a properly operating system, the Safety Stock level should be high enough to prevent stockouts when problems occur, so that personnel at the lower levels will not find it necessary to lie about how much they need.

#### Step 4 Set the Minimum

After setting the lead time, review period, and the safety stock we are ready to establish the minimum months of stock we should keep on hand.

Ask students again what the Minimum tells you? The students should respond that Min is the stock level which you would like the facility to have on hand at the end of a normal Review Period. Min must be high enough to prevent stockouts when things do go wrong.

Inform the students that for Max-Min inventory control, the Min should be set to be the approximate stock level that you want the facility to have on hand at the end of a "normal" review period.

Additionally, Min must clearly include the lead time stock level. This is because you will need stock to distribute after you place an order and are waiting for the order to come in. For example, if it takes a month from the time you place an order until you receive and unpack your new stock, the min must be at least one month.

Ask the students if it is surprising to them that our Min includes enough stock to cover the lead time. Students should respond that it is not surprising. Explain that the Min has to include at least the amount of stock you will need to last from the end of the Review Period when you prepare and place an order until you can get more. If it is a month from the time you order until the time you receive and unpack your new stock, Min had better be at least one month.

Point back to the Min in the forced ordering system hypothetical clinic and remind students that the Min was 2 months and the average monthly consumption was 100 condoms. Ask the students if clinic has reached Min? (Answer: Yes.) Ask the students if the Storekeeper cares. (Answer: No; in fact, he does not even know.) Ask the students if they, as system designers care. (Answer: They had better care! They want the stock level to be at or near Min at the end of the review period.)

Ask the students why you might design a Max-Min system this way: why one would want to set a Min of 2 months if the clinic can order more supplies every month? Students answers may include: (write the answers on flip chart).

- It may be a long time from the time you order until the time you receive the product
- You may see more clients than you expect, and so will need more stock than you thought
- Deliveries may be late
- You may not get everything you order.

Summarize these ideas by saying that the Min has to be set high enough to take account of:

1. The normal time needed to replenish stocks, and
2. All other uncertainties in system operation.

Mention that this is the case for all versions of Max/Min.

### Setting the Minimum Stock Level: Forced Ordering and Continuous Review

Explain that the formula for setting the Min is the same for Forced Ordering and Continuous Review versions of Max Min

Show **Slide 12: Formula for Setting Minimum Stock Level** (Forced Ordering and Continuous Review Versions):

$$\begin{array}{ccccc} \text{Min} & & & \text{Lead} & & \text{Safety} \\ \text{Stock} & & & \text{Time} & & \text{Stock} \\ \text{Level} & = & & \text{Stock} & + & \text{Level} \\ & & & \text{Level} & & \end{array}$$

where lead time < review period

Invite students to follow along on page 66 in their **Logistics Handbook**.

Remember, the min stock level should approximately equal the stock level you want the facility to have at the end of a normal review period. Set the Min high enough to account for the normal lead time needed to replenish stock and to cover unexpected delays and uncertainties in the logistics system. Take into account the following factors:

- Lead time may be variable
- Consumption may be higher than expected, therefore you may need additional stock
- Deliveries may be late

#### The Storekeeper and Minimum level

In Forced Ordering System the storekeeper just orders up to max at each review period. The storekeeper doesn't really need to know the min but the designer of the system needs to for establishing the appropriate levels.

#### Step 5 Set the Maximum Level

Tell the students that once the Minimum has been set, we can then set the Maximum. Show **Slide13: Formula for Setting Maximum Stock Level** Tell the students that the formula can also be found on page 67 of the Handbook.

$$\begin{array}{ccccc} \text{Maximum} & & \text{Minimum} & & \text{Review} \\ \text{Stock} & \geq & \text{Stock} & + & \text{Period} \\ \text{Level} & & \text{Level} & & \text{Stock} \\ & & & & \text{Level} \end{array}$$

Make sure everyone knows what " $\geq$ " means. We want to set the max level higher than the sum of the min and review period when it makes sense to do so.

#### Step 6 Setting the Emergency Order Point

Ask the students if they think that following the Max-Min system can always ensure that we have enough stock available. As a back up question, ask the students if there are ever times when we could run short of stock even if Max-Min is followed perfectly. The students should respond that in exceptional cases (theft or other loss of large quantities, higher than average consumption), we may face stock shortages.

Tell the students that to deal with such possibilities, it is common in Max-Min systems to also establish an Emergency Order Point, defined as the stock level at which an emergency order should be placed to avoid a stock out regardless of whether the end of the Review Period has been reached. Mention that in such cases the storekeeper's decision rule is slightly more complex.

Display **Slide 14 Set the Emergency Order Point** and invite students to follow along on page 68 in their Handbook.

$$\begin{array}{ccc} \text{Emergency} & & \text{Longest} \\ \text{Order} & \geq & \text{Lead Time for} \\ \text{Point} & & \text{Emergency} \\ & & \text{Shipment} \end{array}$$

Tell the students that even after you have correctly determined your Min and your Max, something is bound to happen that is worse than you ever dreamed: the truck breaks down permanently, or, more positively, an IEC campaign succeeds beyond your wildest dreams and consumption doubles.

An Emergency Order Point will allow you to deal with these cases. As with Max and Min, the Emergency Order Point should be stated in terms of number of months of stock.

Ask the students what they would choose for the Emergency Order Point. Students will likely give a variety of answers. Summarize their remarks/ideas by saying that in general, the Emergency Order Point should be the longest lead time required to receive an emergency shipment (or maybe a little more if you're a skeptic). This is called emergency lead time.

Ask the students if we should set EOP to the Min. They should answer "no" because EOP includes the Buffer Stock. The EOP needs to be equal to or greater than the longest lead time in case urgent orders take as long to process as routine orders.

### Applying the Rules

Tell students that you want to give them an opportunity to practice some of these principles by presenting a few situations.

- Return to the condom clinic on the table, and remind students that Min is 2 months and the Review Period is 1 month. Ask them what Max is. The students should respond that Max is 3:  $3 \geq 2 + 1$ .

$$\begin{array}{ccccc} \text{Maximum} & & \text{Minimum} & & \text{Review} \\ \text{Stock} & \geq & \text{Stock} & + & \text{Period} \\ \text{Level} & & \text{Level} & & \text{Stock} \\ & & & & \text{Level} \end{array}$$

- Remind the students that we are still always working in terms of months of stock rather than absolute quantities for all figures, including the Review Period Stock Level. Ask them what the Review Period Stock Quantity would be for our clinic. Students

should respond that it is 100 condoms: 1 month x 100 condoms per month average consumption.

## **7. Final System Design Considerations–Discussion –15 minutes**

Tell the students that once you have set up initial Max-Min policies for each level and type of facility, the next step in overall system design is to check whether the overall distribution system will function properly if the level-specific Max-Min policies are implemented.

### **Length of Pipeline**

The first thing to do is to check the total length of the pipeline that the policies at each level imply. (The facilitator should make sure students know what "pipeline" means, which they learned in the Introduction to Logistics.)

Ask students how long should a pipeline should be. Ask them to review this example. Remember that this time period is added to any time that pre-dates the commodity's arrival in-country. When the max stock levels are added to the total pipeline is even longer.

Ask students to imagine that they had a pipeline with the following Max levels. The Central Warehouse has a Max of 12 months and a Minimum of 9. Regional 9 max and 6 min and so on. Write the information below on the board.

12 for Central  
9 for Regional  
6 for District (or higher)  
3 for Clinics  
(30 or 2.5 years total)

Ask the students what the length of the entire in-country pipeline is. The students should answer that the in-country pipeline is 30 months. Explain that you just sum the Maximums from all levels to determine the total pipeline length.

Ask the students if having a 30 month pipeline would change their minds about how they set the Max-Mins by looking individually at each level. Ask the students the significance of having a 30 month in-country pipeline would be. Discuss that the one obvious answer is that shelf life becomes very important and with an in-country pipeline of 30 months many health commodities would be at or near expiration by the time they went through the system.

For example: Depo-Provera® from USAID would probably not make it down this pipeline before it expired, even if it were fairly new when it was received. Mention that products may be more than a year old by the time they get from the manufacturer to the central warehouse.

Ask the students what they might do to reduce the length of the pipeline, and note their answers on the board. Responses should include the following. As each solution is noted discuss what it would entail:

- Shorten review periods. The result is more frequent resupply which results in more frequent deliveries and additional transportation. This also results in more calculations on the part of the personnel.
- Reduce the lead time. Lead time is extended due to administration (i.e. signatures and approvals). Reducing the lead time will reduce max and min levels. To reduce the lead time, you must change the process.
- Improve reliability to reduce safety stock levels. Safety stock is kept primarily because of uncertainty about the system's ability to provide routine service.
- Eliminate a level from the supply chain. This will result in large resource savings and is often the best method. [LOOK back at the example.] This can impact transportation and supervision at higher central levels and be politically hard to manage. But, it is possible.
- Reduce the Maximum Stock Level. Students should respond, or the facilitator can mention that they can't simply choose lower levels arbitrarily; they would have to change one or more of the components of Max (and Min). Ask the students what elements of the formulas they would have to change in order to reduce the Max. Answers can include:
  - shorten the Review Period at one or more levels
  - reduce the Lead Time at one or more levels
  - improve the distribution system's reliability at one or more levels so that Safety Stock can be reduced.

Point out that by making these changes, you could reduce the length of the pipeline by maybe 5 months, possibly more.

Ask the students what other factors might affect their determination of Maximum and Minimum stock levels besides the length of the pipeline.

Note factors on the board and explain how each affects stock levels. Factors should include:

- cost of contraceptives
- reliability of transportation
- storage capacity
- cost of storage
- storage conditions at different levels
- shelf-life of health commodities
- lead times
- reliability of source of supplies
- effect of a zero balance of stock
- management skills of staff
- age of program
- accuracy of forecasts.

Sum up by explaining that when Maximum and Minimum stock levels are first set, you must watch stock levels carefully for the first few months to be sure levels are adequate, and adjust if necessary. Note that Maximum and Minimum stock levels should also be reviewed and adjusted if necessary during periodic assessments of the logistics system. This is a key step in moderating the pipeline.

## **8. Advantages and Challenges of Max-Min and Session Conclusion Large Group Discussion – 10 minutes**

Tell the students that we have now seen a total of five versions and variations of Max-Min systems. Ask the students to recall generally what the advantages are to using any Max-Min system. Participant responses can include:

- Avoid overstocking
- Avoid understocking
- Minimize wastage
- Avoid costs of emergency orders
- Simplify inventory control decision-making
- Consistency of stock levels aids forecasting.

Tell the students that while we certainly want to have a system to help us to achieve these purposes, there are certain challenges that we face when we try to select and design a system in practice. Ask students if they can recall any of the challenges that were mentioned during our discussions of each of the versions and variations. Participant responses may include: (The facilitator can provide “clues” or specific questions to elicit one or more of the following if the students are unable to identify these on their own.)

- Systems with numerous levels
- Systems that manage a large number of commodities
- Systems that manage products for new programs

Tell the students that these challenges and others are magnified when we consider the contexts in which health commodities are managed and the kinds of programs whose products are managed using inventory control systems.

Tell the students to think of each situation below and to identify particular challenges in selecting a Max-Min system: (example challenges are given for each situation)

A single system that manages long and short shelf life products (e.g, contraceptive with 4 – 5 year shelf life, HIV tests with 1.5 year shelf life)

- Can the same Max-Min levels be used for all of the products?
- Can the products be distributed through the same system, i.e., number of levels in the system?

A country that has numerous vertical systems managed by the same people (e.g., districts and clinics that manage all categories of products, each category of which is vertically managed at the higher levels)

- Can the personnel who manage the system be expected to manage each set of products correctly according to different systems?
- What happens if products also move through different distribution systems? Will the commodity managers be overloaded or unable to cope?

A country that has numerous vertical systems managed by different people (TB program with its own dedicated staff, FP/RH program with

its own dedicated staff, HIV/AIDS program with its own dedicated staff, etc.)

- Must each of the systems be a different version? With different Max-Min levels?
- What happens if the same products are managed in different programs? Will/can they have different Max-Min levels? Will/can they have different Emergency Order Points?

Summarize this part of the discussion by mentioning that we can see that designing an inventory control system can get rather complicated, yet it is essential to have and implement a system in order to ensure product availability.

Note: Tell the students that during this session we have been discussing the design of the inventory control system, which is one of the components that need to be addressed when developing a logistics system.

Mention to students that to further expand their knowledge on the other components to consider when designing a system, that they should read the Chapter on **System Design** in the **Logistics Handbook**.

Ask students if they have any questions at this time about Max-Min and its versions and variations. Clarify any terms and any confusion about the three versions, and tell the students that we will come back to issues related to Max-Min systems at other times during the course.

### **Synthesis Questions**

1. What is the purpose of an Inventory Control System? (see Activity 1)
2. What triggers order placement of stock in the Forced ordering version? (end of review period)
3. Define the following:
  - Max stock level/max quantity (level of stock above which inventory levels should not rise. Set in “number of months of stock” and it indicates how long supplies will last).
  - Min stock level/min quantity (the level of stock at which actions to replenish inventory should take place. Also expressed in months of stock).
  - Review period (the time scheduled to examine stock levels and determine if additional stock is needed).

## Activity 5 Using Max-Min – Exercise Answers

### FORCED ORDERING MAXIMUM-MINIMUM INVENTORY CONTROL

July	12	2108
August	12	2868
September	12	2424

**7,400 Brand X condoms consumed in the last 3 months**

#### Step 1: Calculate average monthly quantity of Brand X consumed

$$\frac{7,400 \text{ Brand X condoms}}{3 \text{ Months}} = 2466.7 \text{ or } 2467 \text{ average monthly quantity Brand X condoms consumed}$$

#### Step 2: Calculate reorder quantity

$$\begin{array}{l} \text{Maximum Brand X} \end{array} \quad \begin{array}{l} 2467 \text{ average monthly} \\ \text{consumption} \end{array} \quad \begin{array}{l} \times \\ \text{stock level} \end{array} \quad \begin{array}{l} 5 \text{ months} \\ \text{Maximum} \end{array} = \begin{array}{l} 12,335 \\ \text{quantity} \end{array}$$

$$\begin{array}{l} \text{Order} \\ \text{Quantity} \end{array} = \begin{array}{l} 12,335 \\ \text{Max quantity} \end{array} - \begin{array}{l} 2,335 \\ \text{quantity on hand} \end{array} - \begin{array}{l} 3,000 \\ \text{quantity on order} \end{array}$$

Order Quantity = 7,000 or rounded up to **three cases of 3000** each

## 8. Review Game

.....

### **Objectives:**

To review key concepts learned in the course so far in an interactive and fun manner.

### **Time:**

Sixty minutes but the game can be shortened or lengthened depending upon the needs of the group and available time.

### **Materials:**

questions cut into individual strips,  
a container for the questions,  
board for keeping score,  
a watch to count 30 seconds,  
small prizes like candy for incentive and fun

### **Lecturer Preparation:**

It is helpful to have a score and a time keeper to assist with this activity. Check to see if the questions are appropriate for how far the class has progress during the course. Add more if desired

Make a copy of the questions found at the end of these notes. Cut into strips, fold each strip, and place in a bowl or container

### **Instructions:**

Here are some useful guidelines but the Lecturer should use what works best for the group.

Divide the students into three groups. (Lecturer may want to pre-assign people to groups to make it equally competitive or simply divide people by where they are sitting in the room.)

Make a copy of the questions on the following pages. Cut these questions into strips of paper and place in a container such as a small bowl or box. Students pick the questions out of the box and gives it back to the Lecturer who reads the question. The correct answer is provided with each question so the Lecturer can quickly determine if the answer is correct and thus assign the appropriate points (or not)

Before starting determine which group goes first and then second and third. Have each team form a single file line starting at the front of the class room.

The first group will have their first person in line try to answer the question he or she pulls from the container. Only that person may try to answer at first. This person has 30 seconds to answer the question. There will be a penalty of one point if anyone else in the group tries to give him/her the answer. If the person answers the question correctly, then the group gains two points; if the person cannot answer correctly, that person's group gets a chance to answer it correctly for one point. They get an additional 30 seconds to answer.

While that group confers, the other groups should be doing the same. If the original group does not answer it correctly, one of the other groups can answer correctly for one point. However they will lose one point in they are wrong.

The other two groups will have to rely on their respective captains to raise their hand first in order to get a chance to answer the question. If the second group answering is wrong, the third group get a chance to try to answer the same question. All decisions by the judge are final.

Depending on the time, every participant should be able to try to answer at least one question.

The team with the most points at the end is the winner and gets a small prize if available.

## REVIEW QUESTIONS FOR ROUND ONE

1.1 A QUESTION ABOUT INFORMATION FROM THE ICEBREAKER.

1.2 NAME FIVE COMPONENTS OF THE LOGISTICS CYCLE.

- Product selection
- Procurement (Forecasting, Purchasing, Ordering, Receiving)
- Distribution (warehousing, repackaging, processing orders, transport)
- Serving customers
- LMIS
- Human Resources
  - Budgeting
  - Supervision
  - Quality control

1.3 NAME FIVE OF THE RULES FOR PROPER STORAGE.

[See storage guidelines.]

1.4 NAME THE SIX "RIGHTS" FOR LOGISTICS.

goods, quantity, condition, time, place, cost

1.5 DEFINE "PIPELINE."

The pipeline is the entire chain of storage facilities and transportation links through which supplies move from the manufacturer to the consumer, including the port facilities, central warehouse, regional warehouses, district warehouses, all service delivery points and transport vehicles.

1.6 What is another name for systems that are Push or Pull?

Allocation Requisition

1.6 EXPLAIN THE DIFFERENCE BETWEEN A PUSH SYSTEM AND A PULL SYSTEM.

In a push system, quantities shipped are determined at the higher level. In a pull system, the lower level orders the quantity it wants.

1.7 WHAT ARE THE THREE TYPES OF LOGISTICS RECORDS?

Stock keeping records, transaction records, and consumption records.

1.8 WHAT ARE THE THREE ESSENTIAL DATA ITEMS IN AN LMIS?

Stock on hand, rate of consumption, and losses/adjustments

1.9 DEFINE "LEAD TIME."

The time interval between when new stock is ordered and when it is received and available for use.

1.10 WHICH PARTICIPANT CAME FROM THE MOST DISTANT CITY TO ATTEND THIS COURSE?

1.11 WHAT IS THE DIFFERENCE BETWEEN "ISSUES DATA" AND "DISPENSED DATA"?

Issues data are data on stock moving from one level of a system to another. Dispensed data record the exact amounts of contraceptives actually dispensed to users.

1.12 WHAT DOES "LMIS" MEAN?

Logistics Management Information System

1.13 ON WHAT FORMS ARE LOSSES AND ADJUSTMENTS USUALLY RECORDED?

Correct answers include inventory control cards, inventory control registers, quarterly/monthly reports, and bin cards. [Another acceptable answer would be stock cards, though the term has not been used in the course.]

1.14 IN THE LOGISTICS CYCLE, WHERE IS "QUALITY MONITORING" LOCATED?

At all points in the system: specifically, between selection and procurement and distribution and use and selection.

1.15 NAME COUNTRIES FROM WHICH STUDENTS IN THIS COURSE HAVE COME.

1.16 IS ONE BIN CARD USUALLY REQUIRED PER MONTH, PER LOT, OR PER COMMODITY?

One per lot

1.17 WHAT DOES F.E.F.O. MEAN?

First expiry, first out

1.18 TO ASSESS STOCK, HOW MANY MONTHS OF DATA SHOULD BE USED AND WHY?

- 3 months average
- less than 3 months of data--use as much as you have

1.19 HOW DO YOU CALCULATE MONTHS OF STOCK ON HAND?

Divide stock on hand by average monthly consumption.

1.20 GIVE THE NAMES OF ALL OF THE STUDENTS AT THIS COURSE.

(first names are okay)

1.21 IF A QUANTITY OF CONTRACEPTIVES IN A WAREHOUSE REQUIRES TEN SQUARE METERS OF STORAGE SPACE, HOW MANY METERS OF HANDLING SPACE WOULD IT REQUIRE?

Ten square meters would also be required.

1.22 NAME THREE ADVANTAGES TO USING A MAXIMUM-MINIMUM INVENTORY CONTROL SYSTEM.

Reduces stockouts  
Reduces surpluses  
Reduces expirations  
Facilitates forecasting  
Optimize storage and transport resources  
[Several other answers possible]

1.23 IN A FORCED ORDER MAX/MIN SYSTEM, WHEN SHOULD YOU PLACE AN EMERGENCY ORDER?

When you reach the emergency order point

1.24 WHAT DOES “MAXIMUM QUANTITY” MINUS “STOCK ON HAND” MINUS “QUANTITY ON ORDER” EQUAL?

Order quantity

1.25 WHICH SHOULD BE LONGER, LEAD TIME OR REVIEW PERIOD, AND WHY?

Order interval should be longer; otherwise there will be difficulty in calculating amounts to order

1.26 GIVE THE FORMULA FOR SETTING THE MINIMUM IN A MAX/MIN FORCED ORDERING SYSTEM.

Lead Time + Safety Stock = Minimum (Where safety stock = Buffer against uncertainty)

1.27 GIVE THE FORMULA FOR SETTING THE MAXIMUM IN A MAX/MIN FORCED ORDERING SYSTEM.

Maximum = or > Minimum + Review Period (True for all versions, all types)

1.28 WHAT IS THE FORMULA FOR DETERMINING ORDER QUANTITY USING A FORCED-ORDER MAXIMUM-MINIMUM INVENTORY CONTROL SYSTEM?

Maximum Quantity - Stock on Hand - Quantity on Order = Order Quantity

1.29 NAME THE DIFFERENT VERSIONS OF MAX/MIN.

standard, forced ordering, continuous review

1.30 IN WHAT UNITS DO WE USUALLY DESCRIBE STOCK STATUS, MAXIMUM STOCK LEVEL, MINIMUM STOCK LEVEL, ETC. ?

Months of stock

## **QUESTIONS FOR THE SECOND ROUND**

### **2.1 NAME TWO KEY CONCEPTS IMPORTANT IN LOGISTICS**

Customer service, information for decision-making or systems approach

### **2.2 TO ESTIMATE THE MONTHS OF STOCK ON HAND IN A NATIONAL SYSTEM, WHAT TWO MAJOR DATA ITEMS MUST YOU TRY TO DETERMINE?**

National stock on hand, national monthly consumption

### **2.3 IN BEGINNING A LOGISTICS SYSTEM ASSESSMENT, GIVE THREE OF THE MAIN ELEMENTS DO YOU WANT TO ASSESS.**

LMIS, reporting system, average monthly stock on hand, storage conditions, inventory status, who orders what and how, order intervals, supervision system, transportation modes, staff responsibilities

### **2.4 Three of the first three steps for setting Max Min levels are**

Determine your lead time  
Set the review period  
Set the safety stock

### **2.4 IN SELECTING A MAX/MIN SYSTEM--IF YOU HAVE VERY GOOD TRANSPORTATION, WHICH WOULD YOU SELECT? WHY?**

Continuous review

### **2.5 IN SELECTING A MAX/MIN SYSTEM--IF YOU HAVE MORE THAN 40 ITEMS, WHICH WOULD YOU SELECT? WHY?**

Standard

### **2.6 IN SELECTING A MAX/MIN SYSTEM--IF YOUR MAIL SERVICE IS**

NOT RELIABLE, AND YOU CAN'T EASILY GET TRANSPORT ALL THE TIME, WHICH WOULD YOU SELECT? WHY?

Forced ordering--delivery truck system

2.7 NAME TWO TYPES OF CONSUMPTION DATA.

Issues data and dispensed-to-user data

2.8 WHAT ARE THE FOUR TYPES OF DATA USED FOR FORECASTING?

Demographic, consumption, morbidity, and service statistics.

2.9 FORECASTS BASED ON CONSUMPTION DATA SHOULD BE BASED ON WHAT SPECIFIC DATA?

Dispensed to user or consumption data

2.10 WHAT ARE THE SIX STEPS THAT MUST BE TAKEN TO PREPARE A FORECAST? (can require only 4)

1. Gather and organize the data.
2. Evaluate the data.
3. Estimate past and current use.
4. Plot graph of past and current use.
5. Estimate future contraceptive use using as many data sources as possible, and adjust for program plans.
6. Reconcile the forecasts from the different data sources to produce a "final" forecast.

2.11 OF THE TWO TYPES OF SERVICE STATISTICS - "VISITS" AND "NUMBER OF CLIENTS" - WHICH ONE IS BETTER FOR FORECASTING? WHY?

Visits is better than number of clients (since visits data are usually broken down into new visits and revisits with a standard number of contraceptives issued at each type of visit).

2.12 WHAT DO THE FOLLOWING DEMOGRAPHIC TERMS MEAN?  
...WRA, CPR, CYP

Women of reproductive age,

Contraceptive prevalence rate,

Couple Years of Protection

2.13 WHAT IS THE STANDARD NUMBER OF CONDOMS  
CONSIDERED TO GIVE ONE COUPLE YEAR PROTECTION?

120

2.14 NAME 3 IMPORTANT SKILLS A LOGISTICS ADVISOR NEEDS ....

Analytical skills, knowledge of logistics, understanding of system  
operations,

2.15 WHAT LANGUAGE BESIDES ENGLISH IS SPOKEN BY MOST  
PEOPLE IN THIS ROOM?

2.16 WHICH FORECASTING METHOD IS BASED ON THE “NUMBER  
OF INCIDENTS OF A DISEASE?”

Morbidity

2.17 NAME TWO STEPS FROM THE MODEL FOR SUPPLY CHAIN  
IMPROVEMENT.

- Analyze Data
- Select, Plan, Design, Implement or Monitor Interventions
- Complete Assessment

2.18 WHAT IS THE DEFINITION OF REPRODUCTIVE HEALTH  
COMMODITY SECURITY?

RHCS is achieved when every person is able to choose, obtain  
and use quality contraceptives and other reproductive health  
commodities whenever he/she needs them.

2.19 LIST THREE INDICATORS OF SYSTEM PERFORMANCE

- Stocked according to plan, duration of stock-outs, % reporting,  
% accuracy of reporting, stock-out on day of visit, etc.

## Mid-course evaluation

Students will be given the opportunity to share their experiences about how they feel the course is going so far.

The Lecturer needs to be observant all along and maintain a sense of how the course is progressing, session by session. They can supplement observations with short discussions with the group and casual conversations with individuals.

But more formal interim course evaluations are important in helping Lecturers know if in general they are on track in reaching the agreed-upon-objectives. Unfortunately, there is often not much time for interim evaluations, and students may not give thoughtful comments or ratings if evaluations are detailed.

The format below is very K.I.S.S. ("Keep it short and simple.") It takes about five minutes and can be very flexible. The Lecturer begins with these instructions:

- Ladies and gentlemen, would you please take a sheet of scrap paper. Do not write your name on it, but number it from one to eight. Any sort of paper will do.
- I am going to ask you some questions, and all you have to do is write the brief answers. Do not write the questions. I will repeat all the questions twice.
- The only answers you may give are on this list. Just pick your choice of these five answers for each question. (The Lecturer has written in large letters on a flip chart sheet these choices.)

Very Poor

Poor

Satisfactory

Good

Very Good

- When I ask you a question, all you have to do is write one of these possible answers. Don't write the question. Don't write your name on your scrap paper. Here is Question 1:

1. So far, our progress in reaching the goals and objectives of the course have been \_\_\_\_\_
2. The training methodology and techniques have been \_\_\_\_\_

3. Participation by the students has been \_\_\_\_\_
4. The set-up, organization, and materials for the course have been  
\_\_\_\_\_
5. The usefulness of the technical content of the course has been  
\_\_\_\_\_
6. At this point, I believe my ability to use what we are learning will be  
\_\_\_\_\_
7. Overall, I would rate the course to date as \_\_\_\_\_
8. If there are any brief additional comments you would like to make, please write them for Question #8. (Pause a few minutes to let students write)
9. When you have finished, please pass your piece of paper to \_\_\_\_\_  
(name of a participant or alternatively pass them up to the marked envelope on this table – or wherever.) Thank you very much.

## 9. Assessing Stock Status at Any Level

### ..... Session Objectives:

By the end of the session students will be able to:

1. explain how to assess the stock situation at the any level, including the national level
2. explain how aggregated data can give a false impression of actual stock situations
3. explain how stock status can indicate the overall quality of commodity management
4. identify how Pakistan's web based LMIS data is aggregated

**Time:** 90 minutes

### Materials:

Prepared board or flipcharts: a diagram of a basic in-country pipeline with clinic, district and central levels. Note Central level max/min = 9/6, District = 6/3, SDP = 3/2.

### PowerPoint Slides:

1. Session Title Slide
2. General Formula to Calculate Months of Stock on Hand
3. Stock Status: Each Level Aggregated
4. Stock Status: District Level Disaggregated
5. Stock Status: Single District Various Products
6. Stock on Hand at the Central Level
7. Stock on Hand at all Levels
8. Scenario A
9. Scenario B
10. Pakistan's Web-based LMIS (title slide)
11. Web-based LMIS
12. Flow of information in Web-based LMIS
13. National Summary Report
14. Provincial Summary Report
15. District Report
16. Stock on hand of COC in Gilgit Baltistan
17. AMC of COC for AJK Jan-June 2010
18. Comparison of Districts PWD Consumption of Cu-T 380

### Lecturer Preparation:

Facilitator should review the PowerPoint presentation corresponding to this session in advance, to become familiar with its use and with the materials it includes.

Facilitator should also prepare the in-country pipeline flipchart.

## Learning Activities Summary

Title	Type	Time
1. Assessing Stock Status at Any Level	Large Group Discussion	30
2. Scenarios	Large Group Exercises	20
3. Further Points	Large Group Discussion	10
4. Pakistan's web based LMIS	Lecturette and demonstration	30

### Learning Activities:

#### 1. Assessing Stock Status at any Level – Large Group Discussion– 30 minutes

Remind students that in the session “Assessing Stock Status,” we worked with Stock on Hand and AMC from clinics and a district to determine stock status. As a review, ask the students what it means to assess stock status. Students should respond that assessing stock status tells us:

- Months of stock (MOS) available
- How long our stocks will last, if consumption remains the same
- If we are overstocked or understocked.

Ask the students what two pieces of data we need to determine our months of stock. Students should respond: stock on hand and average monthly consumption. Ask the students what additional piece of information we need to actually assess our stock status. Students should respond that we need to know the maximum and minimum levels for each level of the system.

Show **Slide 2: General Formula to Calculate Months of Stock on Hand**.

**Note:** Use the Prepared board or flipchart 1 with the sample in-country pipeline during the following discussion. Annotate the diagram as you go through the discussion, e.g., clinic SOH, total clinic AMC, etc.

Ask the students where we got our stock on hand figures to determine the stock status of the clinic level. Students should respond that the stock on hand figures came from the clinic level (clinic stores plus dispensing stations).

Ask the students where we got our stock on hand figures to determine the stock status at the district store. Students should respond that the stock on hand figures came from the district store.

Finally, ask students where we got our stock on hand figures to determine the stock status of the district as a whole. Students should respond that we got the figures by adding the district store stock on hand quantity to the total of the clinic level stock on hand quantities.

Ask the students where we got the AMC figure for all of these situations. Students should respond that we got the AMC figure from the total dispensed to user number for all clinics. This is true for assessing stocks at any level of the system.

Finally, ask the students where we would get the stock on hand figures to assess the central level alone. Students should answer from the central store stock on hand. Ask the students where we would get the stock on hand figures to assess the country as a whole. Students should answer from the central level store stock on hand plus the total stock on hand from all the regions and all the districts and all the clinics in the country. The AMC figure comes from the total dispensed to user from all the clinics in the entire logistics system.

Ask the students to recall what we had said earlier about using issues data instead of actual consumption data. Points raised should include that using issues data instead of consumption data could give us a false impression of our stock status, if the issues data is not close to the actual dispensed data (i.e., in a poorly run push system or if order quantities are not tied to actual consumption and stock on hand).

Ask students why they think it would be important to know the stock status at different levels. For example, what does the national stock status tell us about the condition of the logistics system?

Among other things, the discussion should include the following:

- Is the country as a whole overstocked or understocked?
- Are the max and min levels reasonable?
- Will health commodities expire/deteriorate in storage before reaching end users?
- Will additional shipments cause an overstock in the country, or, alternately, are emergency shipments required?

Tell the students that we need to be careful when we assess stock status, particularly if we are using aggregated data at one or more levels. To demonstrate this, show **Slide 3: Stock Status Each Level**

**Aggregated.** Ask the students to “assess” the stock status for condoms at the central, district, and SDP levels and for the country as a whole. Students should respond that the stock situation looks normal; all levels are stocked between their minimum and maximum stock levels. Ask the students if we need to take any particular action based on these numbers. Students should respond that we do not; things look fine.

Show **Slide 4: Stock Status: District Level Disaggregated.** Ask the students to look at the disaggregated numbers by district. Ask them if things still look normal and if no action needs to be taken. Students should respond that in fact only two districts are stocked according to plan; one is understocked, one is overstocked and one even has a stockout of condoms. Remind the students that this is one danger of using aggregated data.

Tell the students that in addition to looking at the MOS numbers to tell us our stock status, we can also use them to determine how well an individual facility is managing its products. As an example, **show Slide 5: Stock Status: Single District, Various Products.** Ask the students what conclusions they might draw about this district’s ability to manage its stocks. Students should respond that this district is poorly managed and they apparently do not adhere to max/min principles. Remind the students that if a facility is correctly adhering to max/min levels, then the stock levels of all products should be approximately the same at any given time.

There can of course be some variation based on actual consumption month to month, but generally stock levels should be roughly similar for all products. We certainly would not expect to find such a variety as we see here on Slide 5, with some products below one month of stock and others close to ten.

We want to have the best data visibility possible so we can make good judgments for keeping it operating at its optimal level. Data visibility is about what data is available where, when and for whom. Because of limited resources we only receive data so often and in so many formats, or reports. How this done in tern impacts our view and understanding of the system.

Obviously we want the most accurate reflection of the system that we can find. As you see with these recent slides however, aggregating data can simplify things but also hide some truths. However, data that is too detailed can make it hard to understand the big picture. The challenge is to find the optimum type of report and data delivery system so that every level has what it needs to fulfill its responsibilities.

Ask the students to think about what would improve data visibility for them in their job at their facility – or maybe in their system as a whole if

they are in positions of upper management. Who could use more data and what kind of data would that be? Get some examples from students and guide the discussion so that students get a sense of how having access to, or seeing data in different ways, could improve their work. Keep the focus on specific data needed, by whom, and why. Consider that with increasing automation upper levels will have quicker and better access to the data in the facilities they manage.

As a further example of what we can learn by looking at stock status, show **Slide 6: Stock on Hand at the Central Store** and **Slide 7: Stock on Hand at all Levels**, to show the importance of trying to get a complete picture of the stock situation. Note the difference between using stock on hand from only the central level and the stock on hand at all levels when assessing the national stock situation. Looking at the central level alone, as shown in the first graph, we might conclude that we are about to stockout. But looking at the country as a whole, we actually have plenty of products. In fact, the problem that exists is not that we are facing a stockout, but rather that SDPs seem to be accumulating products.

Remind students that the general formula and calculation should be done for each health commodity. Ask students how often an assessment of stock status should be done at any level. Students can reply that an assessment of stock status should be done as often as reports on dispensed to user data are received. At the district level, this might be monthly.

Since districts may not report to the central level until the end of a quarter, the central level may only have new data quarterly. Note that the previous quarter's data can be used, however, as long as the stock on hand is available. It is also possible to assess stock as often as daily. Dispensed to user data can be taken from previous reports and stock on hand data can come from stock cards. In other words, do it often and there is no excuse for not being able to do so, even if using stock cards and issues data!

Tell the students that we face a number of challenges and realities in the field when trying to determine national stock status. These include lack of data due to incomplete or inaccurate reporting, no records from physical inventories, etc. Each problem faced will require a particular strategy; we need to calculate the stock status, but we may not have all the data we need.

Tell the students that we will now look at one or two scenarios (depending on time) and see what challenges we might face and how we can address them.

## **2. Scenarios – Large Group Exercises– 20 minutes**

**Note:** Depending on time availability, the exercises can be done as small group discussions followed by large group summary, or directly as large group discussions.

**Show Slide 8: Scenario A:**

The data you have includes stock levels at the central warehouse, issues data from the central warehouse, 80% reporting from district warehouses of stock levels and issues, and 50% reporting from the clinic level.

Tell the students to work in pairs at their tables and answer the questions shown on the slide for Scenario A (noted below in bold). Tell the students to take 5 minutes to discuss. At the end of the 5 minutes, discuss the students' reaction as a whole group. (Points that can be raised for each question are noted as bullet points for each question below.)

How would you calculate the national stock situation?

- If it's not a push system, you may be able to decide by looking at issues data from central store.

What additional data can you gather on your own?

- You can also ask key informants.
- Look at previous years if there are reports. Look at survey data. Make visits. Make your best guess at quantities.
- Do the same for the clinics. Consumption data is missing. Look at where the non-reporters are.
- You should visit a sample of clinics. If you have some clinic data, check it out to see how representative it actually is.

What assumptions will you have to make?

- Use issues data from the district level as a substitute for consumption for non-reporting clinics.
- Are the 80% reporting warehouses representative?

If time is available after the discussion of Scenario A, show **Slide 9: Scenario B:**

You visit three rural clinics and determine that they have an average of two months of stock on hand of each health commodity. You also visit

the district warehouse and find that they too have two months of stock on hand. The central warehouse has twelve months of stock on hand.

Tell the students to work in pairs at their desks/tables and answer the questions shown on the slide for Scenario B (noted below in bold). Tell the students to take 5 minutes to discuss. At the end of the 5 minutes, discuss the students' reaction as a whole group. (Points that can be raised for each question are noted as bullet points for each question below.)

What can you tell about the national stock situation from this?

- There is no immediate danger of stock-out if months on hand are calculated on consumption data and not issues data.

Can you generalize for the whole country from the few sites you've visited?

- You should not generalize for the whole country without more information.
- Ideally, stock would be further down, but it depends on the order interval at all levels, max-min policy and storage capacity.

What are the next steps you should take?

- Next, find out the order interval. See if there are max/min policies, or how to set some. Estimate consumption if district level doesn't have it.

What further data do you need?

- Document all assumptions.

As a summary, briefly review the use of estimated data when actual data is unavailable.

### **3. Further Points – Large Group Discussion– 10 minutes**

Expiration dates

Ask the students if knowing the expiration dates of the products in the pipeline affects the national stock assessment. Discuss the importance of knowing the expiration dates of the health commodities at all levels and how that affects the national stock assessment: if products are at the regional level and are going to expire in two to four months, they probably should not be counted as stock available in the system.

## Strategies for assessing stock status at the national level

Tell the students that we have discussed the need for doing stock status assessments at all levels of the system, and this includes national level stock assessments. Ask the students what this implies. Students should respond that this means that at some point, all of the stock in the country needs to be counted at roughly the exact same time, so that you have as accurate an idea as possible how much stock is in the country.

Ask the students if any of them have experience conducting national level inventories of health commodities. Ask students what some of the challenges would be.

Mention that there are several strategies for doing national level inventories/stock status assessments. Among these, there are:

- Declare national “inventory day” and have staff at all storage facilities do an inventory of all (or a representative list of) health commodities.
- Contract a local company or NGO to conduct a nationwide inventory.
- Use “cycle counting” as would be done at a large facility: Every month, a defined sub-set of commodities is inventoried; by the end of the year, most or all of the products have been counted for the entire country at least once.
- Average monthly consumption or monthly consumption can be reported for the same products that are being inventoried using any of the strategies noted above.

Conclude by emphasizing that data from the lowest levels possible should always be used and that, as this is the “art” part of logistics, best judgment should be exercised and all assumptions should be well documented.

## 4. Pakistan’s web based LMIS’ – 30 minutes

Show **slide 10, ‘title: Pakistan’s web based LMIS’**. Ask students if they know what a web-based system means and if they have any prior experience with a web-based system. Tell students that web-based systems help ensure commodity security by making data easier to access, eliminating duplications and providing data visibility for monitoring and supervision.

Show **slide 11, ‘Web-based LMIS’**. Tell students that web-based LMIS is an online system and can be accessed through url; [www.lmis.pc.gov.pk](http://www.lmis.pc.gov.pk) The

web-based LMIS supports entry of data from district level. At the district level the data from all service delivery points is aggregated and entered into web-based interface provided by the administrators of the LMIS system. Once district level data is entered, it is compiled and analyses is performed at provincial and federal levels.

Show **slide 12, 'Flow of information in web-based LMIS'**. Tell students that this chart describes the flow of data through the web-based system. The facilities (service delivery points) send paper based reports to districts (respective Departments of Health and Population Welfare). The district enters data into web-based system. The data is then stored on the central server housed at planning commission. The Planning Commission is currently overseeing federal functions of health and population e.g. procurement and the central warehouse. From the server all users of logistics data can access data online. In addition to data from district level, provincial and central stores data is also entered into the server.

Show **slide 13, 'National Summary Report'**. Tell students that National Summary Report provides aggregated data for all the following logistics indicators:

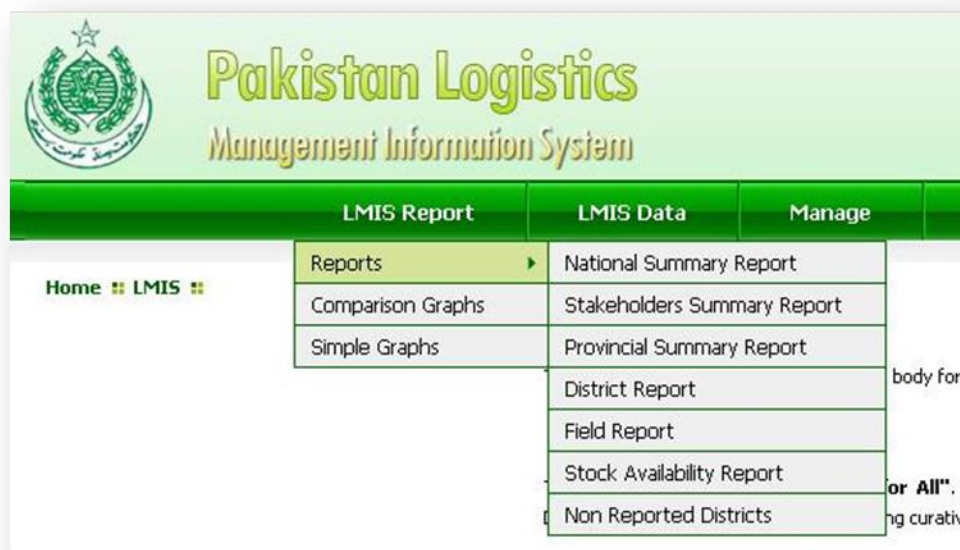
- Consumption
- Average monthly consumption
- Stock on hand
- Months of stock
- Reporting rate
- Availability rate

The national consumption reflects the total sum of issuance of a commodity from all district stores in Pakistan. EXPLAIN to students that LMIS computes the reporting rate by dividing the number of districts which had reported in LMIS with the total number of districts, i.e.

*Reporting rate = Number of districts having reported / total number of districts*  
TELL students that reporting rate helps managers to monitor the timely reporting from districts. The availability rate gives the 'months of stock' at each level in the pipeline and thus quickly identifies the stock distribution issues e.g. under stock and over stock situations.

Demonstrate how to ACCESS reports by opening the LMIS first (The demonstration can be done through local module of LMIS if it is first installed on the computer without having to connect with internet). Tell students that they just need to enter [www.lmis.pc.gov.pk](http://www.lmis.pc.gov.pk) in the web browser to access LMIS from anywhere

BROWSE to national summary report by first placing the cursor onto LMIS reports and then in the reports sub-menu selecting the 'National Summary Report' as shown below



Show **slide 14, 'Provincial Summary Report'**. TELL students that the Provincial Summary Report summarizes the logistics indicators at the provincial level, in the same way National Summary Report does it at National level. TELL students that there are options available to select all stakeholders or a specific stakeholder for the provincial report. TELL students that they can obtain province wise reporting rate and availability rate same as in the case of national report.

Demonstrate how to BROWSE the provincial summary report as shown below

Province	AMC	On Hand	MOS
Punjab	3,178	1,867,552.0	816,880
Sindh	UNK	1,275,871.7	UNK
Khyber Pakhtunkhwa	UNK	862,846.0	UNK
Balochistan	UNK	224,975.7	UNK
AKJ	UNK	27,795.0	615,000
FATA	UNK	18,314.3	UNK
Gilgit Baltistan	UNK	4,264.0	UNK
Islamabad	UNK	73,008.3	UNK
CDA/ICT	UNK	UNK	0

Show **slide 15, 'District Report'**. Tell students that District Summary Report is the most critical of the reports for district level policy makers and

logisticians. TELL students that all logistics indicators are reported for stakeholder in the District Monthly Report. BROWSE the report as shown below

**District Report July 2011**

Reporting Rate: Field: 31 Warehouse: 35 Availability Rate: Field: 31 Warehouse: 36

**District Report**  
Add description for district report in under static page menu

Filter by: Month: July Year: 2011 Province: Punjab

Choose skin to apply: Light

District	Consumption	On Hand	MF
<b>Attock</b>			
P&D PWDs	35,184	34,891.3	35,17
LHW	UNK	UNK	UNK
DOH Punjab	UNK		
<b>Bahawalnagar</b>			
P&D PWDs	122,694		
LHW	UNK		
DOH Punjab	UNK		
<b>Bahawalpur</b>			
P&D PWDs	65,951	66,435.3	149,679
LHW	UNK	UNK	UNK
DOH Punjab	UNK	UNK	UNK

Show **slide 16, 'Total stock on hand for COC in Gilgit Baltistan'** Tell students that in addition to summarizing data in the form of reports, LMIS can also show data in the form of graphs. The X-axis on the graph represents months and Y-axis the selected indicator. Users can select from all the available parameters in the graphs menu and develop customized graphs according to their needs. Tell students that the this slide shows the stock on hand of COC in Gilgit Baltistan form Jan to March 2011. Ask students to interpret the graph. Tell students that stock on hand is declining every month due to consumption and it seems GB has not received any new shipments during this time.

Show **slide 17, 'Average monthly consumption of COC for AJK from Jan to June 2010'**. Tell students that graphs can be developed in bar or line form. This graph is a line graph showing average monthly consumption of COC from AJK from Jan to June 2010.

Show **slide 18, 'Compare districts (Muzaffarabad, Poonch, Gilgit, Sakardu) for PWD consumption of Cu-T 380 for 2010'**. Tell students that graphs menu has another option of comparison graphs. In comparison graphs one can compare various indicators. There are some pre-defined combinations available in the graphs menu from which one can select. If possible go online and demonstrate how to do it.

Tell students that this graph compares the above mentioned districts in terms of consumption of Cu-t for the year 2010. Ask students to interpret it and discuss the utility of such graphs.

Tell students that graphs facilitate the visual interpretation of data. It is easier to identify a month which has unusually low or high consumption through

graph immediately. It is also easier to identify a general trend of declining or increasing consumption or average monthly consumptions. Similarly, district managers can easily identify months in which stock is either below minimum or above maximum through 'months of stock' graph.

### **Conclusion**

The data visibility ensured through LMIS enables managers to perform timely decisions to ensure commodity security. For example, a manager at provincial level could possibly identify that District-A has almost stocked out of COC while the stock of COC is way above maximum in the neighbouring District-B. He can order moving appropriate quantities from District-B to District-A

### **Synthesis Questions**

- 1) What data we need to determine our months of stock? (stock on hand and average monthly consumption)
- 2) Why do we want good data viability? (so we can make good judgments for keeping our system operating at its optimal level)
- 3) What does the National Summary Report help us do? (see slide 13)
- 4) How does Pakistan's Web based LMIS system help provide commodity security for the people who depend on the public health system ?

## 10. Analyzing LMIS Data (Red Flag Exercise)

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### Session Objectives:

By the end of the session students will be able to:

1. List at least five indicators from LMIS forms that can be used by program managers to identify logistics system problems.
2. Analyze an Inventory Control Card, identify problems, and based on it, make recommendations for improved performance of the LMIS.

**Time:** 90 minutes

### Materials:

1. Flip chart, markers
2. Overhead projector & screen or blank wall
3. Colored overhead marker
4. Prizes for pair that identifies the most problems
5. Lecturer's copy of ICC with answers (Found at end of session design)

### Overhead Transparencies:

6. ICC for exercise in an overhead transparency format

### Lecturer Preparation:

Review the exercise answer sheet so that the problems can be more easily explained/pointed out.

### Learning Activities Summary

Title	Type	Time
1. LMIS Program Management Indicators	Large Group Discussion/Brainstorm	20
2. Analysis of an Inventory Control Card	Pairs Exercise	70

### Learning Activities:

#### 1. LMIS Program Management Indicators – Discussion/Brainstorm – 20 minutes

Introduce the session by telling students to imagine that they have arrived at a district warehouse with the Manager in order to do a short

analysis of the functioning of the logistics system. Ask the students what records they should ask to see which would indicate how well the logistics system is functioning. Answers should include stockkeeping records (ICCs or bin cards) and transaction records (indent records, requisitions, etc...).

## **Management indicators**

Ask students to quickly brainstorm the types of logistics management indicators they could assess from the forms that the Warehouse Manager uses.

Write the participant answers on flipchart. For each indicator suggested, ask students to indicate how the indicator would be measured; what indicates good system performance, what indicates poor system performance. Points raised should include: stockouts, overstocking, within max-min levels, rates of consumption, lead time, etc.

## **2. Analysis of an Inventory Control Card – Pairs Exercise – 70 minutes**

**Note:** Instructor's answers are provided at the end of this session.

Tell the students to work with a partner at their desk/table. Ask students to open their Student **Workbooks** to **Exercise: Analysis of an Inventory Control Card**. Review the instructions at the top of the page. We want to see who can spot the most errors.

Tell the students that they will have 30 minutes to do the exercise.

Lecturers should check in with all pairs to verify their progress. If students are having great difficulty with the exercise, Lecturer may bring everyone together to have the group identify 4 or 5 of the answers, and possibly review types of indicators (data) that students should be looking for.

At the end of the allotted time, display **Overhead** for **Session10 Analysis of an Inventory Control Card** on the overhead projector. Ask pairs how many problems they have found, and note the numbers down on a piece of paper, pointing out the pair with the most and the fewest number of problems.

Process the exercise by reviewing all problems found. Mark problems on the overhead as they are identified. To do this, ask pairs who identified fewer problems (about 7 or fewer) to name their problems. As they exhaust their list, ask other pairs that have the same problems listed to mark off these problems on their lists. When the first sets of pairs cannot name additional problems, move on to the next group

(those finding about 15 or fewer), asking them to add to the list. Finally, ask the next group (18 or more) to name any new problems. Continue until the students have named all problems that they have identified.

The facilitator then adds in any problems that the students may have missed and discusses them.

Acknowledge the pair who have found the most problems. (In case counting individual problems has been difficult, the winner may be the pair who boasted finding the most problems.)

There are 29 errors not counting the concern over *Clinic D* ordering 3 times, nor that Clinics A-J are mentioned but there are no issues to *Clinic G* for the month— both red flags.

16 errors are in Balance column – all from 8/1 down  
13 other errors – as shaded areas show

After going over the errors on the inventory control card review the following questions and points with the students:

If average monthly issues (AMI) over the past 3 months for this district store have been 2880, was there any time at which this district warehouse was at or below its emergency order point (EOP)? If so what dates was it at or beyond its EOP? Students will have to determine what EOP is in terms of actual stock levels first. Ask Students how to do this.

Take answers and confirm that to do this we multiply the AMI by 1, which is our EOP. The equation is  $2880 \times 1 = 2880$ . The answer should be that the district was never at its EOP.

Next ask how many days the district store was at or above its maximum stock level. Ask students how to determine this. The equation is our AMI of 2880 x our Max months of stock 6, or  $2880 \times 6 = 17,280$ . The answer is there were no days when we were at max, not even after we were resupplied from Central.

Explore what this might suggest with students.

If we have a pull system we may ask if our order was completed correctly and on time.

If we have a push system was our report completed correctly and on time?

Is there a bottle neck at Provincial or Central levels?  
Are either Central or Provincial levels out of stock or rationing?

What might a store keeper might do in this situation?

With either a push or a pull system not receiving our full allocation of stock for the month is not a good sign and is a red flag, or cause for concern.

Remind students that rationing is not a good idea because it causes facility staff to lose faith in the system. Why complete the orders or reports if we don't get what we asked for or need? However there is an argument to be made that it is better for all facilities to have some of each stock than some being supplied up to max and others not receiving any. These are questions for decision makers. However it is best to always strive for accurate, transparent, data whenever possible.

Ask students how many days were we at minimum stock level or above. Have them provide the equation ( $2880 \times 3 = 8,640$ ). We were at or above min from December 29<sup>th</sup> until January 7<sup>th</sup>.

Ask student what this suggests to them. Can the store keeper relax with what he is holding? Is this more or less work for him than if he was well above minimum most of the month? Explain that it means that he has to be keeping constant track of stock after January 7<sup>th</sup> until his stock reaches EOP at which point he can place an emergency order.

Ask students if there are other things the store keeper can do to prevent making an emergency order? He could try to obtain stock other ways, ration stock or follow the rules of the system and wait until the EOP is reached. The storekeeper must weigh the most appropriate action considering that it takes extra resources to place an emergency order and yet being stocked out could cost a life. What would you do? What are the norms for your system? What are the actual rules for your system?

Ask the students if they can identify any other program or systemic problems represented or indicated through the problems that we have identified. Ask the students if they can make any recommendations to address these problems.

Wrap-up the exercise by observing that a lot of information can be learned from a single record, but that obviously a system assessment cannot be entirely done using only one ICC!

### **Synthesis Questions**

1. How can LMIS forms be used to detect problems with the logistics system?
2. Name several problems that can be identified from reviewing a stock card.

### DISTRICT LEVEL INVENTORY CONTROL CARD

**Product: Oral Rehydration Salt**

**Maximum Stock Level: 6 MOS**

**Package Size: 100 packets per box/10 boxes per case**

**Minimum Stock Level: 3 MOS**

**Issuing Unit: Packet**

**Emergency Order Point: 1 MOS**

Date	Reference number	Received from / Issued to	Quantity		Losses / Adjust	Balance	Initials	Comments
			Receipt	Issued				
29/12/12		<i>Physical Inventory</i>			-20	9,280	RG	
4/1/13	1616	<i>Clinic D</i>		300		8980	RG	
7/1/13	1390	<i>Clinic E</i>		200		8,780	MK	
7/1/13	1525	<i>Clinic A</i>		400		8,380	MK	
8/1/13	1662	<i>Clinic C</i>		500		7980	RG	
14/1/13	0125	<i>To KP District Warehouse</i>		1,200		6780		<i>Emergency supply to KP District</i>
17/1/13	1330	<i>Clinic B</i>		100		6680	MK	
18/1/13		<i>Clinic</i>		200		6450	MK	
21/1/13	0216	<i>Clinic F</i>	300			6150		<i>Overstock product returned to avoid expiration</i>
22/1/13	1492	<i>Clinic C</i>		100		6050	RG	
22/1/13					50	6000	RG	<i>Visual inspection - water damage</i>
11/1/13		<i>Clinic I</i>		100		5900	MK	
22/1/13	1443	<i>Clinic D</i>		150		5750	RG	
23/1/13	1515	<i>Clinic H</i>		200		5550	MK	
25/1/13	1559	<i>Clinic A</i>		300		5350	MK	
28/1/13	1626	<i>Clinic D</i>		400		5050	RG	
28/1/13	1689	<i>Clinic J</i>		200		4750	RG	
29/1/13	1474	<i>Clinic E</i>		100		4650	RG	
31/1/13		<i>Physical Inventory</i>			-300	4450	MK	
1/2/13	0259	<i>Central Warehouse</i>	5,000			9450	MK	

# Instructors Answers

## DISTRICT LEVEL INVENTORY CONTROL CARD

**Product: Oral Rehydration Salt**

**Package Size: 100 packets per box/10 boxes per case**

**Issuing Unit: Packet**

**Maximum Stock Level: 6 MOS**

**Minimum Stock Level: 3 MOS**

**Emergency Order Point: 1 MOS**

Date	Reference number	Received from / Issued to	Quantity		Losses / Adjust	Balance	Initials	Comments
			Receipt	Issued				
29/12/12	1632 no Ref # needed	Physical Inventory			-20	9,280	RG	No comments error
4/1/13	1616	Clinic D		300		8980	RG	
7/1/13	1390	Clinic E		200		8,780	MK	
7/1/13	1525	Clinic A		400		8,380	MK	
8/1/13	1662	Clinic C		500		7980 (7880)	RG	
14/1/13	0125	To KP District Warehouse		1,200	Should be a negative adjustment -not listed as Issued	6780 (6680)		Emergency supply to KP District
17/1/13	1330	Clinic B		100		6680 (6580)	MK	
18/1/13	Missing Ref #	Clinic Clinic name missing		200		6450 (6380)	MK	
21/1/13	0216	Clinic F	300 should be in +/- col			6150 (6080)	missing initials	Overstock product returned to avoid expiration
22/1/13	1492	Clinic C		100		6050 (5980)	RG	
22/1/13		Loss			50 Should have neg sign before 50	6000 (5930)	RG	Visual inspection water damage

11/1/13 Date out of sync	Leave blank as error	Clinic I		100		5900 (5830)	MK	
22/1/13	1443	Clinic D		150 odd issue #		5750 (5680)	RG	No explanation for unusual issue of 150
23/1/13	1515	Clinic H		200		5550 (5480)	MK	
25/1/13	1559	Clinic A		300		5350 (5180)	MK	
28/1/13	1626	Clinic D has received products 2x before already- red flag		unclear		5050 (4880)	RG	should be reason why Clinic D ordered 3x this month
28/1/13	1689	Clinic J		200		4750 (4680) Must assume 300 issued based on math in above action but no way to confirm	RG	
29/1/13	1474	Clinic E		100		4650 (4580)	RG	
31/1/13		Physical Inventory			-300	4450 (4280)	MK	Missing 300 - could this be linked to the data for 28/1 and be a math issue?
1/2/13	0259	Central Warehouse	10,000 likely came in boxes from Prov. Ask how many boxes that is = 50			14450 (14280)	MK	

## 11. Assessing Logistics Systems

### ..... Session Objectives:

By the end of the session students will be able to:

1. Describe the purpose and process of a logistics system assessment
2. Identify and describe indicators of logistics system performance, focusing on in-country supply pipeline and commodity availability
3. Describe what information is needed to assess logistics system performance indicators, what tools are used to collect this information and where the information can be found
4. Identify strengths and weaknesses in a logistics system

**Time:** 150 minutes

### Materials:

Power Point equipment  
 Connection to Internet  
*Access to E-learning for Session 7*  
 Board for demonstrating formulas as desired

### Lecturer Preparation:

Review the E-learning Session 7 - Assessing Logistics Systems.  
 Review Case Study

### Learning Activities Summary

Title	Type	Time
1. Review E-Learning Session 7	Large Group Exercise	75
2. Logistics System Assessment Case Study	Small Group Exercise	75

### Learning Activities:

## 1. Review of E-Learning Session 7 – Large Group Exercise 75 minutes

Introduce the session by telling students that we have looked at many components of a logistics system. Now we want to look at a logistics system as a whole and evaluate it as one entity. Doing so will prepare us for the next component of this course which is the Field Visit.

If we count on our public health logistics system to provide essential medications and medical supplies for the people of Pakistan, if we are investing public money, our time and effort then we will want to know how well our system is functioning and not just wait until there is a stock out to tell us something is wrong. We want to be constantly improving the system as we can to gain better efficiencies and provide better service.

In this session we will look at the process for evaluating a logistics system. We will examine a few key indicators which can tell us how our system is doing and the tools needed to help along the way. We'll end the session using a case study to conduct an evaluation ourselves.

**Start the E-Learning Session 7** and proceed through the session.

Ensure the volume is loud enough for all to hear clearly. Ensure all can see properly

Start the session and **work through each of the slides in order**.

There are some more advance concepts in this session and some slides have a lot of information on them. Ensure students are grasping the material by pausing the session and asking them to put these concepts into their own words or asking related questions. Repeat sections as necessary.

Where appropriate pause and ask students to answer the questions or prod further for more information if possible.

Apply additional examples as necessary to ensure students understand the concepts.

Have students do the knowledge checks themselves – don't provide the answers right away.

The final Session Assessment in the E-Learning session can be used for students to answer individually. Click through the questions one by one. Have student provide their responses and then review the correct answers together. This can be used as a quiz as well.

**Note:** See the Logistics Handbook Chapter 9 section 9.3 *Indicators for M&E of Supply Chains* for additional information on this topic. The whole chapter is suggested reading for the M&E session later on in the course.

## 2. Logistics System Assessment Case Study – Practical Exercise – 75 minutes

Provide students with the following back ground:

The following case study is based on actual findings from an analysis of several public health supply chains. The information has been adapted for use as a case study for Anyland. The facility information is a composite of several facilities of the same type.

In Anyland, there is a growing recognition of the devastating effect of HIV/AIDS and an increasing commitment from the Government of Anyland and donor agencies to strengthen HIV/AIDS prevention activities. International donors have pledged additional funds and will supply HIV/AIDS test kits, condoms for HIV/AIDS and STI prevention, and STI drugs. The Ministry of Health is expecting to manage a significantly larger quantity of HIV/AIDS commodities.

You have been asked to conduct an assessment and provide technical support in logistics to ensure that the expected increased supply of HIV/AIDS commodities is consistently available for use at service delivery points.

Tell Students that they will need to read background materials on Anyland and then they will be given three tasks to do which are written at the end of the case study.

Ask students to open up their **Workbooks to Session 11 Assessing Logistics Systems – Case Study** to where they will find the following information as presented here for the Lecturer. Help students get started as needed. Review the three tasks that they will be asked to do to help them focus their reading.

**Note:** A Lecturer's answer guide is provided at the end to help process this exercise. It is only

**Background information: (Refer to supply chain diagrams below.)**

- Anyland is divided into 7 administrative zones, 20 regions and 120 districts. Health services are provided by health centers, dispensaries, and district hospitals under district authority and through regional hospitals.
- At the central level, the National AIDS Control Program (NACP) coordinates HIV/AIDS prevention activities, forecasts HIV/AIDS commodity requirements, and coordinates donations and/or procurement of these commodities.

Currently NACP stores and distributes condoms, HIV/AIDS test kits and STI drugs within its administrative offices. Condoms and STI drugs are distributed to the Regional AIDS Control Coordinators (RACCs) who are responsible for distributing them to the District AIDS Control Coordinators (DACCs). DACCs provide condoms for AIDS prevention to service delivery points, guesthouses, bars, military units and other distribution points. STI drugs are supplied by the DACCs to the health centres. NACP has one large truck that is used to transport condoms and STI drugs to the regions.

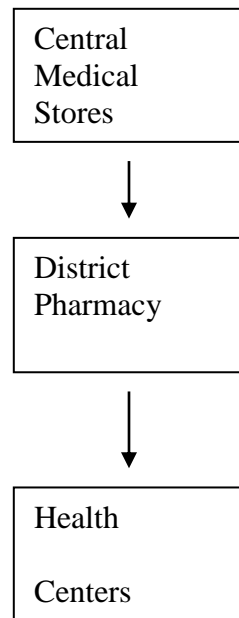
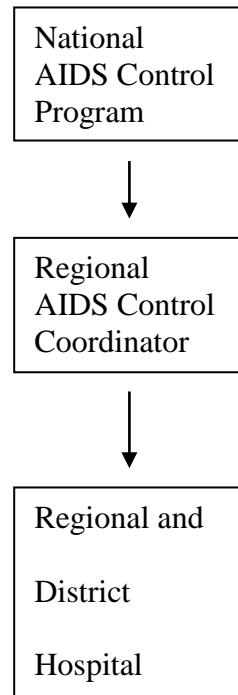
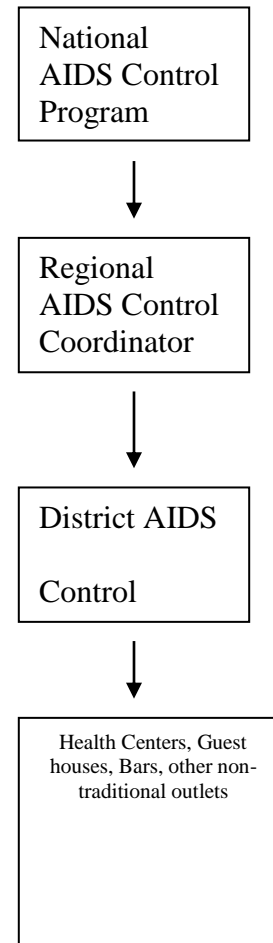
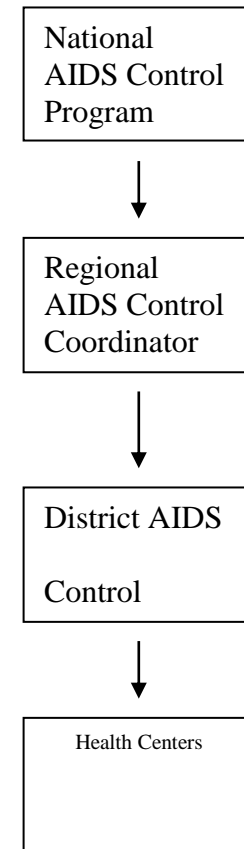
NACP distributes HIV/AIDS test kits to the RACCs, who then distribute them to the Regional and District Lab Technicians for use in the hospitals for blood safety and voluntary counselling and testing. Since the test kits require cold storage, they are flown from the capital city to the regional capitals.

- The Central Medical Stores (CMS), a semi-autonomous agency of the Ministry of Health, is responsible for the procurement, storage and distribution of essential drugs and medical supplies for Anyland. CMS has a central warehouse and 7 zonal offices and warehouses that stock all the products on the Essential Drugs List. CMS is managed much like a private company that provides services to the Ministry of Health.

CMS distributes essential drug kits and family planning commodities, including condoms, to the districts every two months. These products are then distributed to service delivery points by the districts monthly using one of two vehicles assigned to each district.

District and regional hospitals procure and pick up their supplies from CMS monthly.

Diagrams of the supply chains follow.

**Ministry of Health, Republic of Anyland*****Selected Health Commodity Supply Chains*****Essential Drugs  
And Contraceptives****HIV Test Kits****HIV/AIDS Condoms****STI Drugs**

### **Information from field visits:**

To assess the logistics system you make field visits to a health center and the associated district, regional and zonal facilities. During field visits you discover the following.

#### **Kanoda Health Center**

While visiting the Kanoda Health Center, you spoke with both the Medical Assistant who is in charge and the MCH Aide who handles family planning and reproductive health activities. The Medical Assistant reported that he receives the essential drug kit monthly from the district. The District Transport Officer delivers it during the first week in the month. There is plenty of storage space in the health center and the records appear to be up to date and accurate. A member of the DHMT collects information on drugs used when they come for supervision. This happens about once every 2 months. From time to time, a member of the DHMT will bring supplementary drugs to augment what the health center receives in the kit. While the Medical Assistant never complains, often the drugs are not those most needed in the health center.

While this health center does provide STI treatment services, it has not received STI drugs for the last two months. Usually the District AIDS Control Coordinator (DACC) sends them in the same vehicle with the essential drug kit. The medical assistant asked the DACC about the drugs last time he went to the district office. The DACC said that he was not receiving enough drugs from the Regional AIDS Control Coordinator and therefore was only supplying them to the clinic in the district hospital. The health center does not provide HIV/AIDS testing, but refers clients to the district hospital.

The MCH Aide reported that she goes to the district at the beginning of each month and brings the Report and Request for Contraceptives, the Daily Activity Register and the Stock Ledger for contraceptives with her. She and the District Family Planning Coordinator calculate the quantity of contraceptives the health center needs and these are issued to the MCH Aide. The MCH Aide said that she often is not able to take the whole supply of contraceptives back to the health center with her because she hires a bike to bring her to the district and can not carry all the contraceptives with her. This is particularly a problem with the condoms. She leaves what she can not take to be brought by the next vehicle coming to the health center. Sometimes she makes a second trip to the district to pick them up in the middle of the month. The MCH Aide said that sometimes she does not have the money to hire the bike, and must ask for funds from the village chief. While the MCH Aide does not supply many

condoms through the clinic, she does provide them to community-based distributors and local bars and guesthouses when requested.

### **Magu District**

At the District Health Office, you had the opportunity to interview the District Family Planning Coordinator, the District AIDS Control Coordinator, and District Hospital Pharmacist.

The District Family Planning Coordinator reported that she receives the contraceptives she orders every two months from CMS. CMS delivers the contraceptives to her office. She has no problem with storage of the contraceptives. She stores them in her office and has plenty of space. After taking physical inventory you determine that her records are up to date and that she has about 2 months of supply on hand. While the District Transport Officer could schedule delivery of the contraceptives to the health centers, the Family Planning Coordinator prefers to have the MCH Aides come to the district so she can check their records before issuing the contraceptives.

The District AIDS Control Coordinator (DACC) is responsible for supplying STI drugs to the health centers and the District Hospital, HIV/AIDS condoms to bars, guesthouses, military units and other outlets, and HIV/AIDS test kits to the District Hospital which does voluntary counseling and testing (VCT) and blood safety. The DACC is also responsible for HIV/AIDS community education campaigns and distributes education materials.

Each month the DACC collects information on the number of each STI syndrome treated in the health centers and hospital and aggregates that information into a worksheet. Every quarter the DACC prepares a report with this information and takes it to the RACC and receives STI drugs. Last quarter he received only about half of what he needed when he went to the region to collect the drugs. The RACC told the DACC that there were insufficient quantities of drugs at NACP and that was why the DACC couldn't get more.

The DACC has not had any HIV/AIDS condoms for 6 months and has had to borrow condoms from the District Family Planning Coordinator to supply his customers. The DACC said that he has stopped reporting to the RACC on condoms distributed since they were not HIV/AIDS condoms and he knows that the RACC does not have any condoms to supply him.

The DACC supplies HIV/AIDS test kits to the District Hospital Laboratory Technician. The Lab Tech lets the DACC know when he has only 20 tests left and then the DACC goes to the region to pick up a kit for the hospital. Because the supply of test kits to the RACC is irregular, several times the DACC has not been able to get them from the RACC, but has been able to “borrow” them from the referral hospital.

The District Hospital Pharmacist goes to the CMS Zonal Warehouse once a month to procure the drugs needed in the hospital, and if funds allow, supplementary drugs that can be distributed to the health centers. Generally CMS has everything she wants, but because the hospital vehicle can not hold all the supplies, she makes two trips to pick them up. The Pharmacist estimates the type and quantity of supplementary drugs based on her knowledge of the district.

### **Mutata Region**

After making a courtesy call to the Regional Medical Officer, you met with the Regional AIDS Control Coordinator (RACC). You also visited the CMS Zonal Office.

The RACC tells you that he has not received HIV/AIDS condoms from NACP for more than 6 months because the one truck at NACP has been out of service. He has been able to get STI drugs intermittently. A few months back he was sent a shipment of STI drugs by train. Those are the drugs he has been supplying to the districts. Recently he has advised some of the DACCs to purchase STI drugs from CMS as they have a reliable supply. The RACC receives HIV/AIDS test kits about 6 times a year, but on no set schedule. NACP advises him as to when they have been received in the capital and when they will be sent to the region. They are flown to the region in cold boxes and the RACC picks them up and stores them in the refrigerator in his storeroom. He believes the supply of test kits is irregular because they are received from multiple donors.

The General Manager of the CMS Zonal Warehouse was quite proud to show you his operation. He keeps the facility well stocked with over 1000 items. There is more than sufficient storage capacity and five trucks for deliveries. The staff is well trained and organized into functional areas such as receiving, storing, picking and shipping. The items in stock are received from CMS Central. Essential drug kits are prepackaged outside the country. Additional kits are packed in CMS Central. CMS Zonal receives the kits already marked for delivery to the districts. Contraceptives are shipped in bulk to CMS Zonal from CMS Central and are packaged for each district at the zonal facility. Bulk drugs are also received from CMS Central and available for purchase by district and regional hospitals and other customers. CMS has a computerized information system. This system is used to calculate orders for restocking

CMS using stock on hand and issues data. CMS Zonal sends its orders to CMS Central by email and receives deliveries 1-2 times a month.

**Assignment:**

1. Identify the problems
2. List the strengths and weaknesses in the supply chains.
3. Discuss some possible recommendations you might make to ensure that the increased supplies of HIV/AIDS commodities are available for use at service delivery points.

**Processing the Exercise**

Follow the steps below and by using Lecturer's Answer sheet below.

Part One

Take the answers from the students and list key ones on chalk board

- Define or state the problem
- State the consequence(s) of the problem
- List Strengths and Weaknesses of the supply chain
- Suggest a course of action or actions that can be taken to solve the problem

Part Two (as time permits)

- Identify who or what organization or agency should take action on the recommendation.
- Describe which levels of the logistics system will be affected by the recommendation.
- Identify the types of resources will be necessary to complete the actions recommended.
- Suggest a time frame.
- Lastly, identify what the expected outcome should be if/when the recommendation is implemented.

**GENERAL PROBLEMS:**

- NACP does not have the capacity to distribute HIV/AIDS products reliably.
- Essential drug kits for health centers and contraceptives are delivered to district by CMS, while district hospital must go pick up drugs.
- Essential drug kits are delivered to clinics by district transport, yet contraceptives must be picked up from district by health center staff.

**RECOMMENDATIONS:**

#### Supply Chain Management for Commodity Security: Course Evaluation

- Integrate the distribution of HIV/AIDS commodities with the essential drugs from CMS to district. CMS provides transport. If possible have CMS transport hospital drugs to district as well. (May need to do further study of transport capacity of CMS trucks.)
- Integrate the distribution of essential drug kits, STI drugs and contraceptives from district to health center. District to transport to health center.

## Logistics System Assessment Case Study Answer Sheet

## HEALTH CENTER:

Strengths	Weaknesses
Essential Drugs:	
<ul style="list-style-type: none"> <li>• Drugs received regularly</li> <li>• Plenty of storage space for drugs</li> <li>• Records accurate and up-to-date</li> </ul>	<ul style="list-style-type: none"> <li>• Receives drugs not needed</li> </ul>
Contraceptives:	
<ul style="list-style-type: none"> <li>• Regular review of records</li> </ul>	<ul style="list-style-type: none"> <li>• Insufficient transport to bring contraceptives to clinic</li> <li>• Repeat trips to pick up contraceptives from district</li> </ul>
HIV Test Kits:	
Not used in health centers	
HIV/AIDS Condoms:	
No information	
STI Drugs:	
	<ul style="list-style-type: none"> <li>• No STI drugs in health center</li> </ul>

## DISTRICT:

Strengths	Weaknesses
Essential Drugs:	
<ul style="list-style-type: none"> <li>• Drugs needed available from CMS</li> <li>• Regular supply of drug kits from district to health center</li> </ul>	<ul style="list-style-type: none"> <li>• Insufficient transport to carry drugs back to district hospital from CMS</li> <li>• Supplementary drug order irregular and does not seem to be based on information</li> </ul>
Contraceptives:	
<ul style="list-style-type: none"> <li>• Received regularly from CMS</li> <li>• Delivered to Coordinator's office</li> <li>• Sufficient storage space</li> <li>• Uses data from health center records to determine orders</li> </ul>	<ul style="list-style-type: none"> <li>• Storing contraceptives in office</li> </ul>

<b>HIV Test Kits:</b>	
<ul style="list-style-type: none"> <li>• Lab Tech has system for determining when to get resupplied with kits</li> </ul>	<ul style="list-style-type: none"> <li>• Irregular supply of test kits</li> </ul>
<b>HIV/AIDS Condoms:</b>	
<ul style="list-style-type: none"> <li>• Being innovative – borrowing condoms from FP Coordinator</li> </ul>	<ul style="list-style-type: none"> <li>• No condoms available for 6 months</li> <li>• No reporting of condoms distributed for HIV/AIDS prevention</li> </ul>
<b>STI Drugs:</b>	
<ul style="list-style-type: none"> <li>• Information collected on STIs treated and reported to region</li> </ul>	<ul style="list-style-type: none"> <li>• Insufficient STI drugs received</li> <li>• Rationing STI drugs</li> </ul>

## REGION:

<b>Strengths</b>	<b>Weaknesses</b>
<b>Essential Drugs:</b>	
Essential drugs are not distributed through the regional level	
<b>Contraceptives:</b>	
Contraceptives are not distributed through the regional level	
<b>HIV Test Kits:</b>	
<ul style="list-style-type: none"> <li>• RACC receives advance notice of shipment of kits to the region</li> <li>• Cold storage available in RACC storeroom</li> </ul>	<ul style="list-style-type: none"> <li>• Irregular supply of test kits</li> </ul>
<b>HIV/AIDS Condoms:</b>	
	<ul style="list-style-type: none"> <li>• No condoms available for 6 months because NACP truck is out of service</li> </ul>
<b>STI Drugs:</b>	
<ul style="list-style-type: none"> <li>• Beginning to use alternate source of supply for STI drugs – purchase from CMS</li> </ul>	<ul style="list-style-type: none"> <li>• Irregular supply of STI drugs, possibly due to multiple donors</li> </ul>

## CMS ZONAL:

<b>Strengths</b>	<b>Weaknesses</b>
<b>Essential Drugs:</b>	

## Supply Chain Management for Commodity Security: Course Evaluation

<ul style="list-style-type: none"> <li>• Large number of items available</li> <li>• Sufficient storage space</li> <li>• Five trucks</li> <li>• Well-trained staff</li> <li>• Prepackages kits marked for delivery</li> <li>• Computerized information system</li> <li>• Good communications</li> </ul>	
Contraceptives:	
<ul style="list-style-type: none"> <li>• Package contraceptives for each district</li> </ul>	
HIV Test Kits:	
Not currently handled by CMS	
HIV/AIDS Condoms:	
Not currently handled by CMS	
STI Drugs:	
Available through CMS, but not currently part of NACP distribution to health centers	

## **Synthesis Questions**

1. Name four indicators used to monitor system performance.
2. To assess the performance of a logistics system, what key data do you need and where would you locate it?
3. What is meant by “continuous improvement?”
4. What is the main purpose for assessing logistics systems?

## 12. Site Visit

.....  
**Session Objectives:**

By the end of the session students will be able to:

1. Apply the principles of analyzing logistics data for evaluating how a facility is doing
2. Explain how they would apply what they have observed to their own facility
3. Describe how what they observed compares to what they learned in this course
4. Make feasible and cost-effective recommendations to improving logistics management

**Time:** 5 to 5.5 hours (depending on transportation times)

**Materials:**

For the site visit tell students to take:

1. Student Workbook, (Site Visit Check List included)
2. Pens, and notepads,
3. Calculators,
4. other relevant system documents like Standard Operating Procedures,

For Student presentations:

1. Flip chart paper,
2. Markers

**Pre-visit preparations for Lecturers:**

The Lecturer or an Administration person will need to make arrangements well in advance for the students to visit three different facilities for – approximately seven students per facility. The purpose of the visit will need to be explained to the site staff. Dates and times will have to be arranged at the facility, the people to meet at each facility, transportation there and back and an introduction.

Arrangements for the visit should be confirmed once more the day before the visit and every effort be made for the group to show up at the appointed time.

Lecturers need to ensure that all arrangements are in place before the start of field trip. They need to hold a formal meeting with relevant admin staff prior to the visit to check the following

1. The facilities are selected and informed about the visit. This includes a communication with district managers (e.g. EDO or DPWO) to seek their permission. It will be preferable that a written permission is received from district manager and copy of it is handed over to students
2. Check to see all transportation arrangements are in place. The transport has adequate seating capacity and the drivers know where they are going.
3. Each student group will need to be given specific information about the facility they are visiting such as: the contact person(s), their title and cell phone numbers, who they will be meeting with there, their title and job responsibilities, type of facility it is and where it's located.
4. An admin focal person has to be appointed who can be contacted by lecturers or students in case of any problem

### Learning Activities Summary:

**Note:** Only the first 3 activities are done on the first day. The last activity is done the day of the site visit

#### Pre Visit

Title	Type	Time
1) Data for Site Visit Preparation	Lecturette with homework	15
2) Orientation and Use of Checklist	Lecturette	30
3) Site Visit Details	Lecturette and small group work	20

#### Day of site visit

Title	Type	Time
4) Travel to the site from pick up point		30 to 45 min
5) Tour of the site	Experiential Exercise with work in pairs and in small groups	90 minutes
6) Travel back from site to class room		30 min to 45 minutes
7) What did you find at the Facility / Store?	Small Group Work and Large Group Discussion	90 minutes

### Learning Activities

#### 1. Data for Site Visit Preparation – 15 minutes

#### Review of LMIS Data

Tell students that by this time they have looked at various stakeholders in Pakistan's logistics system and their respective commodities flow and ordering systems. Tell students to recall the session on the web-based LMIS system. Ask them what they know about logistics of health commodities at the district level. Their answers might be from what they have learned or what they have experienced in their work. Tell students that tomorrow they will be going on a site

visit to a health facility to learn about how public health logistics is applied in the field.

Explain that in order to prepare for this it is important to review the logistics data available in the LMIS and demographic data available on the internet before visiting their facilities. This will provide them with a general background, a sense of any current critical issues such as stock-outs in recent months and also allow them to observe the recent consumption trends. Tell students the name of the district they will be going to (which in this case is most likely to be Rawalpindi or Islamabad) To learn about the district stock status go to [www.lmis.pc.gov.pak](http://www.lmis.pc.gov.pak) and review the corresponding reports and graphs.

Tell students that they can login to Pakistan's web based LMIS system from their own computers or through the resource centre available at the university. Here they can review recent logistics data of the district they are visiting. Tell students that LMIS currently does not have facility level data. However, by going through the district level aggregated trends they should have some background about the facility before going there e.g. they may observe stock-outs at facility level when sufficient stocks are not available at district store (as noted from LMIS).

Students should also review key demographic indicators e.g. population, number of women of reproductive age to have a background of district they are visiting. Write on the board the web address where they should go: (e.g. Population Census Organization <http://www.census.gov.pk/data census>). Tell students that they can browse through the basic demographic indicators of the district they are visiting from this web page.

Tell students that their homework for tonight is to find this information on the web and familiarize themselves with the logistics data for where they are going.

## **2) Orientation and Use of Checklist - 30 minutes**

Tell students that now they need to learn some specifics about how the site visit will run tomorrow when they will be visiting a number of nearby public health facilities.

Tell students that during the site visit they will observe and ask questions about the management of health commodities at the facility that they go to. We will now review what we will do before, during, and after this visit.

Explain that this is not just a walk through a facility. It is technical work and part of an important exercise they will do. Tell students that this is not an inspection however. We are not going there to tell the staff what they should correct. We are going there to see another facility to learn and make comparisons with our own facility or the standards and principles that we've learned in this class. For students with no experience in the field this exercise will be just as valuable, if not more so, than for the students already working in the field.

Tell students that we will be using a **Checklist** to review key areas of a health facility relating to logistics. We will use this checklist as a guide to help us through our visit. Following the checklist will inform us in what to look for and the types of questions we should be asking. However, students observations should not be limited to items in the checklist, and they should look for other relevant items and record it in space provided at the end of checklist.

Explain that after the site visit is over we will reconvene in the class room and work in our small groups to develop our presentations that we will share with the whole group. The details of the presentation will be given later in this session but for we will focus on the site visit and the checklist.

### **Review of Checklist and Basic Guidelines for Site Visit:**

**Note:** A copy of the Checklist is available at the end of these session notes for the Lecturers.

Ask students to open their **Student Workbook**, Session 12 and the page titled **Field Visit Checklist**. Ask students to take a few minutes to review it and become familiar with the documents. Give them a full three or four minutes.

Tell students they will have to gather information in the order that it is presented to them at the facility and some things that they are shown may not be on this list at all. Also they may not be able to go through the facility all in one group together. They may be split up depending on the facility. Therefore they need to know what they are looking for and be sure that they gather information on the elements of this list to the extent that they can.

Often conversations will reveal as much information about how a facility is running as any stock card or order form will. Therefore they should also be open to conversing with the staff on these issues if the staff is willing to speak with them.

**Note:** Students should seek to talk to and learn from the staff and not simply be driven by completing the check list. Tell students that the checklist is a guide to help them know what to look for but it is only a tool and that they will learn just as much, if not more, by talking with the staff. The checklist provides the columns for recording our observations and recommendations. The recommendations are better not recorded during the visit and completed later before the class group work. Tell students that recommendations are for their internal discussion and not for the facility staff. However, students can take good guidance from recommendations for improving their own facilities

**Legend** - Call student's attention to the top of the document in the Legend section. Explain that they are to consider that they have at least 3 ways to gather information. They should record the appropriate symbol in the methods column for the data they gather across from each line in the checklist. This is not of great

importance but it provides them with a way to recall later how they got the information which may allow them to remember more of the content.

**Group Members:** List who is in your group after receiving group assignments.

**Department** – complete this after they learn where they are going

**Facility Type** - complete this after they learn where they are going

**Pre-Visit:** Review the points in this section reminding students that it is important for them to do these things before they go. Provide more details as desired.

1. Review the checklist
2. Review the logistics and demographic data as described above

### **During Visit**

Tell students that as an extra challenge while at the facility they should also be looking for practical things of what can be done for low cost or no cost. It is important to observe how the facility can be improved with limited resources. Most facilities have only a small budget for making improvements so what can be done to make the greatest impact. What is the greatest good?

### ***Standard Operating Procedures and Guidelines***

Review the components in this section and provide additional details or clarification as desired

### **Commodity Availability**

Next, review the components in this section and provide additional details or clarification as desired

Remind students that the most important element in public health logistics is to make products continuously available. If there are no health care products there is no program.

Encourage students to think about other important indicators to stock availability. When at the site they should reflect back on the research they did before their trip.

### **Storage**

Remind students that all the equipment, training, and calculations to provide the right stock at the right place may not be worth anything if the commodities are not kept properly. Good storage practices help ensure maximum shelf life. The Checklist has only a few items to consider. Tell them to consider the storage guidelines that are in their Workbook as well when they are at the facility. If staff is not available or difficult to hear it is easy to observe these issues.

### **Ordering**

Review the components in this section and provide additional details or clarification as desired. Tell students that proper ordering is critical to maintaining adequate stocks. Each facility should have the capacity to properly record its

consumption in order to get correct replenishments and this process also needs to be completed in a timely manner to maintain adequate stocks at all time

### **Human Resources**

Review the components in this section and provide additional details or clarification as desired.

### **Other items**

Tell students that either at the facility or when they return they should write additional comments in the last two sections i.e. *What can be done for low or no costs* and their *General comments and Observations*. They should remain engaged with the facility staff however as long as the staff is providing them with information. This exercise is for the students to learn about the field not about completing boxes.

Ask if there are any questions about the Checklist. Remind students that this is a guide to help them apply the principles that they have been learning in this course. They should as a group try to complete all the sections but if learning opportunities present themselves differently then they should allow for those. Refer to the **When At the Site** section in your **Workbook** for guidance on general questions that can be asked.

Remind students also that they are guests of the facility not inspectors seeking to point out the faults and shortcomings of the facility. They may share what they have learned in the course with the facility staff but it should be done tactfully and with respect to the staff. It is usually better to appreciate the good points first and praise the hard work the facility staff is doing to serve the community. Tell facility staff that you are here to learn from them and they are expert in their area. However, students may share the new things they have learnt from the course to make it a mutually learning experience

Point out to students the section in their **Workbook** titled **When at the site**. Tell them that this is a list of additional items that they should keep in mind. Give them a minute to review it and let them ask any questions.

### **When You Return**

Tell students that when they return they will need to prepare for their presentations. When they get back they will meet with their group in the class room or another nearby room. They will prepare a ten minute presentation based on their site visit and will receive materials to do so like flip chart paper and markers.

### **3) Site Visit Details - 20 minutes**

The Lecturer should now divide up the group members and assign them a facility. Consider where students work and which type of facility might be best for them to visit to get the most from this experience. It may be best for them to visit

a facility at a level different from their own. Plan ahead where you want them to go.

Each group will need to be given specific information about the facility they are visiting. Such as the contact person(s), their title and cell phone numbers. Who they will be meeting with, their title and job responsibilities. What type of facility it is and where it's located. Use the chart below as a guide. This information needs to be put on a flip chart or in a hand out so students can copy this down and have this with them.

Arrangements for the visit should be confirmed once more the day before the visit and every effort be made for the group to show up at the appointed time.

Tell students how much time they have at their facility (90 minutes) and that someone in each group should be appointed to keep track of when the group has to leave the site. It may be easiest to work backwards from when students need to be back in the classroom ready to present. The Lecturer will need to determine the timeline for this.

Stress where the transport will leave from, especially if it is not from the class room. Tell the students approximately how long it will take to travel to the site and what the transportation arrangements are.

<b>Site Visit Details</b>	
Departure Time:	_____
Departure Point:	_____
<b>Name of Facility 1:</b> _____	
Contact Person/Title	_____
Phone # Facility 1	_____
District/Department	_____
Facility Type:	_____
Type of Transport/Driver Facility 1:	_____
<b>Name of Facility 2:</b> _____	
Contact Person/Title	_____
Phone # Facility 1	_____

District/Department_____
Facility Type:_____
Type of Transport/Driver Facility 2:_____
<b>Name of Facility 3:</b> _____
Contact Person/Title _____
Phone # Facility 1 _____
District/Department_____
Facility Type:_____
Type of Transport/Driver Facility 3:_____
Mobil Phone # of Lecturer: _____
Return here at _____ o'clock!

Answer any questions student may have.

Next give the students time to get organized in their groups so they are ready for tomorrow. Tell students to open their **Workbooks** to **Before leaving on Your Site Visit** and address those issues.

### **Before leaving on Your Site Visit**

Get together with those going to the same site as you and do the following:

- Appoint a team leader and representative (not necessarily the oldest male)
- Review the Checklist carefully
- Develop a general plan of action and appoint leads for different Checklist sections. (all should be involved in leading discussions with staff)
- Organize all necessary materials you will need to take i.e. Student Workbooks (with Checklists), SOP manual, calculators, pens, note

books for taking good notes, other, details about facility, times and key phone numbers

- Appoint a person to be the logistics and transport lead to ensure group leaves and returns on time (communicates with the driver as needed)
- What else is needed?

### **Day of site visit**

#### **4) Travel to the site from pick up point**

#### **5) Tour of the site**

#### **6) Travel back from site**

#### **7) What did you find? – 90 minutes**

**Note:** This activity is done after the students have returned from the site visits

**Note:** In the schedule this is designed to be done in parallel with a working lunch. Students would have 1.5 hours to prepare their presentations and have lunch. This can be adapted by the Lecturer to best meet the needs of the group.

This activity takes place back at the class room.

Begin by asking students to form into the groups that they were in for the site visits. This will ordinarily be about three groups.

Ask each group to prepare a ten minutes presentation on a flip chart based on the check list from their field observations. In addition to summarizing the findings ask each group to focus their attention on the discussion questions displayed on the flipchart and try to answer them after having group discussion. Tell them they will have 1.5 hrs to eat lunch and prepare their presentations using a flip chart to summarize their findings and answer the discussion questions posted below. The flipchart needs to be where all three groups can see the questions.

**Note:** If needed and time allows give students more time to develop their presentations.

**Site Visit Discussion Questions**  
**(use your Checklist to answer these questions)**

- 1) Identify 2 – 4 things that the facility is doing well**
- 2) Identify 2 – 3 weaknesses that need improvement**
- 3) Did you find any surprises in the facility?**
- 4) What are the low cost/no cost things the site could do to improve logistics management at this facility?**
- 5) What will you do the same (or differently) in your facility?**
- 6) Other comments on what you saw?**

One Lecturer will serve as a resource person in each of the three groups and help facilitate, but mostly the groups will do the work themselves.

Each group will need a spokesperson or two to give a report. The report can be presented on flipchart. The report focuses on critical analysis of the logistics management practices and should not just describe the observations. The students should be able to link the observations with what they have learned in the course. There is time limit of ten minutes.

The Lecturer may need to point out from time to time that these are discussion questions, and that there is not always one correct answer.

It is fine if the questions are not taken in exact order, and students or the trainer can always add questions. It is OK if the discussion goes beyond the stated questions, as long as it is valuable discussion that helps the students.

Tell them that each group will need to have a reporter or reporters. Here is the reporter's job:

- The report lasts ten minutes.
- The reporter Prepares a flipchart or PowerPoint
- The reporter just stands and says who was in the small group
- The reporter summarizes the observations and presents a critical analysis of the observations
- The list of discussion questions on the flipchart can help the reporter remember what the group responses are
- After the reporter has completed the presentations, there is a brief discussion period (about ten minutes).

The trainers should be sure that the students are in the same groups as when they were on the tour.

Let the groups begin on their own, but after a few minutes, the trainers should sit in a little and be sure that the groups are working on the visit observations, analysis and discussion questions. Make sure that the group selects reporter/reporters as soon as possible and that the reporter understands the job. If the trainer is needed to keep the discussion going, the trainer should try as much as possible to be a resource person and not a small group facilitator.

The trainers should circulate when there are only a few minutes left to be sure that each group has started preparing its presentation.

The trainers should call time. The students should stay in the groups that they worked in without moving back to their original seats at this time.

The trainer asks the reporter from the first group to present the report and begin by saying names of the group members. The maximum time is ten minutes, and then this is followed by another ten minutes of large group discussion.

**Note:** large group discussion time may be shortened if needed or if there is little discussion from the audience

If the discussion coming from students does not come through easily, then the trainer can easily insert discussion points such as these, if they are needed:

- Did you always agree on what you saw?
- Which question on the flipchart did you spend the most time on?
- Which component of supply chain did you spend the most time on during your visit?
- Did you get ideas that you would want to use in your own facilities?
- Would any of you be ready to have a group take a tour to your facility in the next few days? (If not, what would you have to do to prepare for visitors?)

### **Wrap-up**

Tell students the exercise was aimed to impart them with knowledge of practical challenges and issues related to SCM within their local context. The knowledge gained can be easily utilized in improving functioning of their own supply chains. Tell students that it is important to realize that there are some feasible and low cost solutions which can greatly improve the logistics management performance.

## ***Field Visit Checklist***

**Group members'** \_\_\_\_\_ **Department:** \_\_\_\_\_

**Facility type:** District Office / District Hospital / Tehsil Hospital / Rural Health Center / Basic Health Unit - **Data Gathering Method:** R = Reading, O = Observation, D = Discussion

S/No	Indicator	Method	Observations	Recommendations (for class presentations)
	<b>Pre- Visit</b>			
1.	Review of district Logistics data from LMIS (www.lmis.pc.gov.pk)			
2.	Review the demographic and other health indicators of the districts			
3.	Review what type of health and / or population services are being provided by the facility			
	<b>During Visit</b>			
	<b><i>Standard Operating Procedures &amp; Guidelines</i></b>			
4.	Do written storage guidelines and procedures exist			
5.	Do written ordering guidelines / job aids exist			
6.	Do written shipping guidelines / job aids exist for commodities (if applicable)			
7.	Any other observation			
	<b><i>Commodity Availability</i></b>			
8.	Discuss availability of a few key commodities (Condoms, Oral Contraceptive, Essential Medicines etc.) and observe their stock positions by reviewing their bin or stock cards			

9.	Are any commodities typically over or under stocked Evaluate the reason(s) for this.			
10.	Which products does the facility typically stocks out of			
11.	How are problems of under/over stock are handled			
12.	Are stock cards available and completed accurately? Are they up to date for products?			
13.	Observe whether the stocks have been most recently ordered have been delivered			
14.	Any other observation			
	<b><i>Storage</i></b>			
15.	Are damaged stocks counted and separated from the other stock and appropriate actions taken?			
16.	Is the Store room well lit yet protected from direct sunlight and well ventilated?			
17.	Is the store room clean and free of clutter and non related items?			
18.	Are medicines kept off the floor and stacked properly?			
19.	Are stocks are arranged by FEFO (first expiry first out)			
20.	How are physical inventories conducted? How often are then done.			
21.	Any other observation			
	<b><i>Ordering</i></b>			
22.	How are the quantities to be ordered determined			
23.	Are past order forms completed correctly and fully			
24.	What percentage of the time do you receive your orders on time?			

25.	Are the supplies received according to requested quantities			
26.	Any other observations			
	<b><i>Human Resources</i></b>			
27.	Did the staff receive formal training for managing inventory			
28.	Did the staff receive formal training for ordering and receiving orders			
29.	If you could receive logistics training in any one area what would help you most to do your job?			

**What can be done for low cost or no cost?**

**For additional observations not included in the checklist use the space provided below**

**General Comments / Observations**

## 13. Quantification of Health Commodities

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### Session Objectives:

By the end of the session students will be able to:

1. Explain what quantification is and why it is important
2. Describe the general steps in quantification
3. List the key activities in preparing for a quantification exercise
4. Explain the relationship between forecasting and supply planning
5. Describe the steps in supply planning and the use of the supply plan for informing financing and procurement decisions
6. Explain the importance of routine review and updating of the quantification

**Time:** 165 minutes

### Materials:

Student Workbook  
Session overheads

### PowerPoint Slides:

1. Session Title: Quantification of Health Commodities
2. Definition of Quantification
3. Activities of Quantification Definition
4. Importance of Quantification
5. The Logistics Cycle
6. Diagram of Steps in Quantification (Preparation)
7. Preparing for a Quantification Exercise
8. Diagram of Steps in Quantification (Forecasting)
9. Steps in Forecasting
10. Types of Forecasting Data (1)
11. Types of Forecasting Data (2)
12. Services Data for Family Planning
13. Forecasting Using Morbidity Data
14. Forecasting Using Demographic Data
15. Formula to Calculate Number of Users
16. Diagram of Steps in Quantification (Supply Planning)
17. Steps in Supply Planning
18. Information for stakeholders
19. Guidelines to updating quantification

**Lecturer Preparation:**

Review the Power Point slide presentation and be familiar with its contents and use.

Lecturer may want to write the two formulas for converting data to products in Activity 6 ahead of time. (see bolded formulas)

**Learning Activities Summary**

Title	Type	Time
1. Introduction to Quantification	Interactive Lecturette	15
2. Product Selection	Lecturette	10
3. Overview of Steps in Quantification	Small Group exercise	10
4. Preparing for a Quantification Exercise	Interactive Lecturette	15
5. Steps in Forecasting	Interactive Lecturette	15
6. Four Types of Data Used for Forecasting	Small Group exercise and Interactive Lecturette	60
7. Steps in Supply Planning	Interactive Lecturette	15
8. Using Quantification Results and Updating Quantification	Interactive Lecturette	20
9. Session Conclusion	Lecturette	5

**Learning Activities:**

**1. Introduction to Quantification –Interactive Lecturette – 15 minutes**

Tell the students that with this topic we will not be looking at system design elements, such as we did with LMIS and Inventory Control Systems, nor day-to-day commodity management activities, such as LMIS and Storage. Rather, we will look at some issues related to administration and management of commodities at the national level.

Tell the students that “quantification” is a term we will use to describe a process with several steps that comprise a key logistics management activity that is critical to ensuring a continuous supply of products for a health program, and for achieving commodity security. Quantification is one of the pillars of commodity security that we have been discussing in the course.

Remind students that this session provides an overview of the quantification process.

Display **Slide 2. Definition of Quantification** and tell students to turn to page 85 in their Logistics Handbook. Ask a participant to read the definition:

Quantification is the process of estimating the quantities and costs of the products required for a specific health program (or service), and determining when the products would be delivered to ensure an uninterrupted supply for the program

For those who may have been involved in conducting quantification before, ask if this definition describes what the quantification involved? Process the responses and say that as we can see from the definition, there are a couple of different activities described in the definition. Display **Slide 3: Activities of Quantification Definition.**

- Activities:
  - Forecasting: estimating the quantities of the products required for a specific health program (or service)
  - Supply planning: determining cost and when the products should be delivered to ensure an uninterrupted supply for the program

These two points capture two of the major steps involved in conducting quantification which we will be learning about in this session; Forecasting and Supply Planning.

Ask students why is quantification important? After several suggestions Display **Slide 4: Importance of Quantification.**

The results of a quantification exercise help program managers:

- Identify the funding needs and gaps for procurement of the required commodities
- Leverage the sources, amounts and timing of funding commitments to maximize the use of available resources
- Advocate for additional resources, when needed
- Ensure procurement is coordinated with forecasted supply needs to ensure a continuous supply of commodities

Mention to students that this information is also in their Logistics Handbook.

Tell students now that we understand the definition and importance of quantification; let us see where it is located in the Logistics Cycle. Display

**Slide 5: The Logistics Cycle.** Highlight the importance of quantification in informing financing and procurement decisions and its dependence on other elements in the Logistics Cycle.

Note that specifically, quantification depends on product selection (the right products), data from service delivery points (through LMIS, HMIS), and national/program level data (on program policies, (e.g. Standard Treatment Guidelines), strategies for service delivery, and program expansion plans).

Quantification also depends on external data availability of products on the market. As we continue to go through this session we will see how Quantification is interconnected with the other components of the Logistics Cycle.

## **2) Product Selection – Lecturette – 10 minutes**

Note that before Quantification is the step of Product Selection. Explain that while it is not the focus of this training to go into Product Selection we want to explain a few things about this as it is a key part of the logistics cycle and linked to the remaining steps.

Ask students how they think Product Selection is linked to Quantification. Take responses. If they do not hit on the concept explain that we first have to know what products we want to provide to our people and bring into our country before we can decide how much we are going to quantify.

Explain that limiting the number of products we choose will have a number of benefits. Ask students if they can identify what these might be.

Benefits of limiting the number of products we choose for our country:

- Makes the supply chain more manageable – can monitor fewer products better, can set up a logistics system more easily for them which can ensure better product availability

- Reduces costs – buying products in larger quantities creates cheaper per-unit price and makes them more affordable

- Improves staff familiarity with products – working with fewer products allows people at all levels of the health care system to become more familiar with them – from warehouse workers to nurses.

We still want to provide for the needs of the population however and that should never be forgotten. To do this there are tools in the Quantification course called VEN and ABC Value Analysis which help determine what products to select considering costs and their public health value.

However, explain that when choosing products to purchase it is important that the products are:

- 1) selected from the Essential Medicines list,
- 2) based on standard treatment guidelines that we use in Pakistan
- 3) registered within Pakistan for use.

Tell students that more details on each of these, as well as a more comprehensive look at Product Selection, can be found in Chapter 5 of the Logistics Handbook.

Explain that in the following Procurement session we will talk a little bit about how once the products have been selected the program will complete a procurement requisition form which identifies the product, quantity needed and the requested delivery date. This is then transmitted to the unit responsible for procuring the products.

For now though we want to focus on Quantification.

### **3) Overview of Steps in Quantification – Small Group Exercise – 20 minutes**

Ask students to look in their **Student Workbooks** to the page titled **Steps in Quantification**. Notice that there are 3 squares on this page: Preparation (black square), Forecasting (red square), and Supply Planning (blue square)

Ask students to sit in small groups to put these steps in the order in which they think they occur when conducting quantification. They should do this by numbering the boxes 1,2,3 and drawing arrows on the lines to indicate the direction of the steps. Tell student to then discuss what activities they think would go in each step and list them inside each box. Try to list the activities in the order in which they think the activities should occur. Explain that we will then review the results within the large group.

After 10 minutes ask the students from each group to explain the order of the quantification steps and the activities they think would be needed in each of the steps. Lecturer should note on a board or flipchart the key activities listed by students for each of the steps

- Preparation –
- Forecasting –
- Supply Planning –

Display **Slide 6.Diagram of Steps in Quantification**.

Review the diagram of the Steps in Quantification with students. Relate their responses from the small group exercise to the Preparation, Forecasting and the Supply Planning boxes.

Preparation - In discussing the activities in the Preparation step, identify elements of the program, the scope and purpose of the quantification, and timeframe of the quantification that were addressed by the students.

Forecasting - Relate the results from the small group work to the Forecasting box. Lecturer should point out that the final output of the forecasting step is the forecasted consumption for each product being quantified. This is the quantities of each product that are estimated will be dispensed to users or patients, or used to provide a service during the period of the quantification.

Ask students if these would be the quantities that they would recommend be procured for the health program? The answer should be “no”. Ask students why the forecasted quantities to be dispensed or used would not be what the program should procure. The answer should be that

- The forecasted quantities do not take into account current stock on hand in the pipeline
- Forecasted quantities do not take into account quantities needed to cover lead times and buffer stock
- Forecasted quantities do not take into account quantities that may already have been procured and have not been received yet

**NOTE:** students may not be able to answer this question yet. Their responses will help indicate their level of knowledge, skills, and experience in quantification.

Supply Planning - Review the small group responses for the Supply Planning step with the activities in the Supply Planning box in the diagram. Highlight that the final output of the Supply Planning step is the Supply Plan which details the

- total estimated quantities and costs of the products required for the program,
- the planned quantities and shipment delivery schedule for the period of the quantification, and
- the comparison of funding available to the total cost of the commodities required.

End this part of the session emphasizing the sequence of the steps and comparing the final output of the Forecasting step with the final output from the Supply Planning step. Note that the result of the Forecasting step – the forecasted quantities of each product needed to meet the needs of patients and users of the products in the health program, is the starting point for the Supply Planning step.

The result of the supply planning step is the total quantities of each product that will need to be procured to supply the forecasted quantities to be dispensed or used PLUS the additional quantities of products that need to be procured to maintain adequate stock levels in the country to ensure continuous supply. At this point, explain to students that we will be going into more detail on the specific activities involved in each of the Forecasting and Supply Planning steps.

Lecturer should point out the large arrow to the left that refers to the steps and activities that are directly part of the quantification exercise. Note that the arrow at the top starts with Preparation and ends after the “Funds Sufficient?” and “Increase Funding?” questions have been answered. Note to students that this is to reflect the need to return to the forecasting step to readjust the forecasting assumptions and re-calculate the commodity requirements in the event that there is not enough funding available to procure the total commodity requirements.

#### **4. Preparing for a Quantification Exercise – Interactive Lecturette – 15 minutes**

Display **Slide 7: Preparing for Quantification**. Prior to beginning any data collection for the quantification, initial steps should be taken:

- Assemble the team
- Describe the health program for which the quantification is to be conducted
- Define the scope and purpose of the quantification including the timeframe for the quantification
- Collect and analyze data required for forecasting and supply planning

The Lecturer should briefly review the following for each of steps displayed on Slide 7.

Assemble a team. Most quantification teams have 6-15 members who represent stakeholders from across the supply chain. Who are they? They can be: program managers, procurement specialists, M&E staff, warehouse managers, donors, implementing partners etc. What skills should team members have? Specific program area and knowledge about the commodities and how they are used; computer literacy and proficiency in Excel and/or ability to create/manage databases; commitment to conduct ongoing monitoring, data collection and updating

forecasting data and assumptions and supply planning data; ability to prepare and present data

Describe the health program. Describe the health program for which the quantification is to be conducted. Explain to students that this should include a review of:

- the program goals, strategies and priorities; (e.g. targeting WRA and children < 5 y.o., strategy to integrate TB and HIV services)
- national policies re: standard treatment guidelines, testing algorithms, and dispensing protocols mandating which products should be used and how they should be used; and
- particularly, any expansion plans, planned introduction of new products, or changes in service delivery modes that may significantly influence uptake of services and demand for commodities. (For example, changes in prescribed ARV drug regimens, introduction of mobile HIV testing services, or introduction of new contraceptive products such as hormonal implants)

Define the purpose and scope of the quantification exercise. Let's review the scope and purpose of quantification which are:

- Identify the specific list of products to be quantified including all formulations, dosages and brands of products to be used
- Define if products to be quantified are for use in public sector program, NGO sector, faith-based organizations.
- Define if products are to be quantified for a particular funding agency (USAID, PEFAR, Global Fund, UNFPA, UNICEF), implementing partner, or specific population group e.g. pregnant women (PMTCT), HIV/TB co-infected patients, women of reproductive age, work-based HIV testing program,
- Define if products are to be quantified for the national level or specific geographical region. LECTURER NOTE: National level quantifications of total quantities of products needed to cover demand for a program/service is most useful. Allows all stakeholders to know full extent of commodity needs to coordinate mobilization and allocation of resources for procurement.
- Define timeframe/time period for the quantification. Forecast commodity requirements for sequence of one year periods. Quantification for procurement purposes a minimum two year (24

month) period recommended. Quantifications for longer periods (5 years, 7 years) may be conducted for advocacy and resource mobilization purposes.

Collect required data. In preparation for quantification, data must be collected for both the forecasting step as well as the supply planning step.

- For the forecasting step data is needed on product consumption, number of services provided, morbidity data on number of cases of a disease or health condition treated, and demographic data of the population being targeted for services should be collected. We will discuss these different types of data in more detail in later in this session.
- For the supply planning step, data should be collected on: total stock on hand in the program, quantities on order, procurement and supplier lead times, supplier prices and shipping and handling costs, and funding available for procurements.

## **5. Steps in Forecasting – Interactive Lecturette - 15 minutes**

Display **Slide 8. Diagram of Steps in Quantification** and explain that we will now look at the activities in the red box the Forecasting step.

Display **Slide 9: Steps in Forecasting.** We will now look at the activities in the red box the Forecasting step. Ask students to turn to page 88 and read the definition of forecasting (listed under “Step 2: Forecasting”). The activities in the forecasting step are:

- Organize and analyze data
- Build and obtain consensus for forecasting assumptions (structure a forecasting tree)
- Calculate forecasted consumption for each product
- Compare and reconcile results of different forecasts

The Lecturer should briefly review the following for each of steps displayed on Slide 9.

Organize and analyze data. After the data is collected you will need to assess its quality. You may have to make several adjustments, for example, incompleteness of reporting, outdate or unreliable data. Some

data may require conversions, for example, people visits to number of products, incidence of disease to number of medications provided, etc.

Build and obtain consensus for forecasting assumptions. You will need to make assumptions about the program performance, targets, and future demand. For example: expected uptake in services, compliance with recommended treatment guidelines, etc.

Calculate forecasted consumption for each product. You need to document all sources and adjustments to data along with assumptions, and then estimate future consumption for each product.

Compare and reconcile results of different forecasts. Compare the final forecast consumption quantities from each of the forecast and consider the implications of the different forecast for the program, including service capacity, storage and distribution capacity, funding availability; and other issues that could affect demand, supply and use of the commodity and determine a final forecast for each product.

## 6. **Four Types of Data Used for Forecasting Health Commodities – Worksheet Exercise and Interactive Lecturette - 60 minutes**

Tell students that we will now take a preliminary look at data used for forecasting; however, we will not be getting into the actual processes, we will just discuss some of the data available and challenges encountered during this kind of activity.

Ask the students to think now about the specific data we might be able to use to do a forecast. Encourage the students to think of specific data elements (dispensed to user, HIV prevalence rate, etc.), and not categories of data (consumption, services data, etc.). Note participant responses on board or flipchart. At this time, accept all answers, but try to consolidate them into categories of data of the same type. Ideally, the students will give at least one example from each of the four types of data used for forecasting.

Tell students that to familiarize them with some of the concepts in forecasting they will do a short exercise. Ask the students to open their **Workbooks to Forecasting Using Four Data Types: WORKSHEET**. Explain to students that they are to fill in the blanks in the statements, using the words found at the bottom of the worksheet. Tell students that they have about 5 minutes to do this and that they can work individually or with their neighbor.

After 5 minutes call time and go over the answers (which can be found at the end of this session. An overhead of the answers is also available)

Answer any questions and then continue with the review of the data types as below.

Tell the students that for forecasting using the four data types, we will look at data requirements, how we translate the requirements into quantities of products, and situations in which each type of forecast is most appropriate.

Tell the students that we will now look at the specific types of data sets we can use to do our forecasts.

#### **4 Types of Data for Forecasting**

Tell students that in order to prepare a forecast it is recommended to collect as many types of data from as many sources as possible. Ask the students why we would want to use as many data sources as possible. Students should respond that we can use various data sources to cross-check and validate our forecast.

Tell the students that we will focus on four different types of data used for forecasting health commodities.

Display **Slide 10: Types of Forecasting Data (1)**:

1. Consumption Data

Quantities of products dispensed or used over a specified period of time

Emphasize that consumption data counts the number of products being dispensed or used

2. Services Data

Number of services provided, or number of client visits over a specified period of time

Emphasize that services data counts the number of services being provided or, in the case of family planning programs, the number of new and continuing client visits

Display **Slide 11: Types of Forecasting Data (2)**

3. Morbidity Data

Morbidity data may be of two types:

- facility-based morbidity data is based on the number of cases of a disease or health condition treated (in this sense, morbidity data is like services data in that the

cases treated are services that were provided at the service delivery level) OR

- population-based morbidity data is based on the prevalence or incidence of a disease or health condition present in a population in a given year or specific point in time.

Population-based morbidity data is expressed as prevalence (percent of the total population presenting with a particular disease or health condition in a given year), or incidence (the ratio of the number of cases of a particular disease or health condition per 100,000 population at a specific point in time).

Morbidity data in the population may be extrapolated from disease surveillance at health facilities where the cases of disease or health conditions treated is reported.

Explain to students that for our purposes in this course, we will use facility-based morbidity data.

Emphasize that morbidity data counts the number of cases of a disease or health condition treated at a health facility

#### 4. Demographic Data.

Demographic data is data on the number and characteristics of the population for whom the quantification is being conducted (number, age, sex, geographical location, behavior (at risk populations), preferences (choice of contraceptive method) or other characteristics

e.g., counts the number of people targeted for services based on population figures

Refer back to the list of data items that the students generated earlier, and relate each example given by the students to the data type shown on the slide.

Make clear here, and in the discussion of services data, that we do not consider consumption data a part of services data, although they may be collected by the same MIS.

Remind the students that it is important to use as many types and sources of data as possible in order to prepare the best possible forecast. We will use historical consumption and services data to determine current product consumption as the starting point for the forecast, and use all four types of data to make forecasts of future product consumption. The final forecasts based on each of the types of data used would then be cross-checked

against each other, with their differences investigated and taking into account the quality of the data available. This cross-checking serves as a validation of the final forecast.

### Forecasting using Consumption Data

Remind the students that when we are doing a forecast based on consumption data, we are working with numbers that directly give the quantities of products being dispensed or used.

Ask the students to identify which consumption data elements we would want to know in order to do our forecast using consumption data. Students should respond:

- Data on quantities of products dispensed or used (dispensed to user data for family planning programs)

Note: The students might identify other data items, but at this point, to forecast future consumption, all we need is consumption data.

Ask the students to recall where we would get this data for a family planning program. Students should respond:

- Dispensed to user records
- Summary reports that show dispensed to user data

Ask the students what we will eventually be procuring. Students should respond that we will be procuring quantities of products. Tell the students that, in this regard and from a logistics standpoint, the forecast based on consumption data is the most straightforward, we are already working with the numbers of quantities of products.

Ask students if they have any questions related to consumption data and forecasting. Answer any questions that are raised. Note: Again, this is intended to be a very general introduction, so detailed discussion is not required.

Tell the students that we will now look briefly at the second type of data used for doing forecasts: services data.

### Forecasting using Services Data

Ask the students to define what we mean by “services data,” what kinds of data might be included in services data. Students may respond from among:

- Number of pregnant women who received an HIV test
- Number of cases of TB treated

For family planning programs services data could be

- Number of new clients
- Number of returning clients
- Number of new visits
- Number of re-visits
- Number of doctor appointments scheduled

Display **Slide 12: Services Data for Family Planning:**

- New Acceptors or New Clients: the number of persons visiting a program and accepting a method for the first time;
- Revisits: the number of repeat visits made by all clients during a particular time period;
- Users or Current Users: the number of individuals who are users of a particular method at a particular point in time, whether or not they have actually made a visit during the reporting period.

Note that these data items measure very different things. New acceptors plus revisits equals the total number of visits made during the time period, since an individual is counted each time she or he visits. Users or Current Users counts this individual just once. Mention that Users or Current Users are very difficult to collect from service data unless you have a sophisticated client tracking system, probably computerized, since users can move away, discontinue, or die.

Tell the students that because of the kinds of confusion that can arise when tracking visits and clients, we first want to conclude that if services data are used for a forecast, then only services data on the number of visits should be used.

Remind the students that our eventual procurement will be for a quantity of products. Ask the students if we can directly procure a quantity of products based on the numbers of visits that we have collected through our services data. Students should respond that we cannot.

Tell the students that we need to have a way of translating the number of visits to a quantity of products. Ask the students what method or technique we might use for doing this. Students may respond, or the facilitator can mention that the translation is done based on dispensing protocols: a quantity of products that is given to each client at each visit in this case.

Explain that the calculation for doing the conversion is as follows: (write the formula on board or flipchart)

**(total number of new visits x qty. dispensed at new visit) + (total number of re-visits x qty. dispensed at re-visits) = total quantity required**

Ask the students if they can give any examples that they know from their own experience. The students can suggest examples similar to those below, or the facilitator can give the following examples:

- In a typical FP program, a client using oral contraceptives receives one cycle of pills at the first/initial visit and three cycles of pills on subsequent visits.
- In Bangladesh, all clients receive one antacid tablet and two paracetamol capsules at every visit, including first visits and subsequent visits.
- In an HIV/AIDS prevention program, every client receives 6 male condoms at the first/initial visit, and 24 condoms at subsequent visits.
- An ART patient is dispensed quantities of products based on the treatment regimen and dosages prescribed, e.g. two tablets of AZT 300mg/3TC150mg plus one tablet of EFV 600mg per day

Note that when doing a forecast based on services data, a major assumption is that products are dispensed according to the dispensing protocols. Ask the students what would happen if dispensing protocols were not being followed. Students should respond that consumption (quantities of products) would be over- or under-estimated. Mention to the students that this is one of the main problems with using services data in forecasting; dispensing protocols are frequently not followed faithfully. Another problem is with the application (definition) of new and return visits, as we discussed earlier.

### Forecasting using Morbidity Data

Tell the students that we will now look at forecasting using the third type of data, this one based on morbidity data collected from health facilities. Ask the students to define what we mean by morbidity data.

The facilitator should explain that what we are calling morbidity data here is data on the number of cases of a disease or health condition treated that are reported at a health facility which is actually a type of services data.

Ask for or give examples such as:

- The number of cases of tuberculosis treated in a month or year
- The number of cases of malaria treated in a month or year
- The number of cases of gonorrhea treated in a month or year

Mention that this is different than counting the number of visits to a health facility or even the number of people who get sick: the same person can visit a health facility several times during a year for repeated episodes of a disease or health condition requiring treatment, for example for malaria.

The Lecturer should explain that this is different from the standard definition of morbidity data which is population-based data on the prevalence or incidence of a disease or health condition present in a population. This morbidity data can be used for estimating the quantities of products that would be required to treat all cases or, in the absence of consumption or services data health facilities, can be adjusted to arrive at an estimated number of cases of the disease or health condition that will be treated.

Summarize by saying that:

- when we talked about consumption data based forecast, we counted numbers of products,
- when we talked about services data based forecasts, we counted numbers of visits, or services provided and now
- when we talk about forecasts based on morbidity data, we are counting the number of cases of a disease or health condition treated.

Ask students to think about where they would get morbidity data. For consumption data, we got our data from the LMIS; for service data from the HMIS most likely. Take a few answers from students on where they would get morbidity data.

Most likely they would find this data in HMIS reports if the number of cases of a disease or health condition is collected and reported in the HMIS. Alternatively you could collect population-based data from a national level where the data is compiled by an epidemiology department or health statistics department. (this would be data on prevalence or incidence of disease present in the population you are forecasting for)

Ask students how frequently you might get updated morbidity data? At best you might get it yearly unlike consumption data that you might get updates on possibly monthly or quarterly.

Remind the students that now that we have our collected our morbidity data, as we saw earlier, our eventual procurement will be for a quantity of products. Ask the students if we can directly procure a quantity of products based on the number of cases of disease or health conditions treated that we have collected. Students should respond that we cannot.

Tell the students that, as with services data, we need to have a way of translating our numbers: from number of cases of a disease or health condition into a quantity of products. Ask the students what method or technique we might use for doing this. Students may respond, or the facilitator can mention that the translation is done based on standard treatment guidelines: the quantity of each product that is required to treat a given disease or health condition.

Explain that the calculation for doing the conversion is as follows: (write the formula on board/flipchart)

**(total number of cases of a disease or health condition x qty. of product required to treat the disease) = total quantity required**

Remind the students that if a disease or health condition requires two or more different products, then the calculation has to be done for each product needed for treatment.

Ask the students if they can give any examples that they know from their own experience. The students can suggest examples similar to those below, or the facilitator can give the following examples:

- for the treatment of gonorrhea: Cefixime, 400 mg, 1 tablet orally in a single dose
- for the treatment of intestinal worms: Mebendazole, 100 mg tablet, 2 times/day for 3 days
- for the treatment of fungal infections: Fluconazole (Diflucan), 200 mg, 1 tablet, 2 times/day for 14 days

Tell the students that the most difficult part in doing a forecast using morbidity data is in determining the number of cases of disease or health condition that need to be quantified for.

Explain that, in addition to forecasting using morbidity data, morbidity data can also be used as a benchmark for comparing against consumption figures to verify rational drug use, i.e. by applying the STG to the number of cases of the health problem actually treated. This comparison, and in

fact, doing a forecast, may be complicated by the fact that many drugs have multiple uses and are used according to different treatment guidelines depending on the health problem, and that different drugs can be used to treat a same illness. Ask if there are any questions about the morbidity method.

Summarize the morbidity method by showing **Slide 13: Forecasting Using Morbidity Data**, and reading through the contents of the slide.

Morbidity Method:

- Requires morbidity data from health facilities.
  - Morbidity data – the number of cases of a disease or health condition treated;
- Requires established Standard Treatment Guidelines.
  - Need to know what the recommended products and dispensing protocols are for treating a particular disease.

Display **Slide 14. Forecasting Using Demographic Data**

Population-based morbidity data

- provides a theoretical quantity needed for treating all cases of disease in a population
- useful for comparing with current coverage and identifying unmet need
- while the most complex and time-consuming method, may be the most convincing for advocacy e.g. scale-up of ART

Tell the students that we will now look at our fourth and final data type for forecasting.

### Forecasting using Demographic Data

Ask the students to review the three types of forecasting data that we have seen so far, and the type of data that is related to each. Students should respond:

- Consumption data: quantities of products dispensed or used
- Services data: number of visits, or number of services provided e.g. number of HIV tests performed
- Morbidity data: number of cases of a disease or health condition treated

Tell the students that we will now look at doing a forecast based on demographic data. Ask the students what we will be counting in a demographic forecast. Students should respond, or the facilitator can mention that we are counting numbers of people.

Ask students to think back to the other methods and to propose why and when they would want to use a demographic based forecast; why yet another forecasting method is needed.

The students or the facilitator can propose:

- When you are initiating a new service, introducing a new product hence you have no historical consumption data, services data, or morbidity data
- When a program is scaling up services and past consumption, services or morbidity data is no longer predictive of future consumption
- When existing consumption data, services data, and/or morbidity data are of such poor quality as to make them unusable
- As a validation check on the other forecasts

Mention that all forecasting methods should be used as a validation check on other forecasts.

Tell the students that there is an important difference between doing a forecast based on demographic data as compared to the other methods. Ask the students if they can think of what that difference might be. Students may respond, or the facilitator can mention that the other three methods make use of historical data, whereas demographic forecasts are looking only at the future; there is no attempt to estimate past numbers.

Remind the students that we have said that when doing a demographic forecast, we are basing the forecast on numbers of people, so we will now briefly discuss which people we are talking about.

Ask the students to think of the people who are served by their program or by some specific in-country program, such as a reproductive health program, an HIV prevention program, an ART program, a tuberculosis program, or other.

Ask the students what the target population of the program is. Students may respond from among the following:

- reproductive health program: women who are at risk of becoming pregnant
- HIV prevention program: sexually active people

- ART program: people with HIV eligible for treatment
- a tuberculosis program: people who are afflicted by TB

Tell the students that we will now briefly look at what demographic variables we would need to take into account to narrow down the general population to our target audience.

Tell the students that we will think together about a public sector reproductive health program, and that we will look at other programs in a moment.

Ask the students to propose what demographic variables we would need to consider when doing a forecast for a family planning method, Lo-Femenal for instance. Students may respond, or the facilitator can mention that we would need to know the following: (note the responses on flipchart; take as many responses as the students can give quickly)

- the size of the total population
- the % of the population that is women
- the % of these women are able to get pregnant: Women of Reproductive Age (WRA)
- the % of these women who are at risk for pregnancy: WRA in Union\* (having sexual relations)
- the % of these women use any form of contraception: Contraceptive Prevalence Rate (CPR)
- the % of these women who use oral contraceptives: Method Mix
- the % of these women who use Lo-Femenal: Brand Mix
- the % of these women who get their products from the public sector: Source Mix
- Couple Years of Protection CYP factor for Lo-Femenal/oral contraceptives

Tell the students that once we have identified the demographic variables that are relevant to the product we are quantifying, we then need to apply each of the variables in a formula to narrow down the general population to our target population: the number of people that we will receive services or be treated.

Show **Slide 15: Formula to Calculate Number of Users**. Tell the students that this example comes from family planning so the target audience is the number of women who will be accessing Reproductive Health services in the public sector and using a particular brand of contraceptive.

Go through the formula on the slide to explain how the general population is narrowed down to the target audience. Explain that each time we multiply by a variable, the group gets smaller and smaller until we finally arrive at the estimated number of users for whom we need to obtain products.

Mention that for the RH example, it is at the last step where we apply the CYP factor for contraceptives, that we do the translation of number of people to quantity of products. Remind the students that this step was needed for each of the forecasting methods that are based on something other than quantities of products, which we saw with the forecast using consumption data.

Tell the students that if we know each of the CYP conversion factors, then we can calculate the total number of women who will be getting their supplies of Lo-Femeral from our public sector facilities.

Note that there is a CYP factor for each contraceptive method and that the factor represents the number of units of the contraceptive needed to protect a couple for a year.

Ask students to open their **Workbooks** to **Recommended Default CYP Factors** and review briefly with students. The facilitator can mention that wastage through personal misuse and method effectiveness are included. This is the reason why there are 15 cycles of orals. A woman can have at most 13 menstrual cycles in 52 weeks, so the 2 extra are for wastage. One IUD is considered to protect a couple for 4.6 years, which is the average lifetime of an IUD when you take into account early withdrawal, the average age of inserting an IUD, and so on.

From a logistics point of view, the biggest limitation to the CYP factors are that they are global factors. Few countries have analyzed their local CYP factors, since data on coital frequency, loss, wastage, and misuse is difficult to obtain. Despite these limitations, CYP is the best tool we have to estimate quantities of products required per person when doing a forecast.

Mention that other programs would each have default factors for the products that they distribute, generally based on Standard Treatment Guidelines. This tells us what quantity of each drug is required to treat each patient or case of a disease or health condition. For example, one ART patient would require 730 tablets of AZT300mg/3TC150mg and 365 tablets of EFV 600mg for one year of treatment.

Tell the students that we have just seen one example of how to define the set of demographic variables that are required to do a forecast of family planning/reproductive health products using demographic data. The

variables for other programs will be different than those for the family planning example that we have just seen and be related to the target populations served by each program or type of program.

Ask the students to propose what demographic variables we would need to know in order to do a demographic forecast for other programs. Ask students to identify a specific program and one demographic variable.

Students may respond from among the following: [Note: Spend only a few minutes on this activity; the point is to get an idea of the variety of variables, not to identify all the possible variables for every program.]

Demographic variables for all programs:

- % of people using public sector services
- % of people using a particular brand
- % of people using each product

Demographic Variables for ART Programs:

- HIV prevalence rate
- % people on first- and second-line treatments
- % people with TB co-treatment

Demographic Variables for HIV Testing Programs:

- HIV prevalence rate (to know % of confirmatory and tie-breaking tests needed)
- % of people getting tested as part of another program (pMTCT, TB, blood screening, sentinel surveys, etc. for each program)

Demographic Variables for Tuberculosis Programs

- TB prevalence rate
- % of TB patients with drug-resistant strains

Demographic Variables for Vaccine Programs

- % of population under 5 years old (target age group for some vaccinations)
- % of population at risk of exposure

Demographic Variables for Malaria Programs

- % of population that lives in malaria endemic zone

Tell the students that if we apply all of the relevant variables, including the percentage of the population to be targeted at each step and then we

multiply by the conversion factor (CYP, STGs/dispensing protocol) for the specific products, by the end of our calculations, we will have arrived at the estimated quantities of products that will be dispensed or used for a year of the forecast period.

Thus, the conversion from people to products takes place during the overall process of doing the demographic forecast. The exact moment that numbers of people are translated into quantities of products will depend on the program, but will generally be associated with the moment when we first apply, for example, the default CYP factors (for a family planning program) or the default treatment protocols, testing algorithms, etc.

Tell the students that if we know each of the conversion factors for each product in each program, then we can calculate the total number of people in our target population who will be getting their supplies of that product from our public sector facilities.

Tell students that we have now looked at four different types of data for forecasting to estimate the quantities of products that will be dispensed or used during one year.

Mention that earlier we had said that it is important to conduct a quantification based on as many different types of forecasting data as possible. Ask the students why we should try to do this before deciding on our “final” forecast. Participant responses may include (and the facilitator can point out any that the students do not raise):

- the quality of the data quality collected from the different data sources will vary
- conducting forecasts with different types of data allows for comparison and validation of the final forecast selected

Show the exercise answer sheet once more on the overhead and answer any remaining questions.

Remind students that we just took a quick look at 4 types of data that can be used for forecasting. We talked about the types of data and some of the challenges confronted when using them. However, we did not have the time to discuss when and how adjustments should be made to data along with other components of forecasting. They can find more information forecasting in the Handbook, plus in the Quantification of Health Commodities workshop.

## **7. Steps in Supply Planning – Interactive Lecturette – 15 minutes**

Show **Slide 16: Diagram of Steps in Quantification**. Mention that we have spent time looking in detail at the forecasting steps, which, as we

saw earlier, account for the second step in the overall quantification process. Now we will look at the blue box, the Supply Planning step. Remind students of the exercise they did at the beginning of the session, the identification of the steps in the Quantification process. Review the students' contributions to this part of the exercise by reminding students that Supply Planning is the second part of Quantification in which we determine cost and when the products should be delivered to ensure an uninterrupted supply for the program

As in Preparing for Quantification and Forecasting, Supply Planning has its 5 step process, Display **Slide 17. Steps in Supply Planning**

- Organize and analyze data
- Build and obtain consensus for supply planning assumptions
- Estimate total commodity requirements
- Develop supply plan
- Compare costs to available funding

The Lecturer should briefly review the following for each of steps displayed on **Slide 17.**

Organize and analyze data. As with forecasting, the quantification team will want to organize and analyze data. The data is different from the forecasting data but it also needs to be collected and analyzed.

- current stock on hand
- quantities on order
- procurement and supplier lead times
- supplier prices, shipping and handling costs
- funding available for procurement

This data is what will help you know how to cost and procure the commodities that you forecast needing. You need to know these data requirements because these are the elements that will impact your supply plan.

Build and obtain consensus for supply planning assumptions. With data collected and analyzed, you will want to identify assumptions that you need to make in order to develop a supply plan. These include: timing of available funds, amount of available funds, lead times for each supplier, and arrival dates of supplies, min and max stock levels for each level in the system.

You may also need assumptions to account for data that is incomplete, unreliable, outdated or simply not available. For example, current stock on hand may only be available at the central level, procurement lead times or timing of funding disbursements may not be known.

Estimate Total Commodity Requirements.

Ask the students if the forecasted quantities of products to be dispensed are the only products that we require for the program. Students should respond that we also need quantities for buffer stock and lead time stock, for instance. The facilitator can summarize this discussion by saying that in addition to the quantities that will be dispensed to patients or used to provide a service, we also need to ensure that we have enough product to “fill the pipeline.”

Mention that if we are working within an established Max-Min system, then we can multiply the estimated average monthly consumption (our annual forecast quantity divided by 12) and multiply by the system Max, to know how much we would want to have at any given moment. Remind the students that our Max stock level includes buffer stock and lead time stock. Mention that if we do not have a Max-Min system, then we will have to add some percentage onto our estimated consumption (the forecast quantity) to account for some buffer stock and lead time stock.

Tell the students that we will also need to account for current stock on hand. We would not want to purchase product if we already have enough in our pipeline.

Forecasted quantities of products to be dispensed are NOT the only products that we require for the program. We also need quantities for buffer stock and lead time stock, etc., to ensure that we have enough products to “fill the pipeline.”

Note; Tell the students that we will also need to account for current stock on hand. We would not want to purchase product if we already have enough in our pipeline.

Develop supply plan. A Supply plan needs to be developed that includes shipment quantities and delivery schedules that will ensure a continuous supply of products to the country.

Compare costs to available funding. Tell the students that once we have calculated the final quantity of products needed to fill the pipeline and ensure continuous supply, then we need to estimate how much it will cost to purchase and ship all of those products and compare it to the funds that are available. If sufficient funds are not available, more resources will have to be identified or the quantities of products will have to be reduced by adjusting the forecasted amounts.

## 8. Using the Quantification Results and Review and Update the Quantification – Interactive Lecturette – 20 minutes

### Using the Quantification Results

Upon completion of the Supply Plan, the quantification team should formally present their results to stakeholders (including the budget or financial body). The goal of this is to receive feedback on assumptions and data sources as well as describe the national stock status and describe actions required to maintain adequate stock levels.

Display **Slide 18. Information for stakeholder** and tell students that this information will allow stakeholders to:

- Determine funding requirements for procurement
- Coordinate resource mobilization efforts
- Advocate for expanding access to services

This step also allows us to:

- uncover supply chain management needs
- provide opportunities to advocate for improvement
- inform procurement decision making and coordination and
- adjust timing of procurements and shipment delivery schedules

Upon completion of this the results should be given to the Procurement unit so they can purchase the needed products on schedule.

### Update the Quantification

Tell students that once the quantification is completed, approved and given to the Procurement team, it does not mean that it is done. Quantification is an ongoing process of monitoring, reviewing, and updating the forecasting data and assumptions; and recalculating the total commodity requirements and costs, as needed.

Display **Slide 19. Guidelines to Updating Quantification Estimates** to follow when updating the quantification include:

- Review and update the quantification every six months, more frequently for programs that are scaling up services
- Review actual consumption data and update forecasting assumptions as needed
- Recalculate commodity requirements and costs
- Update stock on hand for each product
- Assess national stock status for each product (based on product consumption and stock levels)
- Review and update shipment delivery schedules to ensure continuous supply

- Mobilize additional resources if needed
- Adjust procurement quantities and shipment delivery schedules as needed

NOTE: For programs that are scaling up services to meet new targets or introducing new products, the quantification should be reviewed and updated quarterly to capture changes in consumption and adjust the supply plans more frequently if needed to ensure continuous supply of the commodities needed.

If time permits that facilitator can ask the following questions and discuss with students.

- How accurate will your forecast be? (Never 100% accurate, but better and better as more data becomes available and the program develops.)
- When you update your forecast, what other parts of the quantification should you review and update? (You should review the supply plan and the funding requirements as these will also change as the forecast changes).
- What might happen to your supply plan as you revise your forecast and have more recent data? (The supply plan may change and you may need to recalculate the procurement quantities and postpone shipments or request earlier arrival dates depending on actual and updated forecasted consumption.) The review of the supply plan should include
  - assessment of current stock status and shipment delivery schedules,
  - revision of the supply plan as needed to recalculate procurement quantities and adjust supplier delivery schedules to ensure continuous supply,
  - review and update of the commodity costs

## **9. Session Conclusion – Lecturette – 5 minutes**

Remind the students that we have looked at the key steps in quantification, and that even though we did not go into great detail on most of these, the important thing to remember is that each of the steps are inter-related and required in order to complete a quantification exercise. Again tell that students that this was a very simple overview of the quantification process.

We will now look at the next step in the logistics cycle: Procurement.

**Synthesis Questions:**

- 1) For which products should you do quantification? (All that you distribute)
- 2) What are the four types of forecasting data? (Consumption, Service, Morbidity, Demographic)
- 3) How frequently should you do a quantification exercise? (Even though you may be forecasting for a few years at a time, update your quantification at least annually, with a mid-year review, as better data becomes available.)
- 4) How do you adjust for missing data? (see the rules for each data source)
- 5) Describe how you would adjust for stock outs.
- 6) When you update your forecast, what other parts of the quantification should you review and update? (Update the pipeline requirements based on changes to the forecast, recalculate costs and compare with the budget.)
- 7) What might happen to your supply plan as you revise your forecast and have more data? (The supply plan may change and you may postpone shipments or request earlier arrival dates depending on actual and updated expected consumption.)

### Forecasting Using Four Data Types: ANSWER SHEET

Instructions:

Fill in the blanks in the following statements using the appropriate word from the list at the bottom of the worksheet.

1. Forecasting based on services data counts the number of *\_new visits\_*, or *\_\_\_\_revisits\_\_\_\_*.
2. In forecasting using morbidity data, to convert the number of cases of a disease or health condition to be treated into the quantity of medicines needed, you need to know the *\_\_\_\_standard treatment guidelines\_\_\_\_*.
3. When forecasting using consumption data, the specific data to be used is *\_\_\_\_dispensed to user data (or quantity of products dispensed or used)\_\_\_\_*.
4. Morbidity data is usually collected from *\_disease surveillance reports\_\_\_\_*.
5. Forecasting using *\_ demographic variables\_\_\_\_* uses population variables that can be found in surveys and from the *\_national census data\_\_\_\_*.
6. To convert number of visits into the quantity of product required you must use the *\_ dispensing protocols\_\_\_\_*.
7. Data for forecasting using consumption data comes from the *\_\_\_\_Dispensed to User data\_\_\_\_*.
8. *\_CYP (Couple Years of Protection)\_\_\_\_* represents the number of units of a contraceptive needed to protect a couple for a year.
9. Forecasts for contraceptives can not be prepared using *\_morbidity data\_\_\_\_*.
10. Prevalence is an example of *\_\_\_\_demographic\_\_\_\_* data.
  - national census data
  - CYP factor
  - cases of disease treated
  - demographic
  - demographic data
  - dispensed-to-user data
  - dispensing protocols
  - HMIS
  - LMIS
  - morbidity data
  - new visits/revisits
  - services provided
  - standard treatment guidelines
  - disease surveillance reports

## Procurement Session 14

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The Session is divided into the following four Activities:

1. Introduction to Procurement
2. Public Sector Competitive Bidding Process
3. Contract Performance Monitoring and Product Delivery
4. Public Sector Procurement in Pakistan

Each Activity has its own objectives which are reviewed at the beginning of the section. For this session, it is important to explain that students are getting an overview of procurement. They cannot memorize all this material. But they will learn the basics, and then know how to use reference materials for detailed guidance when they need it.

**Time:** 330 minutes (5.5 hrs.)

### Learning Activity Summary:

Title	Type	Time
<b>1. Introduction to Procurement</b>	<b>Presentation and informal discussion</b>	<b>30 min</b>
<b>2. Public Sector Competitive Bidding Process</b>	<b>Presentation and informal discussion</b>	<b>210 mins (3.5 hrs)</b>
<b>3. Contract Performance Monitoring &amp; Product Delivery</b>	<b>Presentation and informal discussion</b>	<b>30 mins</b>
<b>4. Public Sector Procurement in Pakistan</b>	<b>Presentation and informal discussion and exercise</b>	<b>60 minutes</b>

### General information

Each activity has its own objectives which are reviewed at the beginning of the activity.

As a procurement reference document for the course, each student has been given a hard copy of the **Contraceptive Procurement Manual: Government of Pakistan**. This document provides detailed step-by-step instructions on conducting an international bidding process in compliance with Pakistan Public Procurement Rules 2004 and Public Procurement Regulations 2008 and also incorporates best international procurement practices. The **Contraceptive Procurement Manual** contains many useful tools and forms that are referred to throughout the procurement session. The specific reference to these tools and forms will be noted in this Lecturer's Guide in the corresponding slide in which the reference is made.

And note the special pages below on presenting this long and important session.

## **SPECIAL LECTURER GUIDANCE FOR SESSION 14 (PROCUREMENT): TIPS AND SHORTCUTS FOR BETTER IMPACT**

The Procurement Session, Session 13, is one of the most important sessions in the course, and it is also the longest, 5.5 hours. It can be a challenge, both because of its deep technical content but also because important parts of it rely heavily on PowerPoint. The danger is that students will just sit passively, write a few notes, and let the content pass them by. A lot of the time in this long session could be wasted. Here are several tips that will make it easier for lecturers to present and easier for students to get the content.

**Maximize the “work periods” to divide the long series of 93 PP slides.** The seven work periods include interactive quizzes, case studies, and/or discussion periods. They help the lecturer maintain a ratio of about 20% PowerPoint slides and 80% work periods so that the lecturer can reinforce what students have seen in the slides.

On average each slide will take less than a minute to present; that means 90 minutes of the 5.5 hours are needed for the slides. That leaves 4 hours for the work periods.

The seven “work periods” interspersed in the 93 PP slides and time estimates are the following:

- Interactive Quiz at the end of Activity 1, reviewing Slides 1-12, (25 mins.)
- Discussion Period in Activity 2 after Slide 20, (20 mins.)
- Interactive Quiz in Activity 2, reviewing Slides 14-35, (30 mins.)
- Case Study in Activity 2, after Slide 38, reviewing all slides so far, (60 mins.)
- Interactive Quiz at the end of Activity 2, reviewing Slides 39-67, (30 mins.)
- Discussion Questions at the end of Activity 3 after slide 80 (25 mins.)
- Discussion Questions/Small Groups at end of Activity 4, Slide 93 (40 mins.)

-Times listed are approximate and can be adjusted to the needs of various groups.

-Answer keys for the three interactive quizzes are included in the lecture guide.

-The quizzes without the answers are included at the end to be photocopied, if they are not already included in the student guide.

-Discussion questions and case study are also in this Lecturer Guide.

-At the end of these presentation tips is a list of “generic discussion questions” that can be adapted to almost any time or topic.

**If at all possible, make copies of slides or e-mail them to the students,** preferably in advance. Alternately, let them copy the slides from a flash drive. This will help assure them that they do not have to write endless notes as the lecturer presents the slides, notes that might be of questionable quality. Alternately, if it is feasible, print out the slides for this long and important session and distribute them as a handout. The seventy-two slides would require 24 sides of page with three slides to a page with room left on the page for

notes, or 12 sides of paper with six slides to a page and no room for notes. Three slides to a sheet is better. Also, the slides can be printed back to back as a further economy.

**Look at the students as you present the slides.** Don't look at the screen. This is always good advice for PowerPoint. It keeps the students better engaged, and the lecturer can see if they are following well or if they have lost interest.

**Explain the slides; don't read them to the students.** The students can read the slides very easily. Reading the slides aloud is not a good use of time. Explain the slides with additional information, details, examples, applications, etc. There are many good points in the Lecturer Guide. This is what students need. Don't use up time reading the obvious.

**Ask students to jot down their questions as you go along.** Then take all questions during a work period between the PowerPoint sections. This avoids wasting time on questions that will be answered in later slides, and it keeps the presentation focused. Ask students to mention the slide number if a question refers to a particular slide.

**Make the room darker, but not too dark.** A very dark room encourages passivity and even sleeping. And the presenter can't tell if the group is with him or not. Work with the lighting so that the screen is easy to see but the room is not really dark.

**Be sure they can read the slides!** It is a waste of your time and theirs if they all cannot see the slides and read them easily. Test the slides for visibility by standing in the back of the room to view them. Are they easy to read? If not, you need to move the projector farther back to get a larger image. Or you may need to project on a white or light colored wall instead of a screen to get a large enough image. Do the chairs need to be rearranged so that all can see? Make sure neither you nor the projector blocks the view of the screen.

**Get students to help you.** Let one of two of them turn the lights on and off. One of them can change the PowerPoint slides for you when you ask so that you can better focus on the group and the content. You will have better time management if you give one of them a list of the times for the four Activities in this long Session so that he or she can tell you when you have five minutes left and when time is up. They can even time the work periods so that you use all the time effectively but you do not run overtime.

**Put the schedule for the day on a flip chart.** List the activities, work periods, etc. This helps you stay on track, and the students pay attention better if they know where you are going.

**Use a "Parking Lot."** Sometimes interesting topics or questions come up, but they are not directly related to what you are presenting and the session objectives. One solution is to put or "park" them temporarily on a flip chart labeled "Parking Lot," "Lorry Park" or whatever. This means that you will get to them at the end of the day and cross them off, or you may have to e-mail info on them later. You are not ignoring them, but you are not losing time from the objectives of the training.

## GENERIC DISCUSSION QUESTIONS

These questions can be useful in any of the work periods between the sections of PowerPoint slides. Modify them as needed. Whenever possible and appropriate, turn a question around to see if some other student can answer it well. For example, “Ibrahim, that is a very good question about bidding. Let’s see first if any of the other students can try to answer it.”

1. What was something new or surprising that came up in this last group of slides?
  2. What was something that was difficult for you? It is OK to admit that something was difficult!
  3. Was there anything that was not clear? Let’s see if we can get some clarification.
  4. Is there something that you think will be especially useful to you in your job over the next year or so? What is it? Please explain to us.
  5. Do you have any personal or professional experience yet with any of the ideas or concepts you saw in this last section of slides?
  6. In this last group of slides, have you seen anything that contradicts partly or completely what you believed or what you have seen in practice? (Please, in your explanation, you should not name names or give locations.)
  7. What are examples of specific points or facts that students absolutely need to know, and what might be some examples of points or facts that they need to know how to find in reference works, such as the Contraceptive Procurement Guide?
  8. If I gave you an assignment to pick a topic or concept that you would need to explain to your supervisor or some colleagues, what part or concept in this group of slides would you like to pick, and why? How would you go about preparing your explanation?
  9. Do you have any general comments about this group of slides?
-

## **Learning Activities:**

### **Activity 1. Introduction to Procurement**

#### **Section 1 Objectives:**

By the end of Section 1 students will be able to:

2. Describe the objectives of a procurement system
3. Identify the major differences between public and private sector procurement
4. Identify the guiding principles of competitive bidding
5. Describe the four most common public sector procurement methods

**Time:** 30 minutes

#### **Materials:**

##### **Presentation Slides:**

1. Session Title - Public Sector Procurement
2. The four activities of the procurement session
3. Activity 1 Title. Introduction to Procurement
4. Activity 1 Objectives
5. Procurement System Objectives
6. Principles of Procurement: private versus public sector
- 7 to 10. Principles of Competitive Bidding
11. Procurement Methods – Goods
12. Questions

**There is an interactive (Cheater's) quiz after the last slide in this session**

##### **Student Guide**

1. Interactive (Cheater's) Quiz

##### **Contraceptive Procurement Manual materials**

1. Principles of Competitive Bidding: pages 1-2

#### **Lecturer Preparation:**

Lecturer should review the PowerPoint presentation corresponding to this session in advance, to become familiar with its use and with the materials it includes.

Please note that Slides 7 through 10 identify the ten (10) key principles of competitive bidding. The students will be referred to the pages where they can find these principles in the Contraceptive Procurement Manual.

Slide 6 is animated; after introducing and describing the procurement principles that private and public sector procurement share (economy, efficiency, quality) subsequent

click will show the additional principles that public sector procurement must comply with (equality, fairness, transparency, accountability).

### Learning Activity Summary:

Title	Type	Time
1. Introduction to Procurement	Presentation and informal discussion	30 min

### Learning Activities:

#### 1 Introduction to Procurement – 30 minutes

Display **Slide 1, Session Title**. Welcome students and guests to the first procurement activity of the course.

Tell the students that as we have seen from the previous sessions, there are several key components in a supply chain and procurement is one of those components. It plays a key role in ensuring that quality products are procured in a cost effective manner that supports the overall objectives of the health care program.

Tell students that during the next few sessions we will be taking a look at the public sector procurement process and how it works to support the supply chain process and program objectives.

Tell the students that one of the reference documents they received for the course is the **Contraceptive Procurement Manual**: Government of Pakistan. The reason this document was selected is that the information and procedures in it apply only to contraceptives, but to most health commodities in general. It contains detailed step-by-step instructions on conducting international competitive bidding in compliance with Pakistan Public Procurement Rules 2004 and Public Procurement Regulations 2008 and also incorporates best international procurement practices. The **Contraceptive Procurement Manual** contains many useful tools and forms that we will be referring to throughout the procurement session. So it is recommended that the student keep this reference document handy so that it can be easily reviewed when specific and forms that are found in the document are mentioned and discussed during the course of the procurement session.

Display **Slide 2**, The Public Sector Procurement session is divided into these four activities. In the first section, introduction to procurement, we will look at the objectives of a public sector procurement system. The

second activity is focused on what are considered best practices in international competitive bidding. In activity three we will look at contract performance monitoring and product delivery. And activity 4 takes a look at the rules and regulations governing public sector procurement in Pakistan and some of the common challenges encountered in the procurement process. Each activity will have its own set of objectives.

So let's get started

Display **Slide 3**, Introduction to Procurement

Display **Slide 4**, Tell students in this first activity we will look at the objectives shown here (see slide and note each objective).

Display **Slide 5**, Tell students that any procurement system, be it private sector or public sector, will strive to achieve the following objectives in each procurement that it conducts (see slide and note rights)

These objectives, known as the five rights, are universal for all procurement systems and apply equally to procurement conducted in Pakistan as they do to procurement conducted in France, Brazil, the United States and other countries.

Display **Slide 6**, Tell students the procurement system objectives we reviewed in the previous slide (right product, quality, price, quantity and time) apply equally to private and public sector procurement systems. Both the private sector and the public sector want to acquire good products at good prices.

There is a difference; however, in the process these systems follow to achieve those objectives.

Private sector procurement uses private funding to procure goods. As a result, they do not have to report publicly on how procurement funds are used. They focus primarily on procuring goods in a cost effective manner. The guiding procurement principles for the private sector are economy and efficiency, and good companies also strive for quality in their products and services.

Public sector procurement is also guided by principles of economy and efficiency and quality. Public sector procurement, however, uses public funding to procure goods, works and services that support public programs and improve public health. Public Sector procurement, therefore, must comply with additional guiding principles when conducting procurement.

Ask students if they can identify what those additional principles might be. After some suggestions click on slide to show the four additional principles public sector procurement must comply with.

These additional principles are: equality - providing equal opportunity to qualified suppliers to compete for business, fairness - establishing procedures so all suppliers are treated fairly, transparency -conducting procurements in an open and publicly transparent manner, and accountability – documenting and reporting on the proper use of public funds

Display **Slide 7**, tell students that a competitive bidding process, when properly administered, will address the key principles of good public sector procurement (economy, efficiency, equality, fairness, transparency and accountability) and is the foundation of a good public sector procurement process. To remember these principles, it may be helpful to think of EEEFTA. This is not a real word or acronym, but it may be a good memory hook.

In the next few slides we want to briefly discuss the ten key guiding principles for competitive bidding that should be followed when conducting public sector procurement. Tell students that a copy of these ten principles of competitive bidding can be found on pages 1 and 2 in the **Contraceptive Procurement Manual**.

1. Suitable Package

Design bid requirements to attract the interest of both large and small foreign and domestic suppliers. Consider accepting partial bids, defining parts that must be bid together and those that can be bid alone.

2. Early Warning

For National Competitive Bidding (NCB), allow bidders at least 15 days to submit offers. For International Competitive Bidding (ICB), allow bidders at least 30 days to submit offers.

3. Non-discrimination

Invite bids from as many foreign and domestic suppliers as possible through open advertising in newspapers, trade journals and websites in accordance with alternate procurement methods as defined by the Public Procurement Regulatory Authority (PPRA).

Display **Slide 8**, continue presentation of the guiding principles for competitive bidding.

4. Accessibility

Allow wide access to competition by setting reasonable costs for bidding documents and securities; respond to all written questions and requests

for additional information from each bidder as soon as possible; provide identical information to all other bidders without identifying the source of the inquiry.

#### 5. Neutrality

Base specifications on generic terms. Do not show preference for a specific brand or manufacturer in specifications; include the phrase “or equivalent” if a brand name, trademark or catalogue number must be used.

Display **Slide 9**, continue presentation of the guiding principles for competitive bidding

#### 6. Formality

Require that bids be in writing, signed and received in sealed envelopes before a stated date and hour.

#### 7. Confidentiality

Do not open bids until the assigned date and time. Restrict all bid information to authorized parties.

#### 8. Consistency

Evaluate all bids against the same criteria. Do not ask or permit a bidder to change the substance of his bid unless equal opportunity is given to all bidders within the competitive range.

Display **Slide 10** complete presentation on the guiding principles for competitive bidding.

#### 9. Objectivity

Determine if each bid is “substantially responsive” by checking for errors, correct signatures, inclusion of all required documents and adherence to basic bidding requirements. Select the most advantageous bid considering both the price and the evaluation criteria announced in the bidding documents.

#### 10. No Negotiation before Award

Obtain the lowest responsible offer from each bidder through the competitive bidding process. Negotiate minor contractual adjustments after the winning bid has been selected.

Display **Slide 11**, tell students that in public sector procurement there are traditionally four types of procurement methods that are used to purchase goods. These are: a competitive bidding process, a request for quotation process, a direct contracting process and a petty purchase process. The choice of which method to use is usually based on the anticipated value of

the procurement; with competitive bidding processes used for high value procurements. There are two types of competitive bidding processes that are used in Pakistan, International Competitive Bidding and Open Competitive Bidding.

International Competitive Bidding (ICB) - ICB is an open or unrestricted bidding process that includes international sources. Bids are solicited by advertising an open invitation to all foreign and domestic suppliers telling them about the opportunity to compete for a contract.

Open Competitive Bidding is open, unrestricted bidding, usually among national sources only. Open Competitive Bidding is the basis for GOP's PP Rules 2004 and PP Regulations 2008.

GOP allows Requests for Quotation to be issued for procurement actions under Rs 100,000. In this method, quotations are requested and received from a limited number of suppliers; price and content are compared; and an award is made based on lowest evaluated cost.

In Direct Contracting, price and terms are settled with one chosen supplier, without asking others for bids (e.g., without competition). The GOP limits the use of direct contracting to rare circumstances, such as when there is only one qualified producer/supplier. Pre-approval is required.

Petty Purchases - This method is allowed by the GOP for goods with a value of less than Rs. 25,000. Petty purchases are traditionally exempted from the requirements of bidding or quotation of prices.

Since Competitive Bidding is generally required for large value procurements and also incorporates the 10 key principles that we discussed earlier, in our next session we will take a closer look at this procurement method and how to use it.

Display **Slide 12** and ask if there are any questions, then proceed to the interactive Cheater's Quiz below.

Explain to the students that to reinforce the material in this group of slides, you will ask them to take an interactive quiz. They will be asked to "cheat" on the quiz. First they should try to do it on their own, using their reference materials if they need to; then they should find a fellow student to "cheat" with to see if they agree on their answers and have a very high score. Lastly, the lecturer will ask all of them to compare their answers to see if everyone agrees about these questions.

The version here is the Lecturer version and includes the answers. The version for the students should be included in the handouts for this Session or included in the Student Guide.

## CHEATERS' QUIZ (Lecturer Version with Answers)

(Session 14, Procurement, end of Activity 1, covering slides 1-11.)

There aren't many rules about a "Cheaters' Quiz," except that you must cheat. First try to answer the questions on your own. It is true that much of the information in this session is not for memorization, but it is important to know where to find the information in the reference materials you now have, such as the Contraceptive Procurement Manual. Consult it as needed.

When you have written your own answers, find a colleague with whom you can “cheat” so that you and the colleague get as close as possible to perfect scores. You need not put your name on this paper. It is not to hand in. Your lecturer will review the final answers with you.

1. These questions concern the principles of procurement. Write **Both** before the principles that apply to both private and public procurement. Write **Public** before the principles that apply only to public procurement.  

Both   Economy

  Both   Efficiency

  Public   Equality

Public   Fairness

  Public   Transparency

  Public   Accountability
  
2. **Would you say that the procurement process is easier in the private sector or in the public sector? Give reasons for your answer.** *Many would say that the private sector is easier, since there are few regulations to follow and no equality, etc. However, you could note that in the private sector, if you procure poorly, you will not make a profit and you could go out of business!*
  
3. For this question, you need to match up the words or phrases in the right column with the Principles of Competitive Bidding in the left column. Just write the letter from the item in the right column in the space before the Principle in the left column. For example, if Item X in the right column matches Principle 100 in the left column, you would write an X in front of Principle 100. Caution: some of the terms or phrases are used in a technical sense rather than the common dictionary meaning.

<u>  C  </u> 1. Suitable Package for Bid	A. Low or No Cost for Bidding Docs
<u>  I  </u> 2. Early Warning	B. Info only to authorized parties
<u>  J  </u> 3. Non Discrimination	C. Attract interest of many parties
<u>  A  </u> 4. Accessible	D. “Substantially Responsive”
<u>  G  </u> 5. Neutrality	E. Negotiate minor points afterwards
<u>  F  </u> 6. Formality	F. Sealed Envelopes by stated time
<u>  B  </u> 7. Confidentiality	G. No Specific Brands
<u>  H  </u> 8. Consistency	H. Judge on basis of same criteria
<u>  D  </u> 9. Objectivity	I. 15 days for NCB
<u>  E  </u> 10. No Pre-Award Negotiation	J. Advertise Widely

(Continued on next page.)

Caution: There may be some “trick” questions below. The answer may be somewhat debatable but can lead to worthwhile discussions.

4. In the spaces below, write one of the four types of procurement methods used in public procurement. Your choices are CB for Competitive Bidding (which can be either ICB or OCB), RQ for Requests for Quotations, DC for Direct Contracting, and PP for Petty Purchases.

1.   ICB   Could come from any country
2.   DC   Just one contractor and no other bids
3.   OCB   CB but with no foreign companies
4.   RQ   Based on lowest evaluated cost among quotes from a few suppliers
5.   CB   There are two types of this type
6.   PP   Below Rs 25 000
7.   OCB   Based on PP Rules 2004 and PP Regulations 2008
8.   DC   One Chosen Supplier
9.   CB   Large, complex, and the subject of the next session in the course

**5. In what document can you find the Ten Principles of Competitive Bidding?**

   The ***Contraceptive Procurement Manual***, (Which happens to be a very important reference work and not just for contraceptives!)

**6. Which is better, ICB or OCB? Try to justify your answer.** *This is more of a discussion questions. ICB could provide a wider choice of bidders and maybe lower cost and better quality. OCB could help the country develop its own products and be less dependent in the long term on foreign suppliers. This could vary from one product to another. There is no one correct answer.*

**7. Does the information in the Contraceptive Procurement Manual apply only to contraceptives or to most public health commodities?** *It applies to most types of public health commodities, and in some ways it applies to all of them.*

**8. Which has a longer Early Warning, ICB or OCB? Why do you think one is longer than the other?** *ICB has a longer Early Warning – 30 days instead of 15. This could be because it takes longer to communicate and get responses from potential international bidders.*

**9. Which is more important, to have a bid that is technically accurate or one that completely complies with all the formal requirements and documents that must be included in an acceptable bid?** *This is a trick question. You absolutely have to have both. You cannot consider a bid that has just one of these without the other. Even if a bid is technically superior but does not meet the formal requirements, it cannot be considered, and vice-versa.*

**10. What would you think “eeefta” stands for?** *This is not a real word, but obviously it means Economy, Efficiency, equality, Fairness, Transparency, and Accountability.*

**Bonus question: What is sp-ew-nd-a-n-f-c-o-nn?** *That’s easy: Suitable Package-Early Warning-Non-Discrimination-Accessibility-Neutrality-Formality-Confidentiality-Consistency-Objectivity-No-Negotiation.*

## Activity 2. Public Sector Competitive Bidding Process

### Activity2 Objectives:

By the end of the activity students will be able to:

1. Understand the key steps in the competitive bidding process
2. Understand the information and resources needed to conduct an effective competitive bidding process

**Time:** 3.5 hours

### Materials:

#### **Presentation Slides:**

13. Section Title
14. Section 2 objectives
15. Key Steps in ICB process
- 16- 18 Plan for Procurement
19. Procurement File Records
20. Discussion

#### **There is a “work period” and discussion at this point.**

- 21 – 29. Standard Bidding Documents
- 30 Developing bidding Documents
31. Technical Specifications
32. Prepare schedule of requirements
33. Prepare the bid data sheet
34. Specify qualification criteria
35. Specify evaluation criteria

#### **There is an interactive (Cheater’s) quiz at this point**

36. Prepare special conditions of contract
37. Finalize the bidding document
38. Case Study Exercise

#### **There is a “work period” with a case study and discussion at this point.**

- 39 – 40. Invite bids
41. Prepare for receipt of bids
42. Receive and manage bids
43. Pre-bid Conference
- 44 - 45. Bid Opening.
46. Verify Bid Securities
47. Bid Evaluation Format
48. Evaluating bids – best practices
49. Evaluating bids
50. Preliminary examination table
51. Verification checklist
52. Completeness of bid checklist
53. Technical evaluation

54. Technical evaluation sub-schedule
55. Technical evaluation – testing samples
56. Substantial responsiveness
57. Material deviation
58. Substantial responsiveness
59. Financial evaluation
60. Currency conversion table
61. Qualify the lowest bidder
62. Assemble the Contract
63. Award Recommendation
64. Notification of Acceptance
65. Performance Security and Contract
66. Distribute Contract
67. Arrange Payment

**There is an interactive (Cheater's) quiz at this point**

**Contraceptive Procurement Manual materials**

1. Procurement Plan format : Annex 6, page 103
2. Procurement records check-list: Annex 11, page 109
3. Instructions to Bidders: Annex IV, pages 239 - 258
4. Bid Data Sheet: Annex IV, pages 260 - 269
5. General Conditions of Contract: Annex IV, pages 271 - 284
6. Special Conditions of Contract: Annex IV, pages 285 - 294
7. Bid Submission Form: Annex IV, pages 342 - 343
8. Price Schedule for Domestic Goods: Annex IV, pages 344
9. Price Schedule for Imported Goods: Annex IV, page 345
10. Manufacturers Authorization: Annex iv, pages 346 - 347
11. Bid Security form: Annex IV, pages 348 - 349
12. Contract Agreement Form: Annex IV, pages 350 - 351
13. Performance Security: Annex IV, page 352
14. Technical specifications: Annex IV, pages 296 – 340
15. Schedule of Requirements: Annex IV, page 295
16. Invitation for Bids: Annex 13, pages 114 - 115

**Student Workbook materials**

17. Interactive (Cheater's) Quiz (reviewing slides 14 – 35)
18. Case Study
19. Case Study contract
20. Case Study Schedule of Requirements
21. Case Study General Conditions
22. Case study Special Conditions
23. Interactive (Cheater's) Quiz (reviewing slides 39 – 67)

**Contraceptive Procurement Manual materials**

24. Bid Opening Checklist: Annex 24, page 127
25. Record of Bid Opening: Annex 25, page 128
26. Preliminary Examination Table: Annex 32, page 136
27. Verification Checklist: Annex 35, page 139

- 28. Eligibility Checklist: Annex 36, page 140
- 29. Technical Evaluation Sub-schedule: Annex 39, page 143
- 30. Bid Evaluation Report: Annex 48, page 153
- 31. Recommendation for Contract Award: Annex 50, page 161
- 32. Notification of Acceptance: Annex 54, page 187

Reference Material:

- 1. PATH Procurement Capacity Toolkit. Version 2

Note to instructor: At appropriate intervals in the slides, there are work periods with discussion and/or exercises for students. Approximately 80% of the time in this long session is for discussion and various exercises, with 20% of the time for showing and narrating the 54 slides.

**2. Public Sector Competitive Bidding Process - 3.5 hrs ( 20% of time to narrate slides, and 80% for discussion and exercises)**

Display **Slide 13, Session Title.**

As we saw in the previous session, there are four traditional procurement methods used in public sector procurement, competitive bidding, request for quotation, direct contracting and petty procurement. Competitive Bidding is the most commonly used public sector procurement method for procuring high value goods and we will take a closer look at that process in this session.

Display **Slide 14**, These are the objectives of this session. Competitive bidding can be a long process and there are several steps that must be completed in an effective and timely manner in order to support program objectives. In this session we will look at the key steps that are followed when conducting a competitive bidding process and the information and resources that are required to conduct competitive bidding effectively.

Display **Slide 15**, These are the key steps that are traditionally followed in conducting a Competitive Bidding (CB) process (see slide). These steps generally apply to both International Competitive Bidding and Open (domestic) competitive bidding.

During the competitive bidding process there are times when it is necessary to engage with other groups to obtain important information and approvals that are required for the process to proceed. Given the number of steps and the need for information and approvals at different points, the CB process can take a good amount of time to complete. Therefore, it is important that procurement personnel fully understand the steps and process requirements so that competitive bidding can be completed in as efficient and timely manner as possible. It is also important for logisticians

to have a general understanding of the procurement process so they are in a better position to support the process.

We will be taking a closer look at each of these competitive bidding process steps.

Display **Slide 16**, Good procurement begins with good planning and the much of the information that is needed to effectively plan for procurement comes from the programs that generate the procurement requirements. Public Procurement Rules 2004, Rules 8 and 9 provide general guidance on procurement planning, and in the next few slides we will take a closer look at what are considered good practices in procurement planning.

Every year program managers are asked to review their program goals for the coming year, estimate the resources they will need (labor, medicines, equipment and general supplies) to achieve those goals, and how much those resources will cost. This information is assembled into an Operational Plan and budget.

These operational plans and budgets are then submitted to the relevant authority for review and approval. Often there are adjustments made to the operational plan and budget to ensure that they align with the financial resources that are available to the approving authority.

After the operational plan has been reviewed and approved by the relevant authority, the Program Manager is responsible for submitting the approved requirement to the procurement unit. This is usually done in the form of a competed procurement requisition. The procurement requisition should include basic specifications for the products to be procured, along with estimated costs for the product.

The procurement unit should receive this information as early as possible to allow sufficient time to process the requirement. If this information is not provided in a timely manner, it may become necessary for the procurement unit to directly contact the program manager to request that the procurement requirements be provided by a specific date.

Display **Slide 17**, The Procurement unit must review and analyze the requirements received from programs to make sure all the information that is required to develop a procurement plan for the product has been provided. The type of information that should be reviewed includes (see slide).

If information is missing or not clear, the procurement unit needs to contact the program that submitted the requirements and obtain clarification.

Once any questions on the procurement requirements have been resolved, the procurement unit prepares a procurement plan that identifies the product, estimated cost, the procurement method to be used (in this case we are using CB) and the estimated timeframe for completing each of the procurement steps.

A sample procurement plan format has been developed to capture this information and a copy of this sample procurement plan format can be found in the **Contraceptive Procurement Manual** as Annex 6 on page 103. Let's take a minute to look at the Procurement Plan form which has been completed for a sample contraceptive procurement to demonstrate how the form is used (go to **Contraceptive Procurement Manual** Annex 6 page 103 and review the key information required for the Procurement Plan)

Display **Slide 18**, Once the procurement plan has been completed it needs to be submitted to the proper authority for approval. Often at this step the proper authority will double check with the appropriate finance section to make sure adequate funds, and if necessary, foreign exchange, is available to support the procurement.

It is also important for the procurement unit to establish a procurement file for each procurement activity that is planned. During the time it takes to complete the procurement process all pertinent documents and records should be placed in the file for easy reference. By the time the procurement is complete, the file will contain a record of all the relevant procurement activities from the planning stage to the completion of contractual obligations. This documentation is helpful to support any audits of the procurement activity that may be conducted.

Public Procurement Rules of 2004 require that procurement units must keep records and documents concerning their public procurement activities for a minimum period of five (5) years from the date the supplier finally discharges its contractual obligations.

Display **Slide 19**, This slide highlights some of the key procurement documents that should be kept in the procurement file. It is recommended that the procurement unit develop a checklist of procurement records and documents that should be kept in the procurement file to ensure consistency in this fulfilling this requirement. A sample checklist for Procurement Records has been developed and is found in the **Contraceptive Procurement Manual** as Annex 11 on page 109.

Let's take a quick look at the sample checklist and the recommended documents for filing so that you can see how extensive the requirement is

for keeping good procurement records (review Annex 11 checklist and answer any questions)

Display **Slide 20**. Open floor to a discussion of challenges students have encountered in planning their procurements and completing a procurement requisition. (Note to lecturer: there is another discussion later in Session 14 that looks at some of the broader challenges in procurement, such as delayed financing and transparency, so the focus of this discussion should be limited to challenges in preparing for procurement and completing a requisition form.)

List the key challenges reported on a flip chart. Then use discussion questions like this to reinforce the points and to bring out any experience students may have. To the degree possible, invite other students to give responses to questions or comments raised by a student. Also, blend in any of the generic discussion questions offered in the Lecturer's Tips at the beginning of this session. Avoid calling on the same students all the time. Ask students who have been quiet or not offered many responses.

1. Would you like more explanation for any of these challenges?
2. Which of these challenges are news for you, and you did not realize them till now?
3. Without naming names or places, has any of you seen any of these challenges in your professional work?
4. Things are changing rapidly. Can you identify any of these challenges that might not be as great now as they were five or more years ago?
5. Technology is making advances every day. Can you think of ways that technology, including electronic communication and the internet, could help address some of these challenges?
6. Are there other challenges you would like to see added to the list?
7. If you were an official at the district level, realistically speaking, which would you try to resolve first?
8. What do you think you personally can do to help reduce some of these challenges?

Display **Slide 21**, Let's now take a look at the second major step in the Competitive Bidding process, which is preparing standard bidding documents.

In public-sector competitive procurement, the procurement unit prepares and sells (or provides at no charge) detailed bidding documents to potential suppliers. These documents explain all the requirements of what is to be supplied, all rules and procedures for bidding, and identifies the specific criteria that will be used to choose a winning bid.

Some sections of the bidding documents also become part of the future contract between the supplier and the purchaser.

Preparing accurate and complete standard bidding documents is important because:

- Good documents vastly reduce problems during the procurement process regarding bidding, evaluation, and contract award.
- Bidding documents provide a key opportunity to protect against counterfeit, fake, and possibly unsafe products.
- Bidding documents set up rules and expectations for contract performance—including timely delivery of the product

Every aspect of the bidding documents must be correct and complete because nothing can be changed after the bids are opened, even if a mistake is discovered.

Display **Slide 22** There are different models of standard bidding documents. Often the main sections and the various clauses are sequenced differently from model to model, and the precise wording may differ, but overall, the content of standard bidding documents is very similar.

The model standard set of bidding documents for competitive bidding that we will be discussing consists of seven (7) sections shown on this slide with each section consisting of one or more documents. We will take a few minutes to briefly review those seven sections and the role each plays in the bidding document package.

As we review these sections please note that a set of standard bidding documents has been included in the **Contraceptive Procurement Manual** as Annex IV beginning on page 237. We will be referring to these documents during our discussion of standard bidding documents in the upcoming slides.

Display **Slide 23** Instructions to Bidders- this first section of the bidding documents provides the information necessary for bidders to prepare and submit responsive bids that will meet the purchaser's requirements. It provides general guiding information on the rules and procedures in regard to:

a. Bid submission, b. Eligibility of bidders, c. Bid opening, d. Bid evaluation, e. Award of the contract, f. Definitions and warnings about fraud and corruption.

Since the Instruction to Bidders form is providing general information to the bidders it is not changed or modified in any way. Specific information that is directly relevant to the procurement is provided through the Bid Data Sheet.

As noted in bullet two in this slide, the Instructions to Bidders (ITB) provides general information on the eligibility of a supplier to submit a bid. Let's take a look at the Instructions to Bidders section that appears in the **Contraceptive Procurement Manual**, Annex IV on pages 239 to 258. As an example, if we look at clause 3, page 241, on Eligibility, we see it provides general information on firms that are excluded or ineligible for bidding. Of course, one question that often arises is how can a purchaser confirm if a supplier is ineligible so that you do not send them an invitation to bid.

Display **Slide 24** Identifying ineligible suppliers in Pakistan has become easier since the Public Procurement Regulatory Authority (PPRA) began posting a list of ineligible suppliers on its website, noted here (see slide).

This list identifies suppliers and agents who are not eligible based on having committed previous violations of fraud or corruption provisions. International agencies, such as those seen here, also maintain lists of firms that are ineligible from bidding on their contracts.

Display **Slide 25** Bid data sheet - The Bid Data Sheet complements the Instruction to Bidders section by providing information that is specific to the procurement action. The Bid Data sheet is used to supplement and/or modify the Instructions to Bidders information.

The information the Bid Data Sheet includes, but is not limited to:

- a. Amount and type of bid security, if required,
- b. Directions for submitting bids, including markings and timeframe,
- c. Dates, times and other specific information about bid opening,
- d. Specific criteria that will be used to evaluate bids,
- e. Criteria for eligibility of contraceptives or the other relevant health products and the documents required to establish eligibility ,
- f. Criteria for eligibility and qualification of bidders and the documents required to establish bidder's eligibility and qualification.

To see how these two documents, the Instruction to Bidders and Bid Data Sheet, support each other, let's take a look at one of the clauses that appears in both documents.

Please turn to page 252 in the **Contraceptive Procurement Manual**. This is the Instructions to Bidders document. Look at clause 24.1, Bid Opening. This clause states that the purchaser will open all bids on the date and at the place specified in the Bid Data sheet. For the bidder to find out what the bid opening date and place are, he would look at the same clause number, 24.1, in the Bid Data Sheet. If we turn to page 267 in the **Contraceptive Procurement Manual**, Annex IV, this is the Bid Data sheet. Find clause 24.1. We can see that it states "Time, date and

place for bid opening are: “ with a blank space for the procurement unit to add this specific information.

Display **Slide 26** The Bid data sheet also identifies the specific qualification and evaluation criteria that will be used for the procurement.

Qualification criteria usually include, but are not limited to:

- Experience and technical capacity demonstrated by the number of years of manufacturing and/or selling the product to be provided, completed contracts of similar nature with contact information for verification and bank references
- Licensing and registration by the ministry of health or National regulatory agency (if applicable)
- Financial capability in terms of average annual turnover in each of the past three years as evidenced by audited financial statements

Evaluation criteria – Identifies the criteria that will be used to determine the lowest evaluated bidder. Evaluation criteria are limited to price, price adjustments, and application of economic factors (nonfinancial items given a value, such as domestic preference). The bidding documents should include the evaluation criteria to ensure an open and transparent bidding process.

We will talk more about qualification and evaluation criteria later in this session when we look at how to prepare standard bidding documents.

Display **Slide 27** General Conditions of Contract. This section consists of widely used clauses that will apply to the future contract. This section is included in the bidding documents “as is” without making any changes to the wording of the clauses.

General conditions cover standard, normal contract issues such as:

- Delivery
- Payments
- Warranty
- Termination
- Force Majeure
- Governing language

A sample General Conditions of Contract can be found in the **Contraceptive Procurement Manual**, Annex IV, on pages 271 to 284.

Special Conditions of Contract. This section provides clauses for the contract that are specific to the procurement action. The procurement unit uses this section to supplement or modify like numbered clauses in the General Conditions of Contract. Special conditions apply to unique requirements of the procurement, such as:

- Regulatory compliance issues

- Pre-shipment inspection and testing
- Requirements for immediate notification of air shipments

A sample Special Conditions of Contract can be found in the **Contraceptive Procurement Manual**, Annex IV, on pages 285 to 294.

Display **Slide 28** Technical specifications provide a precise technical description of the goods to be supplied. They constitute the benchmark against which the procurement unit will verify the technical responsiveness of the bid and then be used to evaluate the bids. They must include a complete description of the product presented in an industry standard vocabulary and format. We'll be talking more about technical specifications in the coming slides.

The schedule of requirements lists the products required, the quantities required, and the required delivery dates.

Display **Slide 29** Additional forms are often required in a standard bidding document package to obtain additional information or commitments from the bidders.

These include (see slide)

- Bid submission form – the signed bid submission form binds the successful bidder to conditions set out in the bidding documents and becomes a temporary contract when the award is notified.
- Price Schedule – Completed and signed by the bidder and identifies the itemized price for goods being provided
- Manufacturers authorization letter – completed and signed by the manufacturer of the goods if the bidder is not the manufacturer – authorizes the bidder to submit a bid, and confirms they will honor the warranty obligation
- Bid security form – filled and signed by the bank of the bidder, guarantees to pay a specified amount to the purchaser if the bidder receives an award but fails to go through with a contract.
- Contract agreement form – signed by the purchaser and the winning bidder, it incorporates the relevant sections of the bidding documents into a binding contract; general conditions, special conditions of contract, technical specifications, price schedule and other documents as required.
- Performance security form – completed and signed by the bidder's bank, it guarantees to pay a specific amount to the purchaser if the bidder defaults on the contract.

Samples of these additional standard bidding document forms can be found in the **Contraceptive Procurement Manual**, Annex IV from pages 342 to 352.

Display **Slide 30** In the previous slides we were discussing the set of documents that make up a standard bidding document package. In the next few slides we will be discussing how to complete some of these documents.

The standard bidding documents shown on this slide must be filled out with information that is specific to the procurement being conducted. The procurement unit will need to seek out the information that is required to complete these forms.

Some of the necessary information will be available from the approved procurement plan and preparations made in the earlier stages of procurement.

Completion of a particular topic from section to section of the bidding documents must be done with extreme care to avoid language that contradicts wording in another section

Display **Slide 31** Technical specifications and the schedule of requirements establish the “bones” of the procurement around which everything else will be built. These should be developed first.

As mentioned earlier, technical specifications are important for the following reasons:

- Provide detailed information to the bidder about the goods
- Create a benchmark for the purchaser to judge the technical responsiveness of the bid
- Form the basis for contractual obligations
- Establish criteria for the acceptability of the goods when shipped

Detailed technical specifications should be written by qualified experts and provided to the procurement unit.

Technical specification in general should include the following information: (see slide)

While technical specifications should be prepared by qualified experts, upon receipt the procurement unit should review the specifications to ensure they are:

- Clear, accurate, and contain complete information; specifications that do not meet these requirements will result in wasted time and resources
- Product neutral / generic terms; no brand names. This encourages broader competition among suppliers which produces more competitive pricing.

Let's take a minute to look at a sample technical specification for an oral contraceptive that is provided in the **Contraceptive Procurement Manual** in Annex IV on pages 295 - 316 (briefly review oral contraceptive specification).

Display **Slide 32** Most of the information necessary for completing the Schedule of Requirements can be found in the procurement requisition form that the procurement unit receives from the program.

The procurement office may need to write a short description of the goods—with just enough information to identify the product without confusion.

A Sample Schedule of Requirements form can be found in the **Contraceptive Procurement Manual**, Annex IV, on page 295.

Display **Slide 33** As we discussed earlier, the Bid Data Sheet (BDS) is designed to include information that supplements what is included in the Instruction to Bidders document and provides the contract-specific details needed for the bidding and evaluation process to be properly carried out. The Bid Data Sheet is specific to each procurement and must be filled in completely by the procurement unit.

The procurement unit will need to identify where to obtain the following information required for completing the BDS:

- Price of bidding documents
- Amount of bid security
- Amount of performance guarantee
- Whether or not samples are required
- Bid opening date and time
- Whether or not domestic preference applies
- Bid currency and language
- Whether evaluation is on the basis of items or lots
- Whether the price should be quoted as fixed

Display **Slide 34** Qualification criteria offer one of the best opportunities for the procurement unit to eliminate bids from sources that are likely to supply poor-quality products, miss delivery dates, or default on contract conditions.

Qualification of bidders can be done as a separate process prior to actual bidding (prequalification), or it can take place during the evaluation process, or it can be limited to the winning bidder (post-qualification).

The Bid Data sheet provides specific information on bidder qualification requirements that are identified in the ITB.

Regardless of when the investigation takes place, the procurement must determine if the bidder is qualified. Basic bidder qualification requirements are shown here (see slide).

It is important that documentary evidence be requested from the supplier to support his claims of eligibility.

If we look at our sample Bid Data sheet in the **Contraceptive Procurement Manual**, Annex IV page 262 we will find the bidder qualification criteria identified in clause ITB 5.1.a (briefly review the qualification criteria)

Display **Slide 35** The Bid Data sheet also provides specific information on bid evaluation criteria.

As we discussed earlier, evaluation criteria are limited to price, price adjustments, and application of economic factors. Here are some economic factors that can be considered for inclusion as evaluation criteria (see slide)

Now explain to the students that to reinforce the material in this group of slides, you will ask them to take another interactive quiz. The rules are the same as those followed in the previous Cheater's Quiz. First they should try to do it on their own, using their reference materials if they need to; then they should find a fellow student to "cheat" with to see if they agree on their answers and have a very high score. Lastly, the lecturer will ask all of them to compare their answers to see if everyone agrees about these questions.

## CHEATERS' QUIZ – Lecturer Version with Answers

(Session 14, Procurement, Activity 2, Slides 14-35)

There aren't many rules about a "Cheaters' Quiz," except that you must cheat. First try to answer the questions on your own. It is true that much of the information in this session is not for memorization, but it is important to know where to find the information in the reference materials you now have, such as the Contraceptive Procurement Manual. Consult it as needed.

When you have written your own answers, find a colleague with whom you can “cheat” so that you and the colleague get as close as possible to perfect scores. You need not put your name on this paper. It is not to hand in. Your lecturer will review the final answers with you.

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**1. The Procurement Unit should prepare the Procurement Requisition documents for the Programme Manager to review. True or False? And give a brief explanation why:** *False! A Procurement Unit does not select the products to be procured or conduct the quantification of requirements. These activities are performed by program personnel and logisticians.*

**2. Following the documented procedures and checklists for the competitive bidding process helps avoid many problems later. True or False? And give an example of why this is true or false:** *It is true. The documented procedures help avoid protests later from losing bidders. There can be no accusations of lack of fairness, etc.*

**3. Tick (✓) the items below which are part of the Standard Bidding Documents.**

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> Instructions to Bidders        | <input checked="" type="checkbox"/> Tech Specifications             |
| <input checked="" type="checkbox"/> Bid Data Sheet                 | <input checked="" type="checkbox"/> Schedule of Requisitions        |
| <input checked="" type="checkbox"/> General Conditions of Contract | <input checked="" type="checkbox"/> Specific Conditions of Contract |
| <input checked="" type="checkbox"/> Bid and Contract Forms         | <input type="checkbox"/> List of Ineligible Bidders                 |

**4. The Instructions to Bidders and Bid Data Sheet include which of the following? Tick your answer(s).**

- ☐ Dates, times, and other info about a bid opening
- ☐ Criteria for eligibility and qualification of potential bidders
- ☐ Specific criteria with which the bids will be evaluated
- ☒ All of the three above plus other guidance

**5. Which of these is never included in a standard bidding document package?**

- ☐ The price schedule for bidders to fill out and submit
- ☐ Manufacturer's authorization letter
- ☐ Performance Security Form
- ☒ The prices of the winning bid of the last similar procurement

**(Continued next Page)**

**6. The required technical specifications for a bid should be written....**

- ☐ Only by qualified bidders
- ☐ By the programme manager
- ☐ By the procurement unit
- ☒ By qualified experts on the commodity involved (could include programme manager)
- ☐ By accountants

**7. One of the four basic bidder qualifications is adequate experience and technical capacity. Is this true or false? True Regardless if it is true or false, can you give an example of one of the bidder qualifications?**

*Licensing and registration requirements and financial capability*

**8. Which of the following are key sources of information and guidance during the bidding process? (Put a tick mark in front of your answers.)**

- ☐ Meetings with agents or firms who probably wish to bid
- ☒ The Contraceptive Procurement Manual
- ☒ Experienced colleagues
- ☒ Public Procurement Rules 2004

**9. The General Condition of Contract has standard clauses to insert on which of these topics? (Put a tick mark in front of your answers.)**

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> Warranty    | <input checked="" type="checkbox"/> Delivery                          |
| <input checked="" type="checkbox"/> Termination | <input type="checkbox"/> Names of Contract Committee Members          |
| <input checked="" type="checkbox"/> Payments    | <input type="checkbox"/> Internet sites with insider info for bidders |

**10. Which of the following three principles is the most important in the procurement process: Neutrality, Confidentiality, or Consistency? Be ready to defend your answer: *This is a trick question. These principles and all the other principles are essential. None is more important than the other.***

**These challenge questions are optional and only for the students who feel they have a good basic understanding of the content.**

**Challenge Question A: What are three non-technical reasons for which a bid might be rejected? 1) Lacks list of goods and delivery dates, 2) Lacks contract agreement form, 3) Does not specify price. And there are various others.**

**Challenge Question B: Is it more important for a bid to be filled out completely with all the required administrative forms and info or to be technically correct? Defend your answer. *Trick question! They are both requirements. One is not enough. A bid with only one cannot even be considered.***

Display **Slide 36** As we discussed earlier, special conditions provide modifying clauses for the contract specific to the procurement action; the procurement unit uses this section to supplement and/or modify like-numbered standard clauses in the General Conditions of Contract.

In completing the special conditions clauses it is important to refer to the general conditions clause so that the information provided in the special conditions accurately supports the general condition requirements.

The Special Conditions also addresses unique requirements of the procurement, such as: (See Slide)

Display **Slide 37** The Invitation for bids form is the official document used to announce the procurement activity and provides potential bidders with a brief description of the goods to be procured, where to obtain a set of bidding documents, and the date, time and place for submitting bids. The Invitation to Bids document is prepared using information from the Bid Data sheet, Special Conditions of Contract, and Schedule of Requirements.

The **Contraceptive Procurement Manual** contains a sample Invitation for Bids form as Annex 13 on pages 114 – 115. Let's take a quick look at it to see the information that is required.

When all the bidding documents have been completed, required entries have been made and all superfluous text has been deleted, the procuring entity compiles the various documents into a single bid package. Clause 23-3 of the Public Procurement Rules of 2004 identifies the documents that should be included in the bid package for competitive procurements by Pakistan national agencies.

Once the bid package is complete, it should be submitted to the relevant authorities for review and approval.

Display **Slide 38**, Now that we have seen how bidding documents are prepared, we are going to take a break from the presentation to do a case study exercise that shows some of the problems that can occur when bidding documents that eventually go into a contract are poorly prepared. We will break into groups of three for this case study exercise. In your **Student Workbook** you will find a case study plus four additional documents needed for the case study:

1. Contract
2. Schedule of requirements
3. General conditions of contract
4. Special conditions of contract.

Read the case study and refer to these four documents to answer the questions at the end of the case study. You should work with people in

your group to answer the questions. We will then discuss the questions and answers. (Lecturer breaks students into groups of three and informs them they have 10 minutes to read the case study and materials, 15 minutes to discuss the case study and answer the questions; then the group will spend 15 minutes discussing the answers.)

For the instructor the case study and answers to the case study are provided below

## **Case Study Instructor's Sheet**

In 2011, the program “PREVENT” (a fictitious name) began a subsidized social marketing program for condoms in Iraq. Its purpose was to sustain condom distribution where donor funding was being phased out. The Ministry of Health’s (MOH) procurement agency, the Medical Stores Iraq (MSI), was their primary in-country partner for distribution activities.

The World Bank had provided bulk condoms to Iraq in the past, but was now providing “seed money” to PREVENT to start the process of phasing out their support. PREVENT would procure a six-month condom supply to launch its new program. The condoms would be repackaged under the social marketing program logo, and MSI would manage the distribution to pharmacies, public health facilities, and nongovernmental organization programs.

The program was late in getting started, so Mr. Afkhazar, the PREVENT program manager, negotiated a sole source procurement with one manufacturer, Kobe Company of Korea since their condoms had already been registered in Iraq for sale on the private market. He communicated by email with the manufacturers on price. On August 1, 2011 PREVENT issued a contract to Kobe Company for 900,000 condoms. Kobe produces 150,000 condoms per lot so this order consisted of 6 lots of condoms.

Shortly after placing the order the Minister of Health of Iraq, who was planning a big promotion for the launch of the program, told Mr. Afkhazar that the date for the launching ceremony was scheduled for October 1. For the ceremony he wanted to have 300,000 condoms available to start distribution.

Mr. Afkhazar called Kobe Company and told them that he needed 300,000 condoms by October 1 for the launching ceremony. He also told them that he would like another 300,000 by November 1 and the final 300,000 by December 1. These staggered deliveries would make it easier to manage his limited warehouse space. The Kobe Company representative said they would try to accommodate this request.

Unfortunately, things did not go according to plan. The week before the ceremony, Mr. Afkhazar contacted the Kobe Company and asked if the condoms had shipped and why he hadn’t received shipping documents. The Kobe representative informed him that there had been problems with the batches of latex they received from their suppliers and this had delayed production.

The condoms finally arrived at the port of entry for Iraq on October 15, two weeks after the scheduled launching ceremony. The shipment was for the entire amount, 900,000 condoms, instead of the 300,000 condoms that Mr. Afkhazar had requested. The shipment did not clear customs for three weeks and incurred demurrage charges since customs reported that the shipment did not include the Supplier’s Certificate of Origin document which is required by Iraq customs for clearing condoms.

After clearing customs, the National Regulatory Control Laboratory (NRCL) took samples from the 6 lots of condoms for testing in accordance with the WHO specifications for condoms. When the testing was complete, two lots failed ISO 4074:2002 standards for latex thickness and air burst limits. The NRCL rejected the goods for entry.

The four lots of condoms that passed NRCL tests were delivered to the contractor who was responsible for repacking the condoms into the social marketing package. Upon receiving the condoms, the contractor called Mr. Afkhazar and informed him that they would not accept the condoms. Their social marketing program calls for condoms packaged in strips of three each and the condoms they received were all single packages. Also the condom foil was to be coloured blue and yellow to match the social marketing program promotional colours and the condoms they received were packaged in orange foil.

The next day Mr. Afkhazar received an invoice from Kobe Company for the remaining 80% due on all 6 lots of condoms (PREVENT had originally made a 20% advance payment to Kobe Company when the contract was signed). The invoice included a higher per condom price than originally agreed to because Kobe Company reported that the cost of latex had increased so they had to increase their condom prices.

The Minister of Health is furious over the situation with the condoms from Kobe Company. His launch was delayed. They do not have any condoms that they can use from the original order for 900,000 condoms and the social marketing program is in jeopardy. He does not want to approve the remaining 80% payment due to Kobe Company.

He is asking you, the Procurement Manager at MSI, to review the PREVENT contract to Kobe Company and advise him what contractual remedies exist to not pay Kobe the 80% remaining balance. (Since the contract to Kobe Company was issued in a hurry, and he had heard from a private marketer that Kobe Company had been a good supplier, Mr. Afkhazar did not request an advance payment guarantee for the 20% advance payment and did not request a Performance Bank Guarantee of 10% of the contract value.)

**Instructions:**

You have received a copy of the following components from the contract issued to Kobe Company for 900,000 condoms:

- Contract
- Schedule of Requirements
- General Conditions of Contract, and
- Special Conditions of Contract.

1. Review the contract components and determine what contract rights and remedies exist to address the following problems:

a. Late delivery of shipment

*PREVENT is in a difficult position to claim contractual remedies for the delay in delivery. Under GCC Clause 21.1 Delays in the Supplier's Performance: "Delivery of Goods and performance of services shall be made by the Supplier in accordance with the time schedule prescribed by the Purchaser in the Schedule of Requirements." In reviewing the Schedule of Requirements we see that the requirement only states that the entire amount of the contract (900,000 condoms) must be delivered in year 1. The contract does not provide specific delivery dates and there is no amendment that incorporated specific delivery dates into the contract. Since Kobe Company delivered 900,000 condoms in Year 1 as required by the Schedule of Requirement, Prevent cannot claim liquidated damages for the late delivery. The conversation between Mr. Afkhar and the Kobe Company was a verbal exchange and the dates discussed were not incorporated into the contract and therefore are not legally applicable.*

*While GCC clause 21.2 requires the Supplier to notify the Purchaser if the delivery is going to be delayed from the contract schedule, since the contract schedule only required delivery in year 1, the Supplier's delivery was in compliance with that requirement and therefore technically they were not required to notify the Purchaser as there was no delay from a contract perspective. A reputable supplier, however, would have informed Mr. Afkhar of the delay given Mr. Afkhar's verbal request for delivery by October 1, 2006.*

b. Delivery of entire contract amount in one shipment instead of three shipments

*Again PREVENT cannot seek legal recourse for the same reasons discussed above. The verbal request of Mr. Afkhar for three shipments was never incorporated into the contract and therefore is not legally binding. The contract called for delivery of 900,000 condoms in Year 1. Without specific delivery dates and amounts identified in the contract, the Supplier has the flexibility to deliver products several different ways as long as the total amount is delivered in Year 1.*

c. Failure to provide Supplier's Certificate of Origin with the shipping documents for customs.

*PREVENT cannot claim for reimbursement of demurrage charges or liquidated damages as a result of Kobe Company's failure to supply a Certificate of Origin for customs clearance. Special Condition of Contract 11 identifies the shipping documents that the Supplier is required to provide to the Purchaser. This list did not include the Supplier's Certificate of origin therefore there was no contractual requirement for Kobe Company to provide this document.*

d. Failure of two lots to comply with National Regulatory Control Laboratory requirements.

*PREVENT can seek remedial action for the failure of the two lots to pass the NRCL test requirements under Special Conditions of Contract clause 9: Inspections and Tests, which states “All medical products will be subject to quality and compliance tests by the National Regulatory Control Laboratory of Iraq before release for use and acceptance will be subject to products passing these test.” Since the two lots failed the NRCL tests which are required in the contract, PREVENT can request that Kobe Company replace the defective lots within 30 days under GCC and SCC clause 15: Warranty. Any requirement for PREVENT to remove or dispose of the defective condoms is done at the Kobe Company’s risk and expense.*

- e. Failure of condom packages to comply with social marketing packaging and colour requirements

*PREVENT cannot seek legal recourse for Kobe Company’s failure to package the condoms in strips of three and in yellow and blue foil to support the social marketing program needs since these packaging requirements were not identified in the contract. SCC clause 10: Packing states that “There are no additional packing instructions other than those specified for particular products in the specification.” Since the contract to Kobe did not include specific technical specifications with packaging information there was no stated packaging requirement for Kobe Company to comply with.*

- f. Kobe Company’s invoice to pay a higher per unit condom price than the original contract price

*PREVENT does not have to pay the higher per unit price submitted in Kobe Company’s invoice. Per SCC clause 17: Prices, “Prices shall be fixed and firm for the duration of the Contract.” So even though the supplier experienced an increase in his raw materials, he is not able to pass this increased cost on to the Purchaser in the form of higher prices.*

- g. The right to not pay the remaining 80% balance due on the contract

*Based on the information from the questions above, PREVENT can reject the two lots of condoms that failed NRCL tests. They cannot reject the four lots that passed NRCL tests and they cannot reject these four lots for not meeting social marketing packaging requirements since these requirements were not stated in the contract.*

*So PREVENT is obligated to pay Kobe Company for 4 of the 6 lots, or \$30,000 of the \$45,000 contract price. Since PREVENT has already made an advance payment of 20% of the contract price, which is \$9,000, PREVENT would need pay the remaining balance due of \$21,000 to the Kobe Company.*

2. Discuss what mistakes were made in preparing and issuing the contract to Kobe Company?

- *Program started late so negotiated a sole source procurement instead of issuing international competitive bids*

- *Verbally communicated delivery requirements instead of amending them into the contract*
- *Did not follow up with manufacturer on schedule until just before delivery*
- *Did not include detailed technical specifications on condoms (WHO specs) in contract*
- *Did not include requirement for Supplier's certificate of origin in contract*
- *Did not include packaging instructions for social marketing program requirements in contract*
- *Did not request an advance payment guarantee of performance guarantee in contract*

***Overall, a failure to include the detailed, specific information in the contract requirements that are needed to protect the Purchaser from a Supplier's performance problems and make a contract enforceable***

3. Discuss and list the contract recommendations you would make to protect the PREVENT program if such problems were to occur again.
  - *Plan procurement early enough so that you have sufficient time to conduct a competitive bidding process when it is warranted*
  - *Be sure to include clear and detailed product technical specification requirements in a contract. Consult with a technical specialist if additional information is needed for the technical specification.*
  - *Review the unique circumstances of the product and the procurement to make sure that all necessary special information and requirements are included in the contract.*
  - *Any changes made to the original contract requirements must be incorporated by amending the contract so that they are legally enforceable.*
  - *Monitor a supplier's performance to identify problems early so they can be addressed and their impact mitigated.*

Display **Slide 39** When the bidding documents have been approved and are ready for release, the procurement unit can begin soliciting bids by extending a public Invitation for Bids to all interested firms and parties.

This is one of the essential elements of open competition.

This is done through advertising in newspapers, official gazettes, specialized journals (in the case of very large values), on organizational and/or governmental websites, and on local bulletin boards.

The Public Procurement Rules 2004 have certain advertising requirements that are based on the anticipated value of the procurement. (See slide)

Display **Slide 40** Advertise the opportunity to bid.

For international procurements, place the advertisement internationally and notify foreign embassies and trade missions in Pakistan. Other advertising opportunities include:

- National and international registers
- International NGOs

- Chamber of Commerce
- Donors and UN agencies

Each set of documents sold should be numbered and a register set up to record the names, addressees, and document numbers of all bidders, so they can be informed about any pre-bid conferences, amendments to the documents, or other official business.

Display **Slide 41** Additional preparation steps that need to be taken to ensure the process of receiving bids is managed properly include (see slide)

Display **Slide 42** The basic rules for receiving and managing bids are:

- Bid envelopes should be stamped with the date and time they are received
- Bids must be held unopened until the stated day and time of bid opening.
- Except for questions and answers in writing to/from the procuring entity, no one associated with the procurement is permitted to communicate with bidders regarding the bid from the time the advertisement appears until after an award has been made.

Display **Slide 43** Pre-bid conferences of prospective bidders are held for international and important local procurements, when it is thought necessary. At these meetings, bidders' questions are answered and minutes of the conference are recorded. If a question or concern cannot be answered during the meeting, it is referred to an appropriate expert.

In a highly competitive situation, pre-bid conferences can become difficult to control, so it is very important to set a firm agenda and make an advanced plan for managing the flow of questions and answers. Procedural errors during the meeting, or in writing or distributing the minutes, can result in official protests by competing bidders, which will almost certainly delay the procurement process.

A notice about the conference should be given to the prospective bidders at the time they purchase the bidding documents. All prospective bidders up through the last one to purchase documents before the pre-bid conference should receive this notice.

Participation in the pre-bid conference should be limited to parties that have purchased bidding documents. Those attending should be registered and an attendance list generated, including titles and contact information. The answers provided to questions asked during the pre-bid conference should be only to clarify an aspect of the bidding documents. It is important to not expand or modify the information stated in the bidding documents when providing an answer. If a question or concern cannot be

answered during the pre-bid conference, it is referred to an appropriate expert.

All questions and answers are documented and provided in writing to all bidders after the pre-bid conference.

Each recipient of the original bidding documents should be provided a copy of the minutes and any deferred answer in sufficient time before the submission deadline to enable appropriate actions.

Display **Slide 44** At least 7 days ahead of the scheduled bid opening, the procurement unit:

- Notifies members of the Bid Opening Committee (BOC) of their upcoming commitment.
- Arranges the location for the bid opening as specified in the bidding documents. It should be well lit, large enough for at least two individuals from each bidding firm, and equipped with any necessary audio facilities.
- Continues to keep all bids unopened and secure until the date and hour designated in the bidding documents.

Each party present at the bid opening is required to register his or her attendance in a special log set up for this purpose. The register should include the following information about each participant:

- Name, address, telephone number, and email address.
- Company/manufacturer represented.
- Organizational affiliation (if not a bidder).
- Signature.

At the stated time, the BOC opens each bid that was received before the deadline and reads aloud the following information:

- Bidder's name and local agent's name (if different).
- Bidder's city/state or province/country.
- Withdrawal or modifications (if any).
- Currency (or currencies) of the bid.
- Bid price.
- Discounts (if any).
- Presence or absence of any required bid security.

To document the opening of each bid a bid opening checklist should be completed. A sample bid opening checklist is found in the **Contraceptive Procurement Manual** as Annex 24 on page 127. (Briefly review bid opening checklist information requirements)

The BOC does not open bids received after the deadline mentioned in the bidding documents. After the bid opening has been completed, any late bids are returned to the sender, unopened, with a letter detailing the late submittal and rejection of the bid.

To document the overall bid opening meeting a record the procurement unit should complete a Record of Bid Opening form. A sample Record of Bid Opening form can be found in the **Contraceptive Procurement Manual** as Annex 25 on page 128.

Display **Slide 45** To help ensure that the bid evaluation process is conducted in a fair manner, it is important that the purchaser does not contact any bidder, either verbally or in writing, until the evaluation process has been completed. This reinforces the idea that all bidders are being treated equally and no bidder has been given additional information or granted special access to the procurement unit. If bidders believe that some bidders have been provided with additional information then they may file a protest which will delay the procurement process.

Display **Slide 46** If required by the bidding documents, bid securities are submitted with bids from both local and international bidders. The bid security is a fixed amount, ranging from approximately 1 to 2 percent of the estimated price of the contract. Per PPR 2004, bid securities should not exceed 5% of the bid price.

The bidding documents identify the forms of bid security that are acceptable, and occasionally, where they must originate. No cash money is allowed.

Soon after the bid opening, the Bid opening committee (BOC) or another assigned body:

- Segregates bid securities from the bids.
- Records each bid security in a register established for this purpose.
- Ensures that bid securities are stored in a locked, secure location until a contract has been awarded.

In order to rule out the possibility of a fraudulent or unsupported bid security, the validity of each bid security should be confirmed with its originator shortly after the bid opening, generally within 5 to 15 days:

Display **Slide 47** Now that we have received the bids and they have been opened, the next step is to evaluate the bids.

The question then becomes how should the bids be evaluated? What format and what procedures should be followed to conduct the bid evaluation?

The first place to look for guidance on bid evaluation requirements is the national Public Procurement Rules of 2004. A review of the PPR 2004 finds that there are no specific requirements identified on how to conduct a bid evaluation. What the PPR 2004 does require is that after the evaluation has been completed certain documents should be created to document the evaluation process. The required documents are: a bid

comparison sheet, a recommendation for award, and a bid evaluation report.

The other area to look for guidance on bid evaluation requirements is in the public procurement rules of the provincial governments. Later in this session we will be looking at both the national and provincial public procurement rules and regulations in more detail, but at this point a brief review of provincial public procurement rules finds that (review Punjab and other provincial procurement rules to identify any bid evaluation requirements) the provinces have established some requirements for evaluating bids. These requirements identify procedures that generally follow best practices in terms of encouraging competition, documenting the process and promoting transparency.

We do not have the time in this course to go into a detailed review and explanation of each of the provincial requirements for bid evaluation. So we will look at a recommended bid evaluation process that follows best international practices. By understanding what the best practices are in bid evaluation, we will be in a better position to apply those best practices when doing procurement which will help to improve the bid evaluation process.

Display **Slide 48** The manner in which bids are evaluated and selected or rejected can affect timeliness, bid prices submitted by suppliers, and overall program costs. When reputable suppliers in the marketplace perceive that the procurement unit awards contracts fairly and in compliance with criteria stated in the bidding documents, they are more inclined to bid—believing they have a reasonable chance to win the award. Over time, this contributes to increased competition among suppliers, which, in turn, fosters lower bid prices and lower overall cost to the program.

We will be looking at a good public-sector process for examining and evaluating bids using international best practices. The evaluation format presented here is comprehensive; supports a clear, transparent process; and generates the documentation necessary to support the award recommendation. It emphasizes compliance with technical, quality, delivery date, and other contractual requirements first, before considering price.

There are three sequential stages in the bid evaluation process: (see slide)

- Stage 1 - Examination of each bid to determine whether or not it is substantially responsive to the bidding documents.
- Stage 2 - Financial evaluation of each substantially responsive bid and identification of the lowest overall.
- Stage 3 - Qualification of the lowest evaluated cost bidder (or confirmation of status for prequalified bidders).

We will be taking a closer look at each of these evaluation stages in the following slides.

In most cases, committees and subcommittees offer the best framework for carrying out bid evaluation tasks. Qualified personnel must be assigned to the committee and it should be in place well in advance of the bid opening date.

Good procurement practice generally asks that bid evaluation tasks be undertaken by personnel not directly connected with the procuring office. The degree to which this principle is followed in actual practice varies based on the size of the procuring unit and other factors. At the lower end of the scale, procurement personnel may indeed do a substantial portion of the evaluation work. However, as “best practice,” it is recommended that two committees should be responsible for bid evaluation: a Bid Evaluation Committee (BEC) and a Technical Evaluation Committee (TEC).

The BEC has responsibility for reviewing and comparing bids and recommending one to the contracting authority based on its comparative merits (including, but not limited to, price). The BEC should be convened promptly after the bid opening and must complete its tasks within the time periods indicated in the bidding documents.

A technical evaluation committee (TEC) is usually a subcommittee to the BEC that may also be appointed to provide specific technical expertise related to the commodity being procured. The TEC is responsible for technical review of the bidders' offerings, including evaluation of options and alternatives proposed by bidders.

In order to evaluate bids, the BEC must know what to examine; this information comes directly from the original standard bidding documents issued for the purchase. These are the documents that we were discussing earlier in this session. These documents will indicate:

- Eligibility and qualification criteria for bidding.
- How the bidder is expected to prepare and submit its bid: what should be included, and how, where, and when the bid should be presented.
- What constitutes the bid.
- Requirements about the goods and delivery: specifications, quality assurance provisions, delivery dates, etc.
- Provisions of the future contract.

So it is important that bid evaluation committee members fully understand and are familiar with the bidding documents and their requirements. There is a recommended code of conduct for bid evaluation committee members that provides guidance on such issues as; timeliness of

performing duties, communication with vendors, and other important topics.

Display **Slide 49** In the first stage of the bid evaluation process the bid evaluation committee conducts a preliminary examination of each bid and determine if it is “substantially responsive” to the requirements of the bidding documents. In other words, is it presented in the required manner? Does it include all required information, statements, securities, signatures, forms, etc.? Are there any deviations or reservations to the terms and conditions in the bidding documents?

The technical evaluation committee will review specifications to see if the proposed commodity is in compliance with the specification requirements stated in the bidding documents. The objective of these examinations is to identify and reject bids that are incomplete, invalid, or substantially nonresponsive to the bidding documents. Only bids that pass these examinations can proceed to financial evaluation and comparison with other bids.

This slide shows the basic criteria against which the bids are evaluated to determine if they are substantially responsive to the bid requirements.

To properly document the bid examination process and establish records for the procurement file, best practices require that forms be used to record the examination assessment and findings for each of these categories. In the next few slides we will look at some forms that have been developed to record information from the bid examination process.

Display **Slide 50** This Preliminary Examination Table serves as a summary form for recording the results of the examination of each bid for the categories that we saw on the previous slide, which were verification, eligibility, bid security, completeness of bid, substantial responsiveness and acceptance for detailed examination. This Table is also found in the **Contraceptive Procurement Manual** as Annex 32 on page 136.

For each of the categories on this table, it is recommended that a separate checklist be used to confirm whether or not the bid meets the requirements of that category.

Display **Slide 51** Here is an example of a checklist that can be used to confirm if the bid complies with the verification requirements. The checklist allows the procurement unit to review the bid and document whether all verification requirements have been met (See slide and read one or two questions)

This Verification checklist is also found in the **Contraceptive Procurement Manual** as Annex 35 on page 139.

Display **Slide 52** This sample checklist can be used to confirm the completeness of the bid, for example if the bid offered all of the required items and if those items were offered in the full quantities requested.

This checklist can be found in the **Contraceptive Procurement Manual** as Annex 36 on page 140.

Display **Slide 53** After the bids are opened, the technical evaluation committee (TEC) should begin the task of examining the bids for technical content. The technical evaluation is a critical part of determining a bid's responsiveness to the requirements and whether or not it can proceed to the next stage—financial evaluation and comparison.

The TEC examines each bid for modifications, exceptions, and interlineations (notations written between the lines of the original bidding documents) regarding:

- a. Technical specifications provided in the bidding documents.
- b. General and Special Conditions of Contract included in the bidding documents that are related to the technical specifications (for example, contract requirements for preshipment inspection, sampling, and testing).

The TEC should list and cross-reference deviations from the bidding documents and indicate whether or not they are acceptable or unacceptable, along with the reasons.

The TEC should summarize its findings for each bid on an appropriate form (see next slide)

Display **Slide 54** This slide shows the Technical Evaluation sub-schedule for recording the Technical evaluation committee's findings in terms of the commodity's compliance with the required technical specifications.

This form also appears in the **Contraceptive Procurement Manual** as Annex 39 on page 143.

A complete set of bid evaluation forms is provided in the **Contraceptive Procurement Manual** from pages 131 – 143.

Display **Slide 55** Often bidding documents may require that samples of the supplier's product be provided with the bid. While samples can at times be helpful in providing an idea of how the commodity is packaged and labelled, for health care products they have limited value when it comes to testing since they do not represent the batch or batches of products that will be supplied if a contract is awarded to the supplier.

Display **Slide 56** Once all of the bid examination checklists have been completed, the Bid Evaluation Committee must make an assessment as to whether the bid can be considered substantially responsive or not to the bidding document requirements.

This is the standard definition of the conditions under which a bid would be considered substantially responsive (see slide and review definition with students)

One of the key issues to address in determining whether or not a bid is substantially responsive is to confirm whether or not the bid contains any material deviations to the bidding document requirements.

Display **Slide 57** In order to assess whether a bid contains a material deviation, we need to understand exactly what is considered a material deviation in the competitive bidding process.

Here is the definition of a material deviation as it applies to the competitive bidding process. (Review definition with students)

Ask students for some examples of what would they consider to be major deviations in a bid.

A few examples are: the product does not meet the specification requirements, product does not meet the regulatory or registration requirements, the requested quantity is not provided, the manufacturer does not provide a warranty for its equipment.

Bidders are not allowed to correct or withdraw material (major) deviations or reservations after bids have been opened.

Display **Slide 58** The bid evaluation committee must exercise good judgment in evaluating whether or not a bid is substantially responsive to the bidding document requirements.

For example, if they were to reject a bid for not being substantially responsive due to a material deviation that is not an actual material deviation, the bidder would have the right to file a bid protest, which would delay the procurement process.

After the bid evaluation committee has completed the process of reviewing bids and determining whether or not they are substantially responsive, those that are determined to be substantially responsive are then put forward for financial evaluation.

Display **Slide 59** For each bid that is accepted for financial evaluation, the Bid Evaluation Committee (BEC) must review the bid and after making any necessary corrections or allowances, it should arrive at what is referred to as the evaluated cost for the bid.

The evaluated cost is not necessarily the original submitted price; the evaluated cost takes corrections, discounts, and other factors into consideration and gives them a value.

It is important that the bidding documents clearly identify these other factors that will be considered in addition to product price. The bidding documents must describe the manner in which these other factors will be applied.

As we saw in the bid examination process where forms and tables were used to help ensure a fair and documented review of all bids, tables and forms have also been developed to support the financial evaluation process.

Financial evaluation forms have been developed for the following categories:

- Corrections and Unconditional Discounts
- Exchange Rates
- Currency Conversion
- Additions, Adjustments and Price Deviations
- Domestic Preference for Goods

A copy of these financial evaluation tables can be found in the **Contraceptive Procurement Manual** from pages 144 – 150.

Display **Slide 60** Here is an example of a sample financial table developed for international competitive bidding to help convert foreign currencies into a single currency, which for Pakistan would be rupees. This table is found in the **Contraceptive Procurement Manual** at Annex 42 page 177.

Display **Slide 61** Once the financial evaluation process has been completed and the lowest evaluated bid has been determined, the Bid evaluation committee must make sure the bidder offering the lowest evaluated bid is qualified to perform the contract and meet the contract requirements.

The objective of bidder qualification is to ensure that:

- The manufacturer has adequate production capacity.
- The bidder has verifiable business and financial stability.
- The manufacturer has verifiable technical capability.
- The bidder has a verifiable history of successful performance.

Qualification may take place either before the bidding starts (prequalification) or after an apparent lowest evaluated cost bidder has been identified (post-qualification).

If the lowest evaluated cost bidder meets the qualification requirements, that bidder is selected for the contract award. If the lowest evaluated cost bidder does not meet the qualification requirements, then the next lowest evaluated cost bidder is selected and that bidder's qualifications are reviewed.

Display **Slide 62** When the lowest evaluated cost bidder has been selected and qualified, the procurement unit should assemble all the relevant documents into a contract package.

The contract is important because it becomes the legally binding document between the purchaser and the seller that identifies:

- Product specifications.
- Delivery requirements.
- Performance obligations of both parties.
- Legal recourse for the parties involved in case of lack of performance or disputes

The documents that traditionally are included as part of the contract are:  
(See slide)

Display **Slide 63** Once the BEC has identified and qualified the winning bidder and prepared the contract, it makes a recommendation to the contracting authority for award. It may only need to fill out and sign a simple form, but in many countries and organizations, the BEC also develops a summary record of the pertinent facts leading to its decision and a description of the decision-making process itself. This is referred to as a Bid Evaluation Report.

This Bid Evaluation Report not only informs and assists the higher-level approving authority, it also establishes and documents pertinent facts that would help to defend against any protest from an unsuccessful bidder. A sample Bid Evaluation Report format can be found in the **Contraceptive Procurement Manual** as Annex 48 on page 153. is included in the study guide.

When the Bid Evaluation Report is complete it should be submitted to the relevant government authority for approval and authorization to proceed to contract award. A recommendation for Contract Award form is often submitted to the governing authority along with the Bid Evaluation Report. A sample Recommendation for Contract Award form is included in the **Contraceptive Procurement Manual** as Annex 50 on page 161.

Display **Slide 64** Prior to the expiration of the bid validity period the procurement unit should issue a Notification of Acceptance to the successful bidder. The Notification of Acceptance established the contract between the procurement unit and the successful bidder. The contract is confirmed later by signature of the contract document.

The Notification of Acceptance should provide the following information:  
(see slide)

A sample Notification of Acceptance form can be found in the **Contraceptive Procurement Manual** as Annex 54 on page 187.

Display **Slide 65** The successful bidder must submit a performance security (if required) and the signed contract form to the procurement unit within the deadline mentioned in the original bidding documents. Performance securities usually do not exceed 10% of the contract value. If the successful bidder fails to meet the deadline mentioned above, his bid security will be forfeited.

The contract form binds the bidder to the special and general conditions of the contract and the specifications contained in the original bidding documents.

As soon as the performance security is submitted by the bidder, the procurement unit must get it confirmed by the issuing institution, which is usually a commercial bank.

After the successful bidder signs the contract form and provides the performance security, the procurement unit should make arrangements to have the relevant governing authority sign the contract.

Display **Slide 66** After the contract has been signed, original contracts and contract copies need to be properly distributed.

Provide one of the two originals of the signed contract to the supplier. Keep the other signed original contract, the performance security and the bank's security confirmation letter in a file under proper security.

Send a copy of the signed contract plus all relevant contract documents to the relevant authority for record keeping.

For international procurements a copy of the contract should be distributed to other agencies as required, such as: finance officer, consignee, central warehouse, clearing and forwarding agent.

The procurement unit should also notify the unsuccessful bidders that their bid was not selected, and return the unsuccessful bidders' bid securities.

This step should not be taken, however, until the successful bidder has signed the contract and provided a valid performance security.

Display **Slide 67**, Immediately after receiving the signed copy of the contract and confirming the performance security, the procurement unit should initiate arrangements for making the initial payment to the supplier. This step should not be delayed since most international firms will not begin producing an order until they have received either a down payment or letter of credit.

The procurement unit should obtain verification that the down payment has been made or the letter of credit has been issued.

The procurement unit should record the date the payment was issued since the shipping date may have to be adjusted based on the payment issuance date since production may not start until receipt of payment.

To reinforce this material with students, proceed with this interactive quiz in the same way as the other quizzes were used.

## CHEATERS' QUIZ – Lecturer Version with Answers

(Session 14, Procurement, End of Activity 2, covering Slides 36-67)

There aren't many rules about a "Cheaters' Quiz," except that you must cheat. First try to answer the questions on your own. It is true that much of the information in this session is not for memorization, but it is important to know where to find the information in the reference materials you now have, such as the Contraceptive Procurement Manual.

Consult it as needed.

When you have written your own answers, find a colleague with whom you can “cheat” so that you and the colleague get as close as possible to perfect scores. You need not put your name on this paper. It is not to hand in. Your lecturer will review the final answers with you.

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**1. If there is a pre-bid conference, who may attend? Tick (✓)one or more answers.**

- ☐ Interested journalists and reporters
- ☐ Anybody who is a prospective bidder
- ☐ Only those who have registered for the pre-bid conference
- ☒ Only those who have both bought the packet of bidding docs, if required, and registered

**2. Which are true duties of the BEC? Tick one or more answers.**

- ☐ Read all the bids before the bid opening meeting
- ☐ Open all the bids whenever the bids come in.
- ☐ Use a bid opening form or check list.
- ☐ Provide more information to bidders whenever they might request it.
- ☒ Evaluates bids and collaborates closely with a TEC, which is usually a subcommittee

**3. What is a bid security? Who gives it to whom? *A financial guarantee that if the bidder is selected for the award and then withdrawals, its bid security will be forfeited. The winning bidder provides it to the procurement unit***

**4. Who does which? Write BEC or TEC before each item below.**

BEC Makes a recommendation for a contract award.

TEC Checks on the technical specifications and quality

BEC Determines if a bid is “substantially responsive.”

**5. Which of these forms or examples can be found in the Contraceptive Procurement Manual?**

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> Preliminary Evaluation Tool | <input type="checkbox"/> Samples of patient insert documents          |
| <input checked="" type="checkbox"/> Checklist for Compliance    | <input checked="" type="checkbox"/> Technical Evaluation Sub-Schedule |
| <input checked="" type="checkbox"/> Financial Evaluation Forms  | <input checked="" type="checkbox"/> Bid Evaluation Report             |
| <input checked="" type="checkbox"/> Notification of Acceptance  | <input checked="" type="checkbox"/> Verification Checklist            |

(Continued Next Page)

**6. Which of the items below are samples of material or major deviations? If you can, add an example of your own to the list.**

- ☐ Manufacturer is new and has no previous successful bids
- ☒ Manufacturer does not provide warranty or equivalent
- ☐ No list of sources of raw materials for product is included
- ☒ Requested quantity is not provided
- ☐ Manufacturer has lost out on bids in early attempts
- ☒ Product does not meet regulatory or registration requirements
- ☒ Product does not meet specification requirements

Your own example: \_\_\_\_\_

**7. Number the following eight steps in the chronological order in which they should ordinarily occur. (Note that until a person has considerable experience, it would probably be necessary to use reference works to address this with certainty.)**

- ☐ 1 Identify substantially responsive bids
- ☐ 3 Select lowest evaluated bid
- ☐ 2 Do financial evaluation
- ☐ 8 Make initial payment to the supplier
- ☐ 7 Inform unsuccessful bidders that their bids were not accepted
- ☐ 5 Get signatures and performance security from the winning bidder
- ☐ 6 Get the relevant governing authority to sign the contract
- ☐ 4 Issue notification of acceptance to the successful bidder

**8. Write True or False before the statements below. Be ready to defend your answer.**

*True* – Bidder qualification may take place either before or after bidding starts

*False* -The winning bidder and losing bidders should all be notified at the same time

*True* - The Bid Evaluation Report can help defend against protests from unsuccessful bidders.

*True* - In procurement for public health commodities, even experienced professionals may need to consult reference documents from time to time.

**9. What is a common role of a commercial bank in finalizing a contract of this sort? *The bid security, a common requirement, is usually confirmed in a commercial bank.***

## Activity 3. Contract Performance Monitoring & Product Delivery

### Session Objectives:

By the end of the session students will be able to:

1. Understand the importance of contract performance monitoring
2. Understand the key activities required to manage product delivery

**Time:** 30 minutes

### Materials:

#### **Presentation Slides:**

68. Section title
69. Section Objectives
70. Contract Performance Monitoring
71. Contract Performance Indicators
72. Performance Monitoring Checklist
73. Pre-shipment Compliance
74. Product Delivery
- 75 – 76. Preparing for Customs Clearance
77. Customs Clearance & Delivery
78. Delivery Inspection
79. Accepting goods into inventory
80. Questions

**There is a “work period” and discussion at this point.**

#### **Student Workbook materials**

1. Performance Monitoring Check List
2. Supplier performance Score Card
3. Discussion guide for activity

### **3. Product Delivery & Contract Performance Monitoring – 30 minutes**

Display **Slide 68, Section Title**. Tell students effective management of commodity delivery is an important element of the procurement supply process.

Contract performance monitoring is also an important component of the procurement process, since unsatisfactory performance by the supplier can jeopardize the objectives of providing quality products to the program.

Display **Slide 69**, Tell students the objectives of the section 3 (see slide).

In this session we will look at some of the key activities that be used to manage product delivery and monitor contract performance.

Display **Slide 70**, Product delivery is the last step in the procurement supply process. Product delivery activities begin after the purchaser authorizes the supplier to ship the commodities.

There are three primary activities that must be effectively managed to support an efficient product delivery process; customs clearance, warehouse delivery and inspection, and accepting goods into inventory. For international shipments, these activities include the shipment of goods from the supplier's warehouse, through the port of entry, clearance through customs, receipt and inspection at the designated place of delivery, and accepting goods into inventory.

Display **Slide 71** It is important to plan ahead and obtain the information that will be needed to support an effective customs clearance process. The purchaser needs to confirm the commodity information (type, quantity, and cost), consignee and notify party information, and ship-to destination prior of the shipment being released by the supplier.

The request for the shipping documents should be made by the purchaser at least 7 days prior to shipment for ocean shipments. Similar information should be requested for air shipments at least 3 days in advance:

Display **Slide 72**, As soon as the goods have been shipped, the supplier is required (by contract conditions) to notify the purchaser and provide the following documents (see slide)

The most important thing to remember is to check where original bills of lading need to go and to have them sent accordingly in good time, as this is a legal document that will need an original signature from the consignee in order for the goods to clear customs. It is imperative to check what documents are needed by the clearance agent to avoid any customs clearance delays and possible demurrage charges.

Display **Slide 73**, In addition to clearing the commodities, the customs clearance agent may also arrange for transport from the customs area to the central warehouse if required, but in most cases, this is arranged by the government agency responsible for distribution of program commodities. All necessary precautions should be taken to protect the commodities from damage during transport from customs to the central warehouse.

The commodities should be insured during this transit; however, when this insurance coverage is provided by the international air or ocean cargo insurer, it can be very expensive. Local insurance, if it is available, can be significantly less expensive. The purchaser should determine the risk and need for insurance during this final stage of transit.

Display **Slide 74**, Upon delivery, warehouse staff must inspect the commodities for the following details (see slide).

The warehouse staff must immediately report any problems found to the procurement officer and appropriate officials. Commodities with unresolved questions should be quarantined and not put into distribution until all the problems are answered.

Display **Slide 75**, After the warehouse staff inspects the commodities, those that meet warehouse delivery inspection requirements are accepted into inventory. The commodities should be placed in the designated location for program distribution and use. The commodities should be stored in warehouse locations with appropriate environmental conditions. The warehouse records should then be updated to reflect the commodities received. All receiving paperwork should be provided to the procurement unit to process the supplier payment

Display **Slide 76**, Tell students that proactive contract management and performance monitoring that engages the supplier's support allows the purchaser to obtain information on supplier production and performance problems at an early stage. Early identification of a supplier problem improves the chances of resolving that problem before it significantly impacts the product delivery schedule. Performance monitoring is also cost effective, since early problem identification allows the purchaser and supplier to consider a broader range of contingency options, which can minimize the need to resort to more costly solutions such as expedited shipments or overtime labor.

A contract performance monitoring system should be established to enable the purchaser to effectively achieve these objectives (see slide) Setting up and properly implementing an effective contract performance monitoring system, however, requires a commitment of both time and resources.

Display **Slide 77**, To track and evaluate a supplier's performance in complying with the contract requirements, it is necessary to develop contract performance indicators.

A range of contract performance indicators should be developed. The exact indicators used will vary according to the commodity, the level of risk associated with contract failure by the supplier, and the value of the procurement.

For most high-value commodity procurements, contract performance indicators should be developed that track compliance with the following categories (see slide).

The specific information needed to develop performance indicators is drawn from the procurement record files and these record files should include all of the key documents, approvals, and information relevant to the procurement transaction.

Display **Slide 78**, Once you have identified the performance indicators that are appropriate for the contract, they should be put into a checklist format to make it easier to track and record the data.

This is an example of some performance monitoring indicators for packing and labeling that have been put into a checklist format. This section is taken from a larger performance monitoring checklist that includes other key categories to monitor. A copy of the larger, complete checklist can be found in the **Student Workbook**. Let's take a quick look at the sample checklist. The **Student Workbook** also includes a sample supplier performance scorecard that can be used to monitor a supplier's performance.

Display **Slide 79**, Once you have a supplier performance monitoring checklist, how do you obtain the required data to complete it?

One of the key activities available to the purchaser for obtaining data to monitor a supplier's performance, particularly regarding the commodity's compliance with technical and quality assurance requirements, is the right to conduct pre-shipment inspection or testing of the commodity. This is also known as pre-shipment compliance. The purchaser reserves the right to conduct pre-shipment compliance by including the requirement in the bidding documents and the contract issued to the supplier.

It is often in the purchaser's best interest to have commodities inspected or tested before shipment. For imported commodities, identifying and resolving product problems prior to shipment (instead of identifying them upon arrival in-country) minimizes the impact on the delivery schedule and the program and saves shipping costs and time.

There are three basic levels of pre-shipment compliance.

Level 1. Pre-shipment document review. For level 1 the supplier submits the documents identified in the contract to the purchaser to review prior to shipment. These documents usually include:

- Certificate of Analysis for each manufacturing lot (batch) in the shipment.
- Commercial Invoice
- Packing List
- Certificate of Origin
- Other documents as requested by the purchaser

**Level II Visual inspection of Product.** For visual inspection, the purchaser contracts a professional, independent inspection company to randomly select and visually inspect product samples to confirm that the following features comply with contract requirements:

- Product labeling.
- Product packaging.
- Shipping container markings.
- Product quantity.

Visual inspection will also reveal any signs of: Product damage or deterioration, package damage, poor workmanship.

**Level III Laboratory or physical testing of product.** Conducting laboratory or physical testing of a product is done on a selective basis. Since testing can be expensive and time consuming, it is usually reserved for products that meet the following criteria:

- Are from new or questionable suppliers.
- Have been the source of previous complaints.
- Are produced by manufacturers that do not have current good manufacturing practice certification.

The types of tests to be performed will depend on the product and the reason for testing.

Display **Slide 80**, ask if there are any questions. And then proceed to the work period, following these steps.

Refer students to the **Discussion Guide** for Activity 3 which is included after the three interactive quizzes for the Session 14.

Explain that following the directions in the Discussion Guide, they should work in groups of four for ten minutes, discussing these five topics. And at the end of the discussion period, each small group will be asked to offer brief and informal comments on the points on the group discussion, such as which topic caused the most discussion or disagreement, which was the least clear, which was best documented in the reference works.

1. The advantages of Performance Monitoring
2. Tasks for Warehouse Staff
3. Documents for Customs Clearance
4. Three Basic Levels of Pre-Shipment Compliance
5. Identification of Contract Performance Indicators

When there are about ten minutes of the session time left, ask for groups to volunteer to have one of their members offer some comments on their discussion, according to the Discussion Guide. As far as possible, let students offer comment and clarification, intervening only when there are errors or lack of answers.

## **Discussion Guide for Session 14, Activity 3**

For ten minutes you will work in groups of four or five to discuss the five key topics listed below from Activity 3 and the recent slides you studied.

Choose a person who will offer some brief and informal comments on your group discussion, if the lecturer calls on your group.

The brief and informal report could mention points such as some of these:

- Which topic caused the most discussion or disagreement?
- Which was the least clear to the group, technical speaking?
- Which topics were well documented in the reference works?
- Was there some other interesting point of comment that came up in your group?

Here are the discussion topics from Activity 3:

1. The advantages of Performance Monitoring
2. Tasks for Warehouse Staff
3. Documents for Customs Clearance
4. Three Basic Levels of Pre-Shipment Compliance
5. Identification of Contract Performance Indicators

Don't forget to select a person in your group who will make a few comments if the lecturer calls on your group.

## Activity 4. Public Sector Procurement in Pakistan

### Activity Objectives:

By the end of Activity 4 students will be able to:

1. Understand the levels of public sector procurement in Pakistan
2. Identify rules governing public sector procurement in Pakistan
3. Identify challenges in public sector procurement

**Time:** 1 hour

### Materials:

#### **Presentation Slides:**

81. Activity Title
82. Activity Objectives
- 83 – 86 Levels of Procurement
- 87 – 89 Rules Governing Procurement
- 90 – 92 Challenges in Procurement
93. Separate Group Activity

**There is a group discussion activity at this point.**

#### **Student Workbook materials**

1. Discussion guide for separate group activity

#### **Contraceptive Procurement Manual materials**

1. Public Procurement Rules 2004: Annex I, page 200
2. Public Procurement Regulations 2008: Annex II, page 225
3. Code of Business Ethics: Annex 5, page 99

Display **Slide 81**, Section title

Display **Slide 82**, In this section we will be taking a look at public sector procurement in Pakistan. We will look at the different levels at which public sector procurement occurs and look at the rules and regulations that govern public sector procurement at each level. We will look at some of the more common challenges/problems that are encountered in public sector procurement. We will also have a group session in which we discuss possible steps that could be taken to address these challenges.

Display **Slide 83** While Pakistan has a complex and diverse public sector procurement environment with many programs and agencies conducting their own procurement, if we take a very broad view of the procurement environment

for health care we can see that in general public sector procurement primarily occurs at three levels: National, provincial, and district level.

Display **Slide 84**, At the national level procurement of health care goods and services is primarily done through various national programs, such as the Population Program Wing of the Planning and Development Division, which is responsible for procuring contraceptives, the National Tuberculosis Control Program and the National AIDS Control Program.

While these programs are currently procuring their commodities at the national level, with further devolution in the future these responsibilities may come under the provincial governments and become provincial procurements.

Display **Slide 85** At the provincial level procurement is done to support autonomous medical institutions such as Medical schools and Teaching Hospitals, as well as some of the districts as needed.

Display **Slide 86** Health care procurement at the district level is focused on procuring goods and services for first level care facilities such as the MCH Centres, Basic Health Units, Rural Health Centres, Family Welfare Centres, Social Mobilizers and Tehsil Hospitals And District Headquarter hospitals. The Executive District Officer Health is in charge of the district and responsible for ensuring that these primary and referral level facilities receive their supplies.

Display **Slide 87** Procurement that is conducted at the national level by national agencies is subject to the Public Procurement Rules 2004, the Public Procurement Regulations 2008 and the procurement of Consultancy Services Regulations 2010. These procurement rules and regulations are based on well-established and widely accepted principles of good public sector procurement and promote economy, efficiency, equality, fairness and transparency. The General financial Rules identify the financial thresholds for procurement responsibility. The Government of Pakistan has also established a business code of ethics to promote the professional behavior of personnel engaged in procurement and contracting activities.

A copy of the e Public Procurement Rules 2004, the Public Procurement Regulations, and Business code of Ethics is contained in the Contraceptive Procurement Manual as Annex I, Annex II and Annex 5. A copy of the Public Procurement Rules 2004 in Urdu, and the Procurement of Consultancy Services Regulations 2010 can be found in your Student Workbook. .

Display **Slide 88** Procurement that is conducted at the provincial level is governed by Procurement rules and regulations that are established by each province. These provincial rules and regulations generally follow the guiding principles and procedures that are presented in the Public Procurement Rules 2004. This slide identifies the current provincial procurement rules.

Display **Slide 89** Procurement at the district level is subject to the provincial procurement rules and regulations

Display **Slide 90** As we saw from the number of steps in the competitive procurement process described earlier, public sector procurement of health care supplies is a complex process that occurs over an extended period of time and can engage several stakeholders. Given the strict nature of procurement procedures, the number of stakeholders, and the often high value of funds allocated for procurement, it is not uncommon to have challenges/problems occur during the procurement process.

In this slide and the following slides we will take a quick look at what are some of the more common procurement challenges.

**Accurate quantification/forecast data** is essential for ensuring the procurement process provides the correct quantity of commodities that will best support the program's projected needs.

A forecast that is too low could result in stock-outs, which often trigger expensive emergency procurements, creating a financial strain on limited health care budgets.

A forecast that is too high can cause excess holding costs, storage-capacity strain, and an increased chance of products expiring on the shelf.

Given the long lead time for the procurement process

**Accurate and complete product specifications.** As mentioned earlier, technical specifications are important for the following reasons:

- Provide detailed information to the bidder about the goods
- Create a benchmark for the purchaser to judge the technical responsiveness of the bid
- Form the basis for contractual obligations
- Establish criteria for the acceptability of the goods when shipped

Specifications that are inaccurate or not complete will create problems for procurement, the correct products may not be procured and the purchasers right to return the wrong products will be limited if the purchaser incomplete specifications.

Display **Slide 91, Lengthy procurement process.** Each of the process steps described earlier, from quantification of requirements to delivery of goods, requires a specific amount of time to complete. While some steps can be done in parallel and will vary in the time required, some are often fixed for a set period of time. For example, most national procurement regulations will stipulate the amount of time a bidder has to respond to an international bid—which can range from 30–90 days. In Pakistan PPR 2004 allows for flexibility in establishing a bidder's response time and states that under no circumstances shall the response time be less than 15 days for national bidding and 30 days for international bidding.

You must also consider the manufacturer's production time, as well as shipping transit time and customs clearance time. Together, it is not uncommon for the public sector procurement process for health care commodities to take from 10–16 months, and sometimes longer, to complete. It is important for supply and program managers to understand procurement lead time requirements to ensure that quantification and procurement planning can be initiated early enough to support the procurement and supply cycle.

**Limited human resource capacity.** In many countries there is a shortage of trained procurement personnel and an overall lack of a professional cadre of procurement staff. Often the people responsible for conducting procurement may not have received sufficient training on the rules, regulations and procedures governing public sector procurement.

**Delays in funding.** In many countries, national policies require that funding for procurement be allocated and available to the program, or procurement unit, before bidding documents can be publicly released. In Pakistan (*confirm national/provincial requirements*)

Delays in government funding approval and allocation of program procurement budgets delay the release of bidding documents; which, in turn, can delay the eventual delivery of the commodity.

Delays in supplier payments, because of national cash flow and treasury management constraints, can cause suppliers to hold shipments; which can lead to delayed delivery and supply problems.

**Display Slide 92, Product quality assurance.** Counterfeit and substandard products are in the marketplace, creating a significant product quality risks for the supply system. To address this risk, public sector procurement processes and national regulatory agencies must implement appropriate quality assurance measures to ensure that only quality products enter the supply system.

Procurement addresses this responsibility through the technical specifications, issued with the bidding document, that identify key product quality requirements, such as product certification requirements, pharmacopeia standards (when applicable), labeling and packaging requirements, shelf life requirements, etc. These requirements become the contractual obligations the supplier must comply with when a contract is awarded.

The bidding and contract documents should also include the right to conduct pre-shipment or post-shipment inspection and testing, as required, to confirm that the product complies with the stated quality assurance requirements.

**Transparency.** Because of the large sums of money involved in health care commodity procurement, it is not uncommon for fraud and corruption to occur. Special interests, suppliers, procurement personnel, and others may seek to influence product selection, manipulate order sizes, and manipulate supplier

selection and contract award decisions to increase sales and profit margins for their personal benefit.

Procurement officials must support an open procurement process by consistently applying national procurement regulations and procedures, and international best procurement practices that promote transparency.

Display **Slide 93** Now that we have identified the common challenges that can occur in the procurement process, we're going to conduct a group exercise to brainstorm some suggestions for addressing these challenges. Please use the Discussion Guide for Group Work at the end of Session 14. It is similar to the discussion guide you used earlier. (This discussion guide should be in a hand out with the similar materials if it is not included in the Student Guide.) A copy is included below for the convenience of the lecturer.

## **Discussion Guide for Group Work**

### **Session 14 Activity 4 (end of session)**

As we saw in the recent presentation there are many challenges encountered in the procurement process. The purpose of this discussion period is to better understand better the challenges the procurement system faces and to identify realistic ways that some of the problems can be dealt with, even if only partly and even if years of work are needed.

Seven major procurement challenges were identified in this last presentation. These challenges and a question to be addressed by the group assigned that challenge are listed below. We will divide the students into seven groups and each group will be assigned to review one of the procurement challenges and identify possible solutions to that challenge.

Take ten minutes to discuss your assigned challenge with your group members. Remember to select a spokesperson in your group who will informally and briefly present up to a half dozen interesting points that came up in your group discussion.

Note the challenges have been placed in larger font in case the lecturer wants to cut them out and pass them out to the individual groups.

#### **1. Challenge: Accurate quantification data**

Accurate quantification data is essential for ensuring the procurement process procures the correct quantity of commodities that will best support the program's needs.

##### **Question:**

What can be done to help ensure that the procurement unit receives accurate and timely quantification data to support an effective procurement process?

#### **2. Challenge: Accurate and complete product specifications.**

Product technical specifications are important for the procurement process because they provide detailed information to the bidder about the goods to be supplied and form the basis for contract obligations.

##### **Question:**

What can be done to help ensure that the procurement unit receives accurate and complete product technical specifications to support an effective procurement process?

#### **3. Challenge: Lengthy procurement process.**

There are many steps in the procurement process, from preparing bidding documents and issuing bids, to opening and evaluating bids, selecting a supplier,

Supply Chain Management for Commodity Security: Course Evaluation  
and awarding a contract. It can be a long process that can take considerable time.

**Question:**

What measures can be taken to try to shorten and streamline the procurement process?

**4. Challenge: Limited human resource capacity**

In many countries there is a shortage of trained procurement personnel and an overall lack of a professional group of procurement staff.

**Question:**

What can be done to strengthen the capacity of procurement personnel to conduct effective procurement?

**5. Challenge: Delays in funding for procurement.**

Delays in government funding approval and allocation of program procurement budgets can delay the start of the procurement process, which, in turn, can delay the eventual delivery of the goods.

**Question:**

What can be done to help improve the timely allocation and release of funds to support the procurement process?

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**6. Challenge: Product quality assurance.**

Poor quality and substandard products are in the marketplace, creating a significant product quality risks for the supply system.

**Question:**

What measures can the procurement process take to help ensure that only good quality products enter the supply system?

**7. Challenge: Transparency**

Because of the large sums of money involved in health care commodity procurement, it is not uncommon for fraud and corruption to occur.

**Question:**

What measures can be taken to help ensure an open and transparent procurement process?

## 15 An Introduction to Cold Chain Management

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### **Session Objectives:**

By the end of the session students will be able to:

1. Explain the concept of cold chain management and its significance
2. Define Cold Chain; briefly describe some Cold Chain equipment and its use.
3. Explain the Dial Thermometer and what is a Vaccine Vial Monitor
4. Identify the correct temperatures of different categories of vaccines
5. Explain the rules of vaccine preservation at various levels of supply chain
6. Cite additional sources of technical information on cold chain logistics and management

**Time:** 90 minutes

### **Materials:**

Power point projector  
Pointer for slides  
Student Guides

### **Presentation Slides:**

23 slides

### **Lecturer Preparation:**

Lecturer should review the PowerPoint presentation corresponding to this session in advance, to become familiar with its use and with the materials it includes.

**Presenting the Slides:** Session 15 is heavily dependent on PowerPoint slides, and it could be a challenge to keep it interactive and effective. Lecturers are urged to use this methodology:

- As always when using slides, test out the equipment and image projected on the screen in advance. Make sure that all students will actually be able to see the screen and that nothing will block their view.
- Don't read a slide to students. They can quickly read it for themselves; explain the slide and add more information.
- A maximum of one minute per slide keeps a session moving along. While a few slides may take a little longer (slide 10 will be the longest), it is best to keep moving. Remember that the material will be reinforced in small group work.

### **Learning Activity Summary:**

Title	Type	Time
1. Introduction to Cold Chain & Key elements of maintaining an effective cold chain	First Nineteen PowerPoint Slides and large group discussion	25
2. Study of Technical Items/Concepts	Small Group Work and Reports Out	25
3. Cold Chain System in Pakistan	Interactive Presentation	10
4. Challenges to and Potential Solutions for cold chain management in Pakistan	Small Group Discussion & large Group Summary	30

### Learning Activities:

#### 1. Introduction to Cold Chain & Key elements of maintaining an effective cold chain – Time 25 minutes

##### Show slide 1: Title slide

Begin by mentioning that this session is only an overview or introduction to cold chain logistics and management, since that is all that can be done in one session. It would take at least one course to present the topic more fully. Such a course would be important for specialists who work with a cold chain. However, virtually everybody in the system will benefit from an overview session like this. Additional information sources on Cold Chain Management will be given at the end of the session.

Ask students to recall the Six Rights of logistics. Tell students that one of the Six Rights they have mentioned is 'Right Quality'. Ask students what right quality means. They may say that if the product is not produced through the correct process, or if it is damaged in storage or transport, it will be ineffective. Tell students that in addition to expiry the product can be rendered ineffective by improper transport or storage. This improper storage may occur at the warehouse or while during transportation.

One of the key factors for storage and transportation of some products, especially vaccines, is the temperature. Some vaccines are rendered ineffective once they are exposed to temperatures above their recommended range even for a very short period of time. And some may be rendered ineffective if they are frozen.

##### Show slide 2: What is cold chain? (1)

Tell students that in the business sector of developed countries 'Chain-shops' are found frequently. In Pakistan 'Chain-shops' are also becoming increasingly common. Ask students, what is meant by Chain-Shops and if they can give examples. If no one answers, explain that, in different developed countries the same company has multiple shops / restaurants in different towns or cities with the same name. In these shops the items have the same quality and same price everywhere. Tell that, through TV/ Radio you might have heard the names of

Macdonald, KFC, etc. In our country also these types of shops/ restaurants are being opened gradually. Some of you might have visited those shops. Tell students that the quality and price of items in chain-shops remains fairly consistent.

Similar to this concept, vaccination centres in the country have one standard quality of vaccines they want to use. In order to maintain this standard, the temperature of vaccines has to be maintained right from the manufacturer to the time the vaccine is given to patients at a vaccination centre. Ask students what questions they have about the definition of Cold Chain on Slide 2. As always, to the degree possible, ask if other students can answer the questions, if there is enough time and if the answers are indeed accurate.

### **Show slide 3: What is cold chain?**

Tell participants the slide further elaborates the concept of cold chain. Once the basic concept of cold chain is identified, the next challenge is how to maintain temperature from production to vaccine usage. Note that the proper temperature is neither too high nor too low. The process requires a thoroughly planned, scientific and well controlled procedure to achieve this objective, and the notion used to summarize all these steps and processes is called “cold chain management,” or CCM’.

### **Show slide 4: Why maintaining temperature is critical**

Tell students that in this slide we will discuss why temperature control is critical to ensuring efficacy of certain pharmaceutical products and vaccines. Some products and vaccines are very sensitive to temperature as mentioned earlier, and vaccines can be rendered ineffective if kept out of the temperature range – too high or too low, for even a short time.

Tell students that any loss of vaccine potency due to temperature is permanent and potency cannot be restored even if the temperature is restored to the range. Emphasize to students that the objective of temperature control is not to achieve the lowest possible temperature, since some products may lose potency on being frozen. Similarly, exposure to light may damage many products even if temperature is well maintained.

Tell students that vaccines can either be:

- Heat sensitive = damaged when exposed to high temperature
- Freeze sensitive = damaged when exposed to temperatures below 0 °C.

A lot is being done to improve thermal stability of vaccines these days so requirements will hopefully be changing. But currently, we need to stay focused on quality CCM.

### **Show slide 5: Major components of cold chain system**

Tell students that like the supply chain system overall, the cold chain management has three main components as follows:

1. Personnel
2. Equipment
3. Procedure

Ask students to tell what role personnel play in cold chain management. Emphasize the importance of training and ability to use the equipment and procedure correctly.

Ask students to name some of the equipment used in CCM. They might name refrigerators, cold boxes etc. Tell students that they will be discussing equipment in details in the next slide. Tell students that equipment is essential in maintaining temperature. In most parts of Pakistan, the climate is hot and humid for most parts of the year, thus having good equipment is essential to maintain the needed temperature range.

Tell students that certain procedures are critical to maintaining quality of vaccines and other temperature sensitive products. There are some specific procedures to control the ordering and transportation of vaccines which need to be adhered to. An example of a procedure is keeping a temperature record in cold chain equipment, or verifying storage history of vaccines before administering them.

Ask which of the three elements of the Cold Chain System is most important, Personnel, Equipment, or Procedure. This is of course a trick question, but it can lead to good discussion. The conclusion is that all three elements are important and essential, and there will be no functioning cold chain system if one of the elements is missing.

### **Show slide 6: Equipment (1)**

Ask students to recall the equipment that was named in previous slide. Tell students that some of the equipment is very basic and simple e.g. refrigerators, while others may be very sophisticated. Following is a list of some cold chain instruments, with pictures of these in their Student Guides:

- Cold room / Freezer room
- Ice lining Refrigerator
- Deep Freezer
- Other refrigerator machineries, e.g. ordinary refrigerator, ice-pack first freezer, solar or gas operated freezer, Cold-box, Vaccine-carrier, ice-pack, etc.

Tell students that cold rooms and are essentials for large storage facilities e.g. provincial or central warehouses, while refrigerators are commonly used at district and facility levels. In order to carry vaccines in the field during the outreach campaigns or to distant facilities cold-boxes, vaccine carriers and ice-packs are required.

**Show slide 7 Comparing Refrigerators** A couple of quick notes about using common refrigerators. Often the easiest and most common storage means for vaccines is in a front opening refrigerator. Here we can see the disadvantages of using these for storing vaccines.

And this is compared to a Top Opening Refrigerator. Briefly, do you think that one is clearly better than the other? Which would you rather have at a clinic where vaccines or other cold storage items are routinely given? Is there a perfect choice for every situation?

**Show slide 8: Walk-in type Cold Room**

Tell students that they will be shown some examples of cold chain equipment. The picture in the slide shows a walk-in type cold room. The temperature is maintained within pre-set limits inside the cold room. The pre-set limits are for both a maximum temperature and a minimum temperature. Of course if the power source is not reliable, the Cold Room may not be able to stay below the upper limit, depending on how long the power interruption is.

**Show slide 9: Combination Walk-in Type Cold/Freezer room**

The room shown in slide is similar to cold room except that it has additional freezer space

**Show slide 10: Cold box and vaccine carrier**

Tell students that a cold box is an insulated container that can be lined with ice-packs to keep vaccines cold during transportation and/or short period storage (from two to seven days). Cold boxes are used to collect and transport monthly vaccine supplies from district stores to the health facility.

Notice that cold boxes do not require external power, such as electricity, except for the fact that power is needed to freeze the ice-packs in the first place.

Ask if any student can explain what diluents are. They should answer that diluents are specialized liquids to be mixed with or to dilute some vaccines and other pharmaceutical liquids.

Note that the diluents are generally transported with the vaccines, but they do not require cold storage themselves. They should be kept close to room temperature. There are various diluents used with various products in different proportions. They are not all interchangeable.

The cold boxes are especially important for getting vaccines to distant populations or where the infrastructure is very poor.

They are also used in addition to vaccine carriers to store vaccines when the refrigerator is out of order or being defrosted and for outreach and mobile sessions.

Different models of cold boxes have different vaccine storage capacities. Health facilities usually need one or more cold boxes that can hold

- a one-month supply of vaccines ; and
- a one-to-two week reserve stock of vaccines .

In addition to their vaccine storage capacity, cold boxes are selected according to their “cold life.” Cold life is the time (usually expressed in hours) by which the temperature can be maintained in a cold box within the desired range. Different models have a cold life of two to seven days depending on the temperature outside.

Tell students that like cold boxes, vaccine carriers are insulated containers that, when lined with frozen ice-packs, keep vaccines cold during transportation and/or temporary storage. They are smaller than cold boxes and are easier to carry if a person is walking. But they do not stay cold as long as a cold box — maximum for 48 hours with the lid closed. Diluents are normally transported with vaccines but should not be refrigerated and should be kept closer to room temperature.

Vaccine carriers are used to transport vaccines to outreach sites and for temporary storage during health facility immunization sessions. In small health facilities they are used to bring monthly vaccine supplies from the district store. Vaccine carriers are also used to store vaccines when a refrigerator is out of order or is being defrosted. Different models of vaccine carriers have different storage capacities

Tell students that a foam pad is a piece of soft foam that fits on top of the ice-packs in a vaccine carrier. There are some incisions in it to allow vials of vaccines to be held in the foam. During immunization sessions, the foam pad serves as a temporary lid to keep unopened vaccines inside the carrier cool while providing a surface to hold, protect and keep cool the opened vaccine vials. Previously, ice packs were used to keep vaccines cool during immunization sessions outside of vaccine carriers. It is now recommended to use the supplied foam pads for this purpose.

### **Show slide 11: Ice packs**

Tell students that as shown in the diagram in this slide, ice-packs are flat, square plastic bottles that are filled with water and frozen. Ice-packs are used to keep vaccines cool inside the vaccine carrier or cold box. The number of ice-packs required for a cold box or vaccine carrier varies. It is recommended to freeze ice-packs before using them in a vaccine carrier so that they are already effective and pre-cool the carrier.

### **Show slide 12: Assisting Equipment for cold chain management**

Point out that this is an interesting slide that lists six types of equipment for CCM. Some of the students may have experience with all or some of them or none of them.

In this session, we will focus on two of the most important ones and the mostly commonly included in the supply chain, the Dial Thermometer and the VVM (Vaccine Vial Monitor).

### **Show slide 13: Dial thermometer**

Ask students how they think the specialized dial type of thermometer is used. Ask if any of them have experience with this equipment, and if so let those student(s) explain.

This brief discussion should end up with the facts that it is important not to touch the black handle of the thermometer, since the heat in a person's hand will change the reading and the thermometer will not be accurate. Also, half of the dial is above 0 and half is below, and that the desired range for most products is 2 to 8 degrees C.

This type of thermometer is often used in various refrigerators and cold boxes.

Students will have more information shortly when they study their student guide.

Also point out that the brands and models of the equipment may change from time to time, so there will be variations in the appearance of the equipment. And as the technology evolves, very new approaches or equipment could appear.

### **Show slide 14: Bar type thermometer**

Show bar type thermometer and explain its various components. Ask if students see advantage of the bar type over the dial type of thermometer. While there are various advantages and disadvantages, there no one correct answer. The discussion should cover that there may be cost differences, and depending on the model, there may be differences in how accurate the two types are, Also, if the bar type is marked with the desired temperature range, it may be easier for people with less training to use.

### **Show slide 15: Vaccine Vial Monitor**

This is a wonderful piece of technical equipment, since it changes colour according the temperatures it has been exposed too, and this can tell you if the vaccine can be used or not.

Explain that there will be further details on the Vaccine Vial Monitor (VVM), but that the key facts are these:

1. If the colour of the square inside the circle is fully white or even still lighter than the surrounding square, the vaccine is still good to use, providing of course that the vaccine is not past the expiration date.

2. When the colour is not really white but still lighter than the colour of the surrounding square, that vaccine can be used and should be used first, if it is unexpired.
3. If the colour of the square inside the circle is the same colour than the square or is darker, the vaccine cannot be used, even if it is not expired. It has been too warm.

### **Show slide 16: Reading a VVM**

Explain to participants, that if the colours show up clearly on this slide, they will see a perfect example of the colouring that a VVM can indicate. Give the students a moment to study this slide, and then ask discussion questions like these:

- If the square is white or lighter than the ring, is the vaccine always OK to use? (No, not always, only if it is not expired.)
- Which of the four colours on the VVM indicates vaccine which should be used first? (the colour still lighter than the circle but not white, and only if unexpired.)
- Which colours can never be used? (same colour as or darker than the circle)
- If you visited a clinic, which colour or colours would you hope you would see most? (Preferably only white, but some “still lighter than the circle” would be OK, too.)

### **Show slide 17: Heat and cold sensitivity of vaccines**

Tell students that the grade of sensitivity to heat or cold varies among different vaccines. This slide describes the sensitivities in a schematic fashion. The diagram shows that Oral Polio Vaccine (OPV) is most heat sensitive while Hepatitis-B vaccine is least heat sensitive. Similarly, Hepatitis-B is the most cold sensitive while Tetanus Toxoid is the least cold sensitive vaccine

**This is good to know, but the safest thing is to keep all vaccines within the range of 2 to 8 degrees C.**

### **Show slide 18: Storage conditions at various levels for common vaccines**

Tell students that the chart in the slide describes the storage temperature range for various vaccines for different levels of storage. The chart can serve an easy guide to maintaining adequate temperatures.

Explain that the key point to remember is that most vaccines need to be kept between 2 and 8° C, but that each vaccine should be stored according to its own instructions.

Diluents normally are stored at room temperature and are never to be frozen.

The World Health Organization, or WHO, among others, suggest that vaccines and diluents are obtained at the same time in appropriately proportionate amounts. This means that whatever the product is, it is best to get the right diluent in the right amount to mix with it. The right proportion is usually not half and half. This overview session does not go into the technical pharmaceutical issues of the needed proportions.

### **Show slide 19: Review of Key points**

Explain to students that this slide summarizes some key points. Pause, and give them a chance to study the slide. After pausing, mention that this is a summary, but that this is a good time to see if all the points are clear. To be sure that students have understood the points, ask these discussion questions, all of which have the answer of NO, but which can serve as good reinforcement.

-Is it true that if you cool down vaccines again, you may be able to reverse their loss of potency?

-Is it true that if you keep vaccines at correct temperatures they are good past their expiration dates?

-Is it true that hepatitis vaccine is damaged by exposure to strong light as well as heat?

-Is it true that vaccines will lose their potency if stored above 0 degrees C?

## **2. Study of Technical Items/Concepts – 25 minutes**

Divide students into groups of four. Explain to them that in their groups, they will have an assignment in three parts.

1. In the **Student Guide**, they will work collaboratively on the **Key Cold Chain Technical Terms and Concepts**. As the directions in the Guide say, each person in the group can pick any term and try to give a good definition, explanation, or example. It is not necessary to take turns, but everybody is encouraged to participate. This should be fast paced and take about five minutes, with two or three terms per minute.

2. Next take a few minutes to study the Sample Cold Chain Management Equipment and try to answer the questions at the end of that section. This should take about five minutes.

3. Join students in a large group discussion and request answers from each group on the questions presented.

If time allows ask these questions:

-Did somebody in your group have a good deal of experience with a piece of equipment or a cold chain procedure that would be good to share briefly with the large group?

-Was there a topic or term that caused a good deal of disagreement in your group?

-Did anything innovative or surprising come out of the discussion in your group?

-Was there something that no one in your group knew about or could provide an answer for?

-Is there some other comment or question that you would like to share with the large group?

As always in facilitating a large group discussion, the lecturer should attempt to “bounce the ball back” and return questions from students to other students. This is more interactive and has greater learning impact. But this must be kept within the time available and if an erroneous answer is given, and students do not manage to correct it, then the lecturer must ultimately intervene.

### **3. Cold Chain System in Pakistan ---Ten Minutes**

**Show slide 20: title slide**

#### **Show slide 21: Cold Chain System in Pakistan**

Tell students that most of the vaccines in Pakistan are imported and arrive in-country through sea or air. The flowchart shown in slide 21 is the most commonly followed chain by the vaccines.

After being released by manufactures, the vaccines are transported in temperature controlled containers / boxes. Most of the vaccines are stored at National Vaccine Store located at the National Institute of Health, Islamabad. The National Vaccine Store distributes to provincial stores according to their requirements.

The provincial stores are located in Punjab, Sindh, Khyber Pakhtunkhwa, Baluchistan, AJK and Gilgit Baltistan. The provincial stores distribute vaccines according to their requirements.

The vaccines are picked up by tertiary care hospitals, basic health units and rural health centres (collectively termed as service delivery points). From the SDPs the vaccinators take vaccine out into the field (especially in outreach vaccination campaigns e.g. polio, measles, TT) stored in cold boxes.

### **Show slide 22: Current Vaccine Management**

Tell students that vaccines follow a similar pattern of distribution as mentioned in the earlier slide. However, there may be minor variations as the existence of divisional stores in Khyber Pakhtunkhwa. The vaccine from the provincial store is shipped to divisional stores before being transported onwards to district / agency stores.

Ask if students believe they could draw the vaccine pipeline, and if there is time, ask them to draw the general outline without going into great detail, or giving exact names, etc.

End by pointing out that there are six levels in the pipeline or distribution system, if you begin with the vaccine manufacturer. The level with the largest number of facilities and staff is of course the last level, the service delivery points with the service providers and the Expanded Programme of Immunisation (EPI).

And you could say this is the most important part of the pipeline, too, since this is where people are actually served, and millions of children receive their vaccines.

### **4. Challenges to and Potential Solutions for Cold Chain Management in Pakistan – Time 30 minutes**

Explain to students that this final activity of the cold chain session will involve small group work on technical points and then large group discussion. All the directions are in the Student Guide.

This work will summarize and review the material covered so far.

Divide students into groups of four and ask them study the last page in this part of the Student Guide with the Final Small Group Discussion Questions on CCM

At the same time, you may show slide 23 with the discussion questions.

### **Show slide 23 Discussion Questions:**

Tell students you want them to attempt to answer as many of the questions as they can in their small group. Perhaps there will be questions that they cannot answer. They should just share what they know or even what they have heard about the cold chain system.

Tell them that after about ten or fifteen minutes, the lecturer will call on different groups to hear what some of the answers have been and see if all the groups agree on the answer. Tell them that they begin their work now.

(Once the groups have begun their work, the lecturer should circulate and see if the groups are working as directed. They should not spend excessive time on any one question. If it seems that one or a few people are dominating the group, it is important to mention that you want to hear from everybody in the small group. Everybody must work and contribute.

At this point, the lecturer should avoid giving direct technical answers. Let the students work for the answer. Only if a group is going off in some wrong direction should the lecturer bring them back on track.

The lecturer should announce when there are just a few minutes left for the group work. It could be that not all groups will finish, but it is important to stop early enough to leave plenty of time for large group discussion and comparison of answers from the different groups.

For the convenience of the lecturer, the final discussion questions are listed below.

1. List all the challenges that are faced at central, provincial, and district levels, to maintain a cold chain taking into account the wide variations in temperatures across geographical areas throughout the year.
2. Discuss and write down possible cost-effective solutions for these changes.
3. Does anyone have examples of how, the cold chain system has changed or improved over time? (When processing tell students that this could even include memories going back to childhood).
4. Can anyone give an example of some aspect of the cold chain system that has gotten worse?
5. Does anybody know of technological changes or improvements that are probably coming into the system or that should come into the system?
6. If you had a small amount of money or resources, what would be one or two priority changes that you would like to make?

Conclude this activity and this session by thanking the students for their good work. Remind them that this is just an introductory session for this important topic of cold chain management. It is not a complete course.

End by pointing out that this World Health Organization has a wealth of important information on CCM: <http://www.who-int/vaccines-documents>

## 16 Monitoring and Evaluation

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### Session Objectives:

By the end of the session students will be able to:

1. Identify and define basic M&E terms and concepts
2. Describe the program cycle for supply chain systems improvement
3. Identify the steps in creating an M&E strategy and an M&E Plan
4. Identify and select indicators to measure logistics system performance
5. Locate tools that can be used or adapted to conduct M&E activities
6. Describe the importance of reporting results and providing feedback.

**Time:** 120 Minutes

### Materials:

Prepared board or flip Chart for Activity 5

A pointer for the slides in this session is very helpful

### PowerPoint Slides:

- 1 Session Title
- 2 Three Reason for M&E
- 3 Logistics Cycle
- 4 Program Cycle for Supply Chain System Improvement
- 5 Key components of a M&E Strategy
- 6 Relationship between Goal, Objectives & Activities
- 7 Good Objectives are Impact Oriented
- 8 Objective
- 9 When is an objective not an objective?
- 10 Key Components of a M&E Strategy
- 11 M&E Plan Definition
- 12 What is the function of a M&E Plan?
- 13 What are the components of an M&E Plan1?
- 14 What are the components of an M&E Plan2?
- 15 Why, What, and How We Measure?
- 16 Indicators Defined
- 17 SMART Indicators

**Lecturer Preparation:** prepare flipchart 1 and review the PowerPoint to be familiar with the content

### Learning Activities Summary

Title	Type	Time
1 Session Introduction	Lecturette	5
2 Knowing What We're Talking About	Pairs Exercise	20

3 Introduction to Supply Chain Systems Improvement	Lecturette	15
4. Steps in Developing an M&E Strategy	Lecturette	5
5 Establishing Goals & Objectives	Large Group Discussion	20
6 Introduction to M&E Plans	Lecturette & Group Discussion	15
7. Introduction to Indicators	Lecturette	15
8 Tools for Logistics System Assessments	Interactive Lecturette	10
9. Providing Feedback and Reporting Results	Interactive Lecturette	10
10. Session Conclusion	Lecturette	5

### 1) Session Introduction – Lecturette – 5 minutes

Tell students that in this session we will be talking about the purpose and process of assessing a logistics system. Ask students what they think the purpose of conducting a logistics assessment is. Take a few of their answers and summarize that the purpose is to improve logistics system performance.

Tell students that when we assess logistics systems we employ the tools of monitoring and evaluation also known as M&E. Ask students what they know about the role of monitoring in logistics. They should know that Quality Monitoring plays an integral and continuous role in logistics because they are familiar with the Logistics Cycle.

Tell students that in these next activities we will look at why we do M&E in the first place and what it can accomplish. We will then look at some key concepts of M&E through an exploration of the terminology. We will then look at steps for system improvement, developing an M&E Strategy and the role of indicators in the process. We will conclude by looking at reporting M&E results. Remind students that this is just an introductory look at M&E in Supply Chains and that there is a full workshop on this topic.

### 2) Knowing What We're Talking About – Pairs Exercise – 20 minutes

Explain that even as logisticians have their own vocabulary, those who assess logistics systems through M&E have their own terminology. In this

activity we will look at the vocabulary that is typically used in M&E as a way to introduce some of the elements we employ.

Ask everyone to work with a partner. Tell students that they will be doing an exercise with two parts. Explain that Part 1 is a simple list of words. Note that they may be familiar with some of them, and if they don't know all of them that that is all right as well. Then point out that Part 2 of the handout has a series of definitions – but that we don't know what terms they are for. Their task is to decide which of the terms in Part 1 best fit the definitions in Part 2. They will need to write the term in the space next to the definition.

Ask students to open up their **Workbooks to Session 14: Basic M&E Terms - Matching Terminology** and tell students that they will have 10 minutes to match each term with its correct definition.

After 10 minutes, stop students even if they have not completed the exercise. Go over the answers with students, beginning with *Monitoring* and *Evaluation*. Facilitator's answer sheet is listed at the end of these session notes. Use this opportunity to underscore the difference between *monitoring* (an ongoing activity that involves the routine collection of data to measure progress) and *evaluation* (a less frequent activity that determines whether or not objectives have been achieved).

Review the terms *Data*, *Information*, and *Analysis*, also emphasizing the difference between them. Note that M&E helps convert data or numbers that may not have much meaning in isolation, into information that managers find useful when they are trying to make decisions to improve programs. Then briefly go over Tools and Data Sources.

Now explain that M&E needs to be built into a program from the beginning and focus on two of the terms related to putting this into action: Baseline Data and M&E Plan. Ask students which of the definitions they thought best fit these two terms. Then explain that a number of terms on the Handout are related to setting up a strong M&E system.

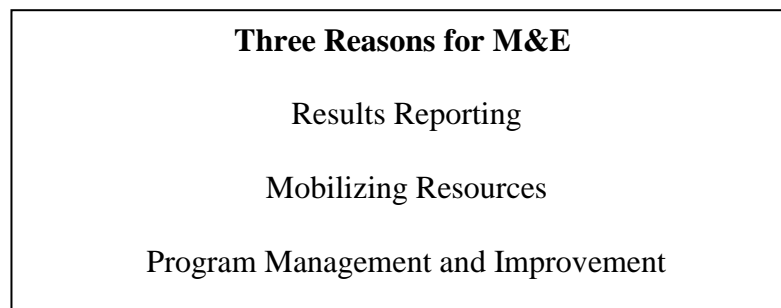
Continue with the terms *Goal* and *Objective* and note that these are what programs are working towards and what we want to achieve. Note that good objectives play a significant role in monitoring and evaluating effectively. They are what we go back to whenever things get bogged down, so we will be spending some time in future sessions talking about what good objectives are.

Ask students which definition they matched to Indicator, Input, Process, Output, Outcome, and Impact. Respond to any questions students may have about the different terms and definitions.

Ask students if they would like you to recap by reading through the answers on the list. Close by explaining that these terms are used frequently when assessing a logistics system and applying principles of M&E.

### 3) Introduction to Supply Chain Systems Improvement – Lecturette – 15 minutes

Ask students if they know why we should do M&E in Supply Chain, after students have provided several answers, display **Slide 2: Three Reasons for M&E** and noting that we have seen three primary reasons why we do M&E:



- 1) because stakeholders supporting programs want to know what results are coming out of their support,
- 2) because results from ongoing M&E can help justify taking action or secure new or additional funding, and
- 3) because M&E can help us improve program management and performance

M&E focuses on improving a specific system- the supply chain for any category of health products. Ask students why we are interested in making improvements to the supply chain. Their responses should include improving customer service, to ensure that clients have the health products they need when they need them.

Ask students if they believe that Supply Chains have some kind of monitoring activity built into them. Students should remember that the Logistics Cycle has Quality Monitoring. Display **Slide 3: Logistics Cycle** and review what was said about the role of Quality Monitoring:

- It happens throughout the logistics cycle
- The activities associated with each component are monitored
- It identifies when specific components are not functioning efficiently and improvements are needed

Ask the students to identify some of the steps they would take in order to implement quality monitoring in the logistics cycle in order to make improvements. Students can identify from among:

- collecting information
- analyzing system strengths and weaknesses
- developing recommendations to more fully take advantage of the strengths of the system and to address the specific weaknesses in the system
- developing implementation strategies.

Note that these are the first steps in making improvements to the supply chain.

Ask the students what should happen next. Participant answers should include:

- carry out the activities in the implementation strategy
- monitor the activities
- reassess and adjust activities as needed

#### Display **Slide 4: Program Cycle for Supply Chain Systems**

**Improvement** and allow students to study it for a minute. Then ask students to turn **to page 130** in the **Logistics Handbook**. Explain that many of the steps they just identified are reflected in this model and that we will be looking at this model in greater detail. Note to students that the system improvement process we're talking about in this case is logistics system functioning.

Emphasize that we assess what is currently happening to see what is working and what is not working. Interventions are then developed to address what is not working, and these same interventions are assessed later on to determine whether or not the intervention worked and improvement has been made.

Explain to students that the cycle reflects two, inter-related elements of system improvement: assessment and intervention. Draw a line down the middle of the board or flipchart paper and write "Assessment" on one side and "Intervention" on the other. Starting with "Assessment," have students shout out all of the steps in the System Improvement Model that involve assessment as quickly as they can. Do the same with "Intervention." Note that they will revisit these lists as students go through each of the different steps and they can change the category of a particular step when the time comes to review it.

#### **Steps in System Improvement**

Conduct Assessment: Bring students' attention to the circle numbered "1," Conduct Assessment, and explain that assessment is a good place to begin because it establishes a baseline that can be used to determine progress over time, helps us describe the current context and how the system is functioning. Confirm that this step is on the "Assessment" side of the flipchart.

Analyze Data: Tell students that this step is crucial to system improvement because what happens during this step will influence the focus of subsequent steps. Discuss with students how an analysis of assessment data helps identify supply chain problems, inform a country or program's vision of how the supply chain should function, and what it will mean to change the current supply chain system to the desired supply chain system. Confirm that this step is on the "Assessment" side of the flipchart.

Develop Recommendations: After we have done our analysis and have identified the strengths and weaknesses of the system then we make recommendations to the stakeholders for how to improve it. This includes making a summary of our key observations, identifying system factors that will influence our choice of interventions, comparing our findings to past assessments and noting which interventions worked and which did not. Included in this step is outlining our suggestions for how to improve the supply chain.

Define Goals and Objectives is step 4 in the process. Here we have to establish our baseline of where we are and where we want to go. We answer the question: What is our desired state? Here we also establish SMART Objectives which we will explain later in the session.

Develop and Plan for Interventions: Here we create an overall implementation strategy for our interventions which coordinates with the work plans of those who run the system. We develop detailed interventions to address our objectives which include identifying our assumptions about the causes of problems and what will take to change them. We also identify our data sources and resources needed to make the interventions – including the people responsible for putting them into place. Confirm that this step is on the "Intervention" side of the flipchart.

Implement Interventions: This step is clear and straightforward. Confirm that this step is on the "Intervention" side of the flipchart.

Monitor Interventions: Make sure students understand that interventions should be monitored regularly to identify the kind of progress being made towards original goals and to make adjustments as needed. Confirm that this step is on the "Assessment" side of the flipchart.

Note that they are now back to the first step, where the greater impact of the selected interventions on the supply chain can be determined and new problems/areas identified, starting the cycle over again.

#### **4) Steps in Developing an M&E Strategy - Lecturette - 5 minutes**

Tell students that in this activity we will introduce the steps for developing an M&E strategy.

Display **Slide 5: Key Components of an M&E Strategy**. Review the outline below explaining that these are the steps needed to create an M&E Plan. Explain that in a full M&E course we spend significant time on each of these components.

Set goals and objectives

- Includes defining the problem and establishing the baseline
- Answers the question: Where do we want to go?

Identify indicators:

- Indicators measure progress towards goals and objectives
- Helps us focus on what we really need to measure
- Monitoring and evaluation of indicators is data dependent, and we need timely, accurate data to do this or identify our best proxy data.

Collect & analyze data

- Includes designing tools to measure, capture, and record data
- Converts data into information
- Helps us identify what progress is being made

Provide feedback for decision making

- Presents information (analyzed data) to stakeholders
- What needs to be changed?

In this next activity we'll look briefly at how to construct and design clear goals and objectives which are a backbone of the M&E process. Then we'll look at how these are linked to activities and indicators and how these elements all come together in an M&E plan.

#### **5) Establishing Goals & Objectives – Large Group Discussion – 20 minutes**

Explain that goals are the overall big vision of what we would like to see like reduction in infant mortality rates by 25%. The objectives are how we are going to make that happen.

With **Slide 5** still displayed remind students that the first component of an M&E plan is to identify our problem statement and develop goals/objectives. Ask students how they would describe a goal and how they would describe an objective. They should basically say:

- Goal is an abstract or lofty description of how to address the problem statement and says something about where we want to go.
- Goal is what we're working toward.
- Objective clearly describes how you will achieve the goal.

Tell students that the goal is something we're all working toward. Ask them who they think works on a day to day basis to achieve the objectives.

Although people like you (program managers, etc.) may be the people who set goals and objectives, we have to remember that the people who work towards these goals and objectives on a daily basis may be those in a Logistics Management Unit or at different tiers in the supply chain. Part of our job in setting goals and objectives is to make what may sound like lofty goals operationalized. This means the objectives themselves should be clear and that there should be clear expectations for how to reach them.

Display **Slide 4** again with the Program Cycle for Supply chain System Improvement and point out that under "analyze data" it says "identify supply chain improvement strengths, weaknesses, opportunities or threats. Point out to them that within this step is "define desired state", which essentially means define your goal/objectives.

Display **Slide 6, Relationship between Goals, Objectives & Activities** to show students the relationship. There should be one overarching goal to address each prioritized program challenge; there may be many objectives to help achieve the goal. Objectives outline how you are going to meet your goal.

Ask if any of the students have heard of SMART Objectives and write S-M-A-R-T vertically on the board/flip chart. If so, ask if they can tell the group what SMART stands for and write in the words below as they are mentioned.

If students give different words than we are using, just let them know that sometimes people use slightly different terminology, but that this is the terminology we'll be using for this course. Ask students what each term

means, making sure that the students understand each term and how it relates to objectives.

Specific: clearly speaks to the single problem that it is intended to address.

Measurable: includes benchmarks, or points of reference, to compare results to later on. Note that at the objective level, it may not be expressed as a % or #. This may be done instead for the indicator related to the objective.

Appropriate: the objective is related to and clearly supports the goal.

Realistic: the capacity and resources are available and can be used to reach the objective.

Time-bound: objectives are planned over time such that they can be met and are measured within a specific timeframe. Note that in programs with a specific time period, such as a 5-year project, it is not always necessary to state the time period as it is implied. This is especially true when you are working within a work plan structure.

Display **Slide 7, Good Objectives are Impact Oriented.**

Specific, measurable, appropriate, realistic, time bound.

Suggested Word Choices for Objectives:

- To Increase
- To Reduce
- To Strengthen
- To Enhance
- To Improve

Explain that objectives should indicate the expected result. Phrases like these five on the slide are good examples of the type of desired impact and are good choices to use when writing objectives.

Show **Slide 8: Objective.**

Goal: Improve availability of essential health supplies to clients

Objective: Improve adherence to delivery schedule

Remind students that we're trying to make this a clear objective, both so that we can monitor and measure our progress towards the goal, and also so that those that work to implement it understand what they are working towards. Go through each criterion for SMART objectives with the group to determine if the example is a SMART objective.

Is it Specific?

Ask if the objective addresses the identified opportunity or problem. The answer (yes, it addresses one specific aspect of a weak in-country supply system) will tell us whether or not the objective is Specific.

Is it Measurable?

Then ask if the statement includes a benchmark or measure of some kind. Remind students that we are still fairly high up on the list of key components for an M&E system (objectives being the second component), so this benchmark may or may not be expressed in a percentage, rate, or number. Oftentimes you don't measure so specifically until you get to indicators to measure performance. If you were to do it here you could say something like, "Improve adherence to delivery schedule by 20% over 1 year."

Is it Appropriate?

Now ask if the objective is related to and clearly supports the goal.

Is it Realistic?

Ask students if the capacity and resources are available and if they can be used to reach the objective. In this case we don't know, but you would want to make sure that they (capacity and resources) were available in order to make the objective Realistic.

Is it Time-bound?

Note that the M&E Plan and work plan strategy as a whole for this international project is for a specified period of time (usually one to five years), and so it is not necessary to include a time period in the objective. It is more important to determine whether this objective is coming at the right time and whether or not it can be achieved within the specified timeframe of the work plan or M&E plan.

Ask students what we can conclude from this example, is it a SMART objective? Why or Why Not? What could it be?

Emphasize to students that using SMART is a good general rule to make sure the objective is a clear one but all elements of SMART won't apply all of the time. As with many disciplines, there is an art and a science in monitoring and evaluation. Writing clear objectives is part of the art. A written objective does not necessarily have to include all aspects of SMART, but if not, they should be understood or defined in the written M&E plan. A written objective does have to clearly outline how you are going to meet or achieve the goal.

Display **Slide 9: When is an objective not an objective?** And ask students to answer the question. After a few answers, display the real answer on the slide by clicking the mouse/hitting enter. When it's an

activity. Tell students that activities are the backbone of any project's workplan, but that there is sometimes confusion between writing objectives and activities. Note that weak objectives may not be objectives at all but actually activities.

Ask students what they think the difference between an objective and an activity is. Their answers should suggest that while both are appropriate, measurable, and realistic, that the major difference is that activities support the objectives, and objectives support the goal/address the problem statement.

Explain to the group that when developing objectives and activities with a group, a good way to keep the group from confusing the two is to periodically ask yourself the following questions: Show the following prepared board or flipchart: Activity or Objective? (The print in *italics* is not part of the prepared flipchart, but to be stated by the facilitator).

Prepared board or flipchart

Activity or Objective?
“Is this something that we are DOING?” <i>If yes, then the group should make sure the <b>activity</b> supports a strategic objective by asking.....</i>
“What is this activity trying to ACHIEVE?” <i>It should achieve your strategic objective.</i>

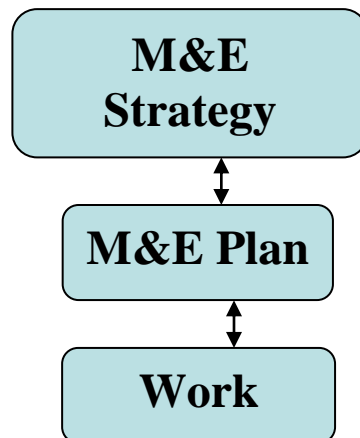
Conclude with the following comments:

- A goal is an abstract or lofty description of how to address the problem statement and says something about where we want to go.
- Goals are what we're working toward.
- Objectives clearly describes how you will achieve the goal
- Use SMART to help strengthen objectives (activities, indicators, etc.)
- Good objectives should address our priority problem/problem statement and point the way to solving this problem.
- M&E is an art as well as a science and today we're getting to practice some of the art!

## 6 Introduction to M&E Plans– Lecturette & Group Discussion – 15 minutes

Remind students that at the earlier in the session we talked about the importance of having an M&E strategy. Show **Slide 10, Key Components of an M&E Strategy** to remind students of the components included.

An M&E Plan details this strategy for your program or project over its given timeframe. Draw a schematic of how an M&E Plan is related to the M&E Strategy and a work plan on a flip chart:



Explain that the role of an M&E Plan is to complement and support a country or program's operating work plan. While key components of an M&E plan should be included in a work plan, an M&E plan can be developed separately from a work plan so that a detailed approach to monitoring and evaluation can be planned, advocated, and funded without making the work plan overburdened with detail.

Ideally the M&E plan is in place before the work plan, so that each work plan can be drawn from the multi-year M&E plan.

Display **Slide 11, M&E Plan Definition**.

A document that describes the complete system for monitoring and evaluation which links strategic information obtained from various data collection systems to decisions that will improve health programs

Note that this type of document can help programs integrate M&E if they have not yet done so. It can improve countries' existing efforts to include M&E into their work plans, and support all countries in the use of M&E results to manage and improve their programs.

Show **Slide 12, What is the Function of an M&E Plan?** and summarize that an M&E plan:

- Guides the design and implementation of M&E
- Highlights what information or data need to be collected

- Describe how to collect data and resources required
- States how programs will measure achievements during a specific time period
- Informs how stakeholders and other audiences will learn about results
- Documents consensus that was made during the development stage of the M&E plan (responsibilities, resources required, timing etc.).
- Preserves what the program knows about itself over time (documenting achievements and challenges).

Highlight the fact that M&E Plans typically span a period of time greater than that of a work plan. Ask students for their thoughts on why this might be.

Note that while for work planning purposes these components are generally for a one-year timeframe, M&E plans can span four to five years because multiple M&E interventions will be needed for several different program interventions. Additionally, some M&E activities need more time in order to observe the medium or long term effects of a particular intervention.

Ask students what they believe should be included in an M&E Plan, in addition to the components just discussed (goals, objective, etc.). Put them on the board/flipchart as students mention them. They can include:

- Description of Programs
- Introduction
- Indicators used to measure progress
- Data sources
- Data collection and management tools, example (score card)
- Reporting requirements and frequency of data collection
- Persons Responsible
- Monitoring Plan
- Evaluation Plan
- Dissemination among stakeholders
- Resource and capacity requirements to implement M&E Plan

Then display **Slide 13: What are the Components of a M&E Plan? (1)**

Highlight the following points related to each element of the first four elements:

Introduction: provides any relevant background and country specific information, leading to the purpose of the M&E Plan. Identifying some of the key system problems should be included in the introduction.

Description of Program: Clearly states the overarching goal, the objectives developed to achieve system improvements, and includes a general description of the activities that will be implemented to meet the objectives.

Explain to students that this is where a clear link should be established to the work plan. The work plan is a natural extension of this component of the M&E Plan, but over a shortened timeframe.

Indicators: Indicators in the M&E Plan are often stated in the form of a question. Presenting indicators in this fashion helps programs and countries as they disseminate results. Using the flipchart, provide students with an example, such as:

Indicator: Current Stock Availability

Question Indicator Can Answer: How many facilities had stock available to distribute to clients on the day of the visit? Be sure indicators accurately measure the interventions you want to measure

Move on to **slide 14: What are the Components of an M&E Plan? (2)**

And draw special attention to the Monitoring Plan and Evaluating Plan by asking students what they think is the purpose of having one section on monitoring and one section on evaluating.

Monitoring Plan: This describes how progress on the interventions will be tracked to ensure proper implementation and monitor advancement towards goals

Evaluation Plan: Explains the methods used to determine if we are being successful in reaching our objectives

Emphasize that monitoring is an ongoing activity that involves the routine collection of data to measure progress of interventions and activities whereas evaluation activities are conducted less frequently and usually determine whether or not objectives have been achieved. Review the following key elements by first asking students if they can define them. Provide answers as needed.

Data Sources: Specifies where staff will get the data they report on

Data Collection and Management Tools: Addresses what instruments will be used to collect the needed data

Reporting Requirements and Frequency of Data Collection: Answers what the reporting needs and frequencies are for all levels of the system including feedback results.

Person Responsible: Details what person, department, or organization is responsible for each task

Resource and Capacity Requirements: Defines all the types of resources needed to carry out the M&E plan

Tell students that ideally they would want to have an M&E plan in place before developing the work plan so that they can make sure that the work plan flows from the M&E Strategy and Plan.

## 7) Introduction to Indicators –Lecturette – 15 minutes

Tell students that we will now introduce one more main element of M&E which are the indicators we use to track our progress.

Ask students why it is important to measure our progress if we've achieved our objectives? Take a few answers. For example, why would we want to know if students achieved the course objectives?

Explain that it is important for us to know that we have met these objectives- that we as course facilitators can report that you are now competent in these areas- that the training was a success and that the Lecturers did their job well.

Display **Slide 15: Why, What, and How We Measure?**

- Why do we measure?
  - To improve performance
- What do we measure?
  - Progress towards goals & objectives
- How do we measure?
  - Using Indicators

Mention to the students that for every component of the programmatic framework there are measurements of what each of the components have achieved by comparing it to AN INDICATOR!

Another way of stating this is that the results statement identifies what we hope to accomplish, while indicators tell us specifically what to measure to determine whether the objective has been achieved (Source: Performance Monitoring and Evaluation TIPS. USAID Center for Development Information and Evaluation)

Ensure that all students are clear on the definition of an indicator. Ask for a few volunteers to explain what an indicator is. Take a few answers then display **slide 16: Indicators Defined:**

- Variables that measure a particular aspect of a program (input, process, output, outcome)
- Variables that help to measure changes, directly or indirectly (WHO 1981)
- Point to the status of assessed activity
- Provide the basis for data analysis and program feedback

An indicator can be defined as a unit of information measured over time that documents changes in a specific condition. As with objectives good indicator should be SMART. Ask someone to review what SMART signifies. Display **slide 17: SMART Indicators**.

- Specific: it should measure as closely as possible the result it is intended to measure?
- Measurable: so it can be analyzed qualitatively or quantitatively (e.g- number of students trained in M&E during this course)?
- Appropriate: is it measuring what it is relevant to meet the objectives of the program?
- Realistic: an indicator should realistically be able to measure the result in question. Are there enough resources available for monitoring the performance for that specific indicator and is their enough information available to make reasonably confident decisions?
- Time-bound: can the data for the indicator be obtained in a timely manner to monitor progress and make decisions?

Additionally the indicators should also be precise and consistent.

- Precise: so it can be consistently reproduced the same way by different people. Since many different people can be involved in data collection over a period of time, or the same indicator is analyzed across various programs, it is important that everyone is measuring the same thing (e.g- commodity availability for “X” product on the day of the visit at the health facility);
- Consistent: Not changing over time so it measures the same thing (Source: Measure of Success, Margolis and Salafsky).

## 8) **Tools for Logistics System Assessments: Interactive Lecturette – 10 minutes**

Tell students that developing an assessment tool is a laborious process that requires, time, skilled personnel, cost, testing, etc. An alternative to

developing an assessment tool is to use a tool that already exists or to adapt these tools to fit your needs.

Ask students to list tools that can be used for logistics system assessments. The facilitator should write the names on a flipchart.

**NOTE** to facilitator: Students could list tools that are not familiar to you. Please ask students to give a brief description of the tool. This is just a brainstorm of ideas of tools that can be used; we do not want to get into a discussion of what tool is the best.

Tell students that there are a great variety of developed tools that can be used and adapted for logistics system assessments. Examples of the tools are: LSAT, LIAT, LIAT ART, LIAT HIVT, SPARHCS, Tool to Assess Site Readiness, and ATLAS. All these tools are available from the USAID | DELIVER PROJECT website, [deliver.jsi.com](http://deliver.jsi.com).

Unfortunately during this session we do not have the time available to discuss and adapt tools. However, facilitators will be glad in assisting you in finding the appropriate tools and further assistance on their implementation.

## **9) Providing Feedback and Reporting Results- Interactive Lecturette – 10 minutes**

Remind students that reporting on results to stakeholders is one of the reasons for having an M&E strategy and system in place. This reporting system can have two types of reports: Summary Reports and Feedback Reports.

Summary Reports:

Ask students what data needs to be passed up the LMIS Summary Reports in order to address the supply chain, M&E and stakeholders' needs.

Answers should minimally include:

- stock on hand
- consumption data
- losses/adjustments
- quantity on order
- etc.

Remind the students that the point of collecting all this data is not simply for the sake of collecting data, but because somebody needs it to make a decision. If the LMIS summary reports are designed correctly they should

be able to provide most of the information that is needed for routine monitoring of the logistics system and its evaluation.

**Feedback Reports:**

Tell the students that besides summary reports there is another kind of report that should be found in an LMIS that can be very useful for M&E: feedback reports.

Ask the students if they can remember the different types of feedback reports we discussed earlier in the course. Help them recall that there are three types:

- reports that present an analysis of the data that is sent up the system and which central level managers use;
- reports that are sent back to lower level personnel for their use;
- reports that are exchanged among “central” level partners.

Then ask students what was the purpose of feedback reports. Students can respond, or the facilitator can comment that feedback reports can:

- help managers make operational decisions, to monitor the performance of the system, and to manage the system;
- help lower level personnel know how the system is working at their level, to motivate them to improve performance, and to indicate any problems in the reports sent or stock levels.

If summary reports can provide information for M&E, feedback reports if designed correctly can be a great tool to share M&E results with logistics system users and stakeholders.

**10) Session Conclusion - Lecturette – 5 minutes**

Thank the students for their contributions to this session. Remind students that this was a very quick overview of Monitoring and Evaluation in Supply Chains. Ask students if they have any questions on the quick presentation of M&E. Mention that they can find more information on the topic in the Logistics Handbook.

Note: If the facilitator has the information on the next “Strengthening Supply Chains through Monitoring and Evaluation” workshop they can provide that information to the students.

**Synthesis Questions:**

- 1) Why do we conduct M&E?

(Report our results and provide feedback, to mobilizing resources,  
for improving program management)

- 2) What are the steps necessary to create an M&E plan?  
(see Activity 4 - Set goals and objectives, Identify indicators,  
Collect & analyze data, Provide feedback for decision making)
- 3) When we establish objectives we want them to be SMART – what  
does this stand for? (see Activity 5)
- 4) Which spans longer time period – Work plans or M&E plans?  
(M&E plans – see Activity 6)
- 5) Explain what an Indicator is. Explain what a good indicator is.  
(see Activity 7)

## PART 1: BASIC M&E TERMS

Match the terms below with the definitions in the table below

Monitoring	Inputs	Baseline Data	Information
Tools or Data Sources	Goal	Outcome	Evaluation
Analysis	Feedback	Impact	Objective
Output	Process	Indicator	Data
M&E Plan			

## PART 2: DEFINITIONS OF BASIC M&E TERMS

	A comparison of objectives with accomplishments and how the objectives were achieved
	The routine collection and analysis of measurements or indicators to determine ongoing progress toward objectives
	Knowledge acquired in any manner; facts; data; learning; lore
	individual facts, statistics, raw numbers
	Specific statement describing the desired accomplishment(s) or results of an intervention or program. These should be measurable and should address existing problems, program weaknesses, and/or client needs (or build on strengths)
	A statement, usually general and abstract, of a desired state toward which a program is directed (usually not measurable)
	A variable that measures a particular aspect of a program (input, process, output, outcome, impact), usually related to achievement of objectives
	Set of resources (e.g., funds, policies, personnel, facilities, supplies, etc.) that are needed to implement a program/activity
	Set of activities (training, supervision, reporting) in which inputs are utilized to achieve desired results
	Direct products or deliverables of a program such as number of people trained, M&E materials developed and available for use
	Results obtained at the program level following activities (access, product availability, improved skills)
	Long-term results obtained at the population level (e.g., TFR or changes in morbidity and mortality)
	Relates objectives and activities to problems, and shows how indicators and tools measure achievement of objectives
	Means for measuring indicators
	Convert data into information
	Presentation of information to decision makers
	Basic information gathered before a program begins. It is used later to provide a comparison for assessing program impact.

**ANSWER SHEET****PART 1: BASIC M&E TERMS**

Monitoring	Inputs	Baseline Data	Information
Tools or Data Sources	Goal	Outcome	Evaluation
Analysis	Feedback	Impact	Objective
Output	Process	Indicator	Data
M&E Plan			

Evaluation	A comparison of objectives with accomplishments and how the objectives were achieved
Monitoring	The routine collection and analysis of measurements or indicators to determine ongoing progress toward objectives
Information	Knowledge acquired in any manner; facts; data; learning; lore
Data	individual facts, statistics, raw numbers
Objective	Specific statement describing the desired accomplishment(s) or results of an intervention or program. These should be measurable and should address existing problems, program weaknesses, and/or client needs (or build on strengths)
Goal	A statement, usually general and abstract, of a desired state toward which a program is directed (usually not measurable)
Indicator	A variable that measures a particular aspect of a program (input, process, output, outcome, impact), usually related to achievement of objectives
Inputs	Set of resources (e.g., funds, policies, personnel, facilities, supplies, etc.) that are needed to implement a program/activity
Process	Set of activities (training, supervision, reporting) in which inputs are utilized to achieve desired results
Outputs	Direct products or deliverables of a program such as number of people trained, M&E materials developed and available for use
Outcome	Results obtained at the program level following activities (access, product availability, improved skills)
Impact	Long-term results obtained at the population level (e.g., TFR or changes in morbidity and mortality)
M&E Plan	Relates objectives and activities to problems, and shows how indicators and tools measure achievement of objectives
Tools or Data Sources	Means for measuring indicators
Analysis	Convert data into information
Feedback	Presentation of information to decision makers
Baseline	Basic information gathered before a program begins. It is used later to provide a comparison for assessing program impact.

## 17 Commodity Security Vignettes and Review of CS

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### Session Objectives:

By the end of the session students will be able to:

1. identify challenges that Pakistan has faced in achieving commodity security
2. identify strategies that class members have attempted to implement or have successfully implemented in order to promote or move towards commodity security
3. describe their own experiences related to promoting commodity security
4. identify interventions that can promote commodity security and have an impact on the focus areas of the Logistics Cycle and the Commodity Security Framework

**Time:** 75 to 115 minutes depending if the alternative case studies are used

### Materials:

As references: provide these on a resource table in the back of the room

SPARCHS Guidelines & Tool

CS Assessment Reports (Samples if appropriate for the students)

CS Index 2006

CS Vignettes completed by the students and selected for use during this session

### PowerPoint Slides:

- 1 Session Title
- 2 RHCS Definition
- 3 CS Definition
- 4 Commodity Security Framework
- 5 Logistics Cycle

### Lecturer Preparation:

This session uses the CS Vignettes which experienced students were asked to complete on the first day of the course and later collected. The facilitators should have reviewed them for relevance and chosen sample vignettes for presentation and discussion during this session.

The facilitators should aim for 3 – 4 participant vignettes to present during the session. To the extent possible, facilitators should choose a set of participant vignettes which demonstrate: 1. problems involving various elements of the logistics cycle, and 2. solutions which are found through a variety of interventions, particularly interventions which reflect non-logistics elements of the CS framework.

If the class does not have students with experience working in the public health sector two case studies are provided which can serve the same function.

It is suggested to provide additional resources for students to review and possibly use if they wish. The Lecturer should determine how the students can get access to these documents. Consider making arrangements with the library or providing them in electronic format.

### Learning Activities Summary

Title	Type	Time
<b>1.Session Introduction</b>	<b>Lecturette</b>	<b>5</b>
<b>2. Review of Commodity Security Principles</b>	<b>Large Group Discussion</b>	<b>15</b>
<b>3a. Commodity Security Vignettes</b>	<b>Student Presentations and Large Group Discussion</b>	<b>40</b>
<b>3b Alternative Case Study 1</b>	<b>Exercise and large group discussion</b>	<b>20</b>
<b>3c Alternative Case Study 2</b>	<b>Exercise and large group discussion</b>	<b>20</b>
<b>4 Summary Discussion</b>	<b>Large Group Discussion</b>	<b>15</b>

### Learning Activities:

#### 1) Session Introduction – Lecturette – 5 minutes

Tell the students that this final technical session will focus back on the concept of Commodity Security.

Remind the students that we had introduced the theme of Commodity Security as an overall theme for the course. Ask the students to recall what we had said about the relation of logistics, the technical focus of the course, to the overall theme of Commodity Security. Students should recall that we had said that logistics is a critical element in achieving Commodity Security.

#### 2) Review of Commodity Security Principles – Large Group Discussion – 15 minutes

Display **Slide 2: Commodity Security (RH)** definition and remind students of the definition of CS highlighting the differences between the RH definition (inclusion of the word “Choose” and the Health definition). Display **Slide 3: CS (Health)** and remind students of the definition.

Ask the students to recall the specific elements of Commodity Security that are most directly applicable to us as logisticians. Students should identify “Forecast,” “Finance,” “Procure,” and “Deliver” as the logistics elements of Commodity Security.

Display **Slide 4: Commodity Security Framework** and remind the students that these logistics elements are crucial to achieving Commodity Security.

Display **Slide 5: The Logistics Cycle**. Remind the students that Quantification, Procurement and Inventory Management are the three elements of the logistics cycle which have already been identified in the Commodity Security Framework.

Ask the students to look again at the Logistics Cycle and identify any element that can also have a profound impact on a country’s ability to achieve CS. Students should identify LMIS as a critical element. Mention that we have already said that the LMIS is the engine that lets our Logistics Cycle function and that the information gathered by the LMIS will equally be used to contribute to Commodity Security overall.

Ask students if having a perfect logistics system will guarantee commodity security. The students should respond that it will not. Mention that logistics is one element, but all are required to achieve CS. Remind the students that this is a logistics course and as we had said at the start of the course, we would be focusing on logistics, but within the larger context of commodity security.

### **3a) Commodity Security Vignettes – Student Presentations and Large Group Discussion – 40 minutes**

**Note:** If there are not enough experienced students in the class to do this exercise two alternative case studies are provided below which can be used instead. They are both in the **Student Workbooks** as well.

Tell the students that we will now spend some time looking at participant experiences in supply chain challenges that have had an impact on their country’s ability to achieve CS. Tell the students that this will also give us an opportunity to see how countries approach these challenges, as well as the relationship between logistics and the other elements of the commodity security framework.

Tell the students that we will use the CS vignettes that they completed earlier in the week as a basis for the discussions during the rest of this session. Explain that 3 or 4 participant vignettes were selected for

discussion and that the vignettes represent a variety of challenges and solutions, attempted and/or successful.

Explain that for each vignette, the participant who wrote the vignette will read through the vignette so that we understand the situation, the challenge, the solution, etc. After that, the students will have an opportunity to make comments or ask questions.

For each of the selected participant vignettes:

- introduce the participant whose vignette was selected
- have the participant read through the questions/responses noted in the vignette
- invite the other students to make any comments or ask any questions
- make a summary comment about the type of challenge, the effectiveness of the solution, how it fits into the logistics cycle etc.

### **3b) Alternative Case Study 1 – Exercise and large group discussion -20 minutes**

Ask students to open up their **Workbooks** to the page titled: **Pakistan Case Study 1.**

- have someone read the case study. Pause after to give students a chance to absorb it.
- invite students to make any comments or ask any questions
- ask for their solutions
- see “Points to consider” below for furthering the discussion
- make a summary comment about the type of challenge, the effectiveness of the different solutions, etc.

You are a young, energetic, public health professional working at the Directorate of Health Services in Punjab province. The federal government as per the 18<sup>th</sup> Amendment devolved MOH and all its vertical health programs to the provinces recently. Your annual provincial health budget (from the DOH) is less than 100 PKR per person per year and 70% of the money is kept for procurement of health commodities and equipment.

One of the DOH strategies is the provision of integrated health care to avert alarming maternal and child mortality especially for the districts in the southern region. One of DOH priority activities is provision of Birth Spacing at district and sub-district level including BHU, dispensaries, RHC, THQ and DHQ. (These acronyms may need to be explained to students)

Despite infrastructure, community based workers and health care providers at the facilities; the region as a result has an average TFR of 4.9, MMR at 530 and CPR at 16% for the last five years. You have just read an article that suggests that availability of FP products may be the single most cost-effective logistics intervention as per study findings. You notice that district stores have poor supplies and sub-district distribution is highly compromised. However, your effort at convincing relevant EDO (H) and DPIU/LHW managers encounters a rather passive, fatalistic response.

**Keeping district health systems and population welfare department in mind, what do you think are the:**

1. Factors associated with low availability of Family Planning products
2. Steps to ensure regular supplies at the district and sub-district levels
3. Ways to improve performance management for the public health supply chain

**Consider the following discussion topics:**

Topic 1 – What role do the following play?

- Misuse of funds or products in the system
- Lack of clear policies and implementation in product distribution
- Lack of public awareness that these products are safe, effective and not against the law – will increase demand
- Improper inventory system
- Improper distribution system
- Poor forecasting and quantification of needs
- Shortage of funds

Topic 2 – How would doing the following impact the system?

- More regular visits and better training by upper level staff
- Establish the average monthly consumption and order accordingly
- Establish an automated ordering system
- Strengthen cooperation between Provincial and District levels
- Strengthen capacity of community health distribution workers

Topic 3 – Which should be priorities?

- Work to establish the 6 rights
- Strengthen:
  - Storage Facilities,
  - Transportation links,
  - Warehouse management,
  - Service delivery
  - Communication between Warehouse mgt and Service delivery

### 3c) Alternative Case Study 2 – Exercise and large group discussion -20 minutes

Ask students to open up their **Workbooks** to the page titled: **Pakistan Case Study 2.**

- Have someone read the case study. Pause after to give students a chance to absorb it.
- Invite students to make any comments or ask any questions
- Ask for their solutions
- See “Points to consider” below for furthering the discussion
- Make a summary comment about the type of challenge, the effectiveness of the different solutions, etc.

Four neighbouring districts are having very different results. Three of them have reduced maternal mortality by nearly 25% over the last two years. The fourth one, however, has actually had a slight increase in maternal mortality. You and a colleague have looked at all the possible variables that could explain the difference. All four districts have similar population size, a similar number of medical and clinic facilities, staff and lady outreach workers. The populations are even very similar ethnically. And the infrastructure in the four districts is about the same, which is to say that none of them has a very good infrastructure.

Then you notice something at the storeroom in the fourth district. There are very large quantities of four key products (mostly antibiotics) that help reduce maternal mortality. And you learn that the district chief came to his job about a year and a half ago, and he missed a major training from the MOH on the national initiative to reduce maternal mortality. He did not know what to do with all these products. He did not know that they are now part of the list of high priority products that are national priorities and that are now in “full supply,” meaning that the country has pledged to have enough of them there should be no stock outs.

But nobody from the clinics in this district was ordering any of the products. And actually, some of the products are now about six months from their expiration date. After some phone calls, you learn that four of the five clinics you called are stocked out of these products and have not had them for a long time. The district chief is a very busy man, and he is sad and somewhat ashamed the maternal mortality statistics for his district have not changed.

The short term solution is easy. He says he will gladly include these important products with the next shipment to all the clinics, making an estimate of what will be enough to last them about two months. But he does not know what to do on a longer term basis so that each clinic gets the right amount for a steady supply

with no stock outs for these full supply products and so that the district shows a decrease in maternal mortality.

What are the most important steps he should take to get these products into the regular supply chain and provide commodity security for them in his district?

The Lecturer may wish to highlight these points if they are not suggested by the students. This is only a partial list

**Goal 1 is to get a sense of true consumption needs for this district**

Collect data on how many times these products would have been prescribed had they been available via informal interviews with local doctors, nurses and pharmacists

Collect demographic data on % of pregnant women in district

Collect morbidity data on # of mothers treated with child birth problems from similar districts in area (facility based) or on number of women needing similar medical treatment during pregnancy in Pakistan as a whole (population based)

**Goal 2 is to establish a way to get these products ordered and supplied regularly**

Confirm that you will be able to get regular supply of these drugs if you offer them to your clinics

Inform clinics in district that these drugs are available  
Be sure these drugs are listed on the order forms

Confirm you have the resources to provide these

**Goal 3 is to deal effectively with the soon-to-expire stock**

Divide up amongst local clinics as possible without burdening them with extra stock that will likely spoil on their shelves

Use proper disposal or return procedures per established rules.  
(Are there established procedures and resources for doing so?)

**4) Summary Discussion – Large Group Discussion – 15 minutes**

Tell the students that we have now heard a variety of experiences. Lead a discussion related to the general nature of the vignettes that were presented: the problems, solutions, challenges.

Use questions such as the following to guide the discussion:

Note: the specific questions asked will be guided by the actual content of the vignettes that were presented. The general purpose here is to attempt to draw out general themes related to logistics challenges, viable solutions, and variety.

- What general observations can we make taking all of the vignettes together?
- Have you faced identical or similar experiences in your work? Were your solutions the same ones? If not, what different solution did you attempt? Was it successful?
- Do we see any examples of direct impact on CS, i.e., immediate results in better commodity security or commodity availability?
- What do we notice about the kinds of solutions that can help to resolve logistics problems?
- Do we see similar types of solutions applied to different types of problems? What might be the underlying nature of these problems which allow a common or similar solution?

If a table has been set up with the materials inform students that a number of tools and publications exist on the resource table if any of them would like additional information about contraceptive security.

- SPARHCS – Diagnostic Guide & Assessment Tool includes a CD and additional explanation of the CS framework and a tool for conducting CS assessments
- CS Index – From 2006- a summary of the rankings of various components of CS by country.
- CS Assessment Reports- Write-ups from various countries resulting from CS Assessments.

## Commodity Security Vignette

Please take a moment to prepare a vignette (mini-case study) that represents an example from your country about a positive or negative effect that logistics management has had on commodity availability. Choose an example from any program you are familiar with. Please be as specific as possible about the nature of the problem, causes and solutions or actions taken.

Name of Participant: \_\_\_\_\_

Year from which Example is drawn: \_\_\_\_\_

### Vignette:

1. What program/intervention is this example for?
2. List the commodities that were affected:
3. Explain the nature of the supply disruption/challenge/problem (*e.g. the program was facing an imminent threat of TB stockouts, or the program had a 3 year supply of condoms with no place to store them*)
4. List the three primary causes of the supply disruption/challenge/problem (*e.g, funding was promised but not provided...., or no forecast was prepared, etc*)

5. Briefly describe the intervention that occurred, if any, or the end result of the problem (*e.g., DfID stepped in with funds for a 3-month emergency supply, or nothing was done and the country was stocked out for 5 months*)

6. If no action, or insufficient action was taken, how could it have been handled differently?

## 18. Course Conclusion

By the end of the session students will:

- Think how they can apply their learning to their work as Logistics professionals
- Identify resources and mechanisms for continuing their learning
- Provide feedback on their own perceived skill levels on a variety of logistics topics to the Lecturers
- Receive a certificate of course completion (as appropriate)

**Time:** 55 or 100 minutes if review game is played

### Materials:

Review Game questions cut into strips  
 Participant list – one for each participant (as collected in Session 1)  
 Signed Course certificates, one completed with each participant's name  
 Course evaluations – one for each student  
 Envelope for collecting course evaluations

### Lecturer Preparation:

Print out copies of the course evaluation for each student

Have answers for outstanding Parking Lot issues

Prepare the students' certificates the day before the session; ensure that the students have had an opportunity to provide the correct spelling of their name and job title for inclusion on the certificate. Sign certificates.

Hand out Certificates as per UHS guidelines

### Learning Activities Summary

Title	Type	Time
<b>1. Review of the Course Content *(Optional)</b>	<b>Final Frame Game</b>	<b>45</b>
<b>2. On the Job Reflection</b>	<b>Individual Work and Large Group Discussion</b>	<b>15</b>
<b>3. Review of Parking Lot</b>	<b>Large Group Debriefing</b>	<b>10</b>
<b>4. Course Evaluation</b>	<b>Individual exercise</b>	<b>15</b>
<b>5. Distribution of Course Certificates</b>	<b>Large Group Activity</b>	<b>15</b>

**Note:** The Course Evaluation forms should be completed by the students prior to distributing the certificates to ensure that students do not leave before completing and turning in their course evaluation forms.

**Note:** Activity 1 – Review Game is optional but highly recommended to review the key concepts that students have learned in the second half of the course. Lecturer can decide based on the time available.

Learning Activities:

**1) Review of the Course Content – Final Review Game – 45 minutes**

Conduct Round 2 of the Review Game using the same teams that you used previously in the course. Use a few questions from the first game, but add the additional questions that are noted as Round 2 Frame Game. (See questions below).

Like with the first exercise the Lecturer will need to make a copy of the questions and then cut them into strips and place in a container for the students to choose. Again it is helpful to have assistance from one or two students to keep time, score and offer questions. The Lecturer serves as the judge.

Quick rules review; students get 30 seconds to answer the question and get 3 points if they can do so. If they can not answer the question they may consult with their team and get another 30 seconds. A correct answer only gives them one point. If they are wrong the other teams may try to answer the question. Other teams only get 1 point for a correct answer and a negative 1 point if they are wrong.

**2) On the Job Reflection – Individual Work and Large Group Discussion – 15 minutes**

Now ask students to imagine themselves in their roles as Logistics Advisors working in their country, program or organization. Ask the students to take a few minutes to think and identify a result of what they have learned in this course, what they might do to improve the availability of health commodities to the programs with which they work and provide assistance.

Ask the students to take a piece of paper and write down their ideas.

After a few minutes, ask students to share some of their ideas.

Process by asking questions such as:

- What will be your first steps?
- What will need to do to take these actions?
- What resources will you need and how will you get them?

- What will enable you to continue to make improvements? To advance commodity security?

Thank the students for their ideas and encourage them to continue their learning through reading and interaction with each other and through other resources. Ask the students to identify some possible resources.

Participant responses may include the following:

- USAID Global Health Supply Chain Program- Procurement and Supply Management web site,
- International Association of Public Health Logisticians,
- other publications and
- technical assistance.

Tell students that an important resource for them will be the others in this class that they've been working with over the last several days. Encourage them to call on each other whenever they seek another opinion about logistics issues. Pass out the Participant Bio Data Sheet list with everyone's email and phone number and tell them this is to help them build and maintain their professional relationships.

### **3) Review Parking Lot – Large Group Debriefing- 10 minutes**

Take time to process any unresolved issues that have been listed on the parking lot.

As appropriate help students identify what they can do and frame ideas for improvements to their supervisors or other available channels. Don't spend too much time going into minor details.

Refer students to reference materials or policy papers that may be available to help students.

### **4) Course Evaluation – Individual Work – 15 minutes**

Tell the students that they will now complete a course evaluation form. Remind the students that their honest comments will help to improve courses in the future.

Distribute a copy of the Course Evaluation Form to each participant. Ask students to complete the form and put them in the envelope you have provided when they have finished.

**5) Distribute Certificates – 15 minutes**

**REVIEW QUESTIONS FOR ROUND TWO**

**2.1 TO ESTIMATE THE MONTHS OF STOCK ON HAND IN A NATIONAL SYSTEM, WHAT TWO MAJOR DATA ITEMS MUST YOU TRY TO DETERMINE?**

National stock on hand, national monthly consumption

**2.2 IN BEGINNING A LOGISTICS SYSTEM ASSESSMENT, GIVE THREE OF THE MAIN ELEMENTS DO YOU WANT TO ASSESS.**

LMIS, reporting system, average monthly stock on hand, storage conditions, inventory status, who orders what and how, order intervals, supervision system, transportation modes, staff responsibilities

**2.4 Three of the first three steps for setting Max Min levels are**

Determine your lead time  
Set the review period  
Set the safety stock

**2.3 IN SELECTING A MAX/MIN SYSTEM--IF YOU HAVE VERY GOOD TRANSPORTATION, WHICH WOULD YOU SELECT? WHY?**

Continuous review

**2.4 IN SELECTING A MAX/MIN SYSTEM--IF YOU HAVE MORE THAN 40 ITEMS, WHICH WOULD YOU SELECT? WHY?**

Standard

**2.5 IN SELECTING A MAX/MIN SYSTEM--IF YOUR MAIL SERVICE IS NOT RELIABLE, AND YOU CAN'T EASILY GET TRANSPORT ALL THE TIME, WHICH WOULD YOU SELECT? WHY?**

Forced ordering--delivery truck system

**2.6 NAME TWO TYPES OF CONSUMPTION DATA.**

**2.7 WHAT ARE THE FOUR TYPES OF DATA USED FOR FORECASTING?**

Demographic, consumption, morbidity, and service statistics.

**2.8 FORECASTS BASED ON CONSUMPTION DATA SHOULD BE BASED ON WHAT SPECIFIC DATA?**

Dispensed to user or consumption data

**2.9 WHAT ARE THE SIX STEPS THAT MUST BE TAKEN TO PREPARE A FORECAST? (can require only 3 or 4)**

1. Gather and organize the data.
2. Evaluate the data.
3. Estimate past and current use.
4. Plot graph of past and current use.
5. Estimate future use using as many data sources as possible, and adjust for program plans.
6. Reconcile the forecasts from the different data sources to produce a "final" forecast.

**2.10 OF THE TWO TYPES OF SERVICE STATISTICS - "VISITS" AND "NUMBER OF CLIENTS" - WHICH ONE IS BETTER FOR FORECASTING? WHY?**

Visits is better than number of clients (since visits data are usually broken down into new visits and revisits with a standard number of contraceptives issued at each type of visit).

**2.11 WHAT DO THE FOLLOWING DEMOGRAPHIC TERMS MEAN?  
....WRA, CPR, CYP**

Women of reproductive age,  
Contraceptive prevalence rate,  
Couple Years of Protection

**2.12 WHAT IS THE STANDARD INTERNATIONAL DEFAULT NUMBER OF CONDOMS CONSIDERED TO GIVE ONE COUPLE YEAR PROTECTION?**

**2.13 NAME 3 IMPORTANT SKILLS A LOGISTICS ADVISOR NEEDS ....**

Analytical skills, knowledge of logistics, understanding of system operations,

**2.14 WHAT LANGUAGE BESIDES URDU and ENGLISH IS SPOKEN BY MOST PEOPLE IN THIS ROOM?**

.....

**2.15 WHICH FORECASTING METHOD IS BASED ON THE “NUMBER OF INCIDENTS OF A DISEASE?”**

Morbidity

**2.16 NAME TWO STEPS FROM THE MODEL FOR SUPPLY CHAIN IMPROVEMENT.**

- Analyze Data
- Select, Plan, Design, Implement or Monitor Interventions
- Complete Assessment

**2.17 WHAT IS THE DEFINITION OF REPRODUCTIVE HEALTH COMMODITY SECURITY?**

RHCS is achieved when every person is able to choose, obtain and use quality contraceptives and other reproductive health commodities whenever he/she needs them.

**2.18 LIST THREE INDICATORS OF SYSTEM PERFORMANCE**

- Stocked according to plan, duration of stock-outs, % reporting, % accuracy of reporting, stock-out on day of visit, etc.

**Continued on next page**

**2.19 NAME THREE DOCUMENTS THAT ARE USUALLY INCLUDED IN THE STANDARD BIDDING DOCUMENT PACKAGE**

- a) Instruction to bidders
- b) Technical Specifications
- c) Bid data sheet
- d) Schedule of requirements
- e) Bid submission form
- f) Bid Security form
- g) General Conditions of Contract
- h) Special Conditions of Contract
- i) Performance Security Form

**2.20 NAME THREE CHALLENGES THAT PROCURMENT FACES**

- a) Accurate quantification data
- b) Complete technical specifications
- c) Long procurement process
- d) Delays in funding
- e) Quality assurance
- f) Transparency
- g) Limited Human Resource Capacity

**Additional questions may be developed based upon the curriculum if needed or desired**

**Supply Chain Management of Public Health Commodities****COURSE EVALUATION****Course Date:**

Your responses to the following questions will help UHS design future Supply Chain Logistics courses. Please read through the questionnaire and carefully select the response that most accurately reflects your assessment of the course. If you need additional space for writing, use the back of each page.

---

Name (optional):

**A. Please rate your level of satisfaction for the following on a scale of 1 (not at all satisfied) to 5 (very satisfied) by circling a number below:**

	<b>Not at all Satisfied</b>		<b>Somewhat Satisfied</b>		<b>Very Satisfied</b>
1. Objectives of the course	1	2	3	4	5
2. Organization of the sessions	1	2	3	4	5
3. Use of Visual Aids	1	2	3	4	5
4. Student Workbook	1	2	3	4	5
5. Small group work	1	2	3	4	5
6. Group size	1	2	3	4	5
7. Level of detail	1	2	3	4	5
8. Pace of the sessions	1	2	3	4	5
9. Length of the course	1	2	3	4	5
10. Course administration	1	2	3	4	5
11. Overall organization of the course	1	2	3	4	5

Go to the next page ...

**B. Please check the appropriate column in the chart below to indicate what you believe your skill level is in each of the following activities after completing the course using the following rating scales.**

**SKILL LEVEL**

**1 =** cannot perform this task with the skills I currently possess

**2 =** can perform this task with assistance

**3 =** can perform this task without assistance

Task	Skill Level		
	1	2	3
1. I can describe the purpose of a logistics system, list the major activities of logistics management, and describe the relationships among these activities.			
2. I can identify the basic elements of a logistics management information system (LMIS), analyze a LMIS, and make recommendations for improving a LMIS.			
3. I can list the basic guidelines for proper storage to ensure health commodity quality.			
4. I can assess health commodity stock status at a local and national level.			
5. I can determine appropriate order quantities using maximum-minimum inventory control procedures.			
6. I can define quantification and describe the steps in the quantification process.			
7. I can describe a variety of methods for preparing a short-term forecast of health commodity needs.			
8. I can describe logistics system performance indicators, as well as monitoring and evaluation tools that can be used to measure the performance of logistics systems			
9. I can describe the concept of commodity security and the role of logistics in assuring commodity security.			
10 I can identify the key steps in the international competitive bidding process			
11 I can describe the importance of contract performance monitoring			
12 I can apply basic logistics principles to the management of a variety of health commodities, including contraceptives, Essential Drugs, and TB and malaria drugs.			

**C. Please answer the following questions:**

1. What did you like best about this course?
  
  
  
  
  
  
  
  
  
  
2. What did you like least about the course?
  
  
  
  
  
  
  
  
  
  
3. In your opinion, how well has this course prepared you to perform your job with respect to logistics management?  
  
\_\_\_\_\_ I feel somewhat prepared.  
  
\_\_\_\_\_ I feel adequately prepared.  
  
\_\_\_\_\_ I feel well prepared.  
  
\_\_\_\_\_ Does not apply
  
  
  
  
  
  
  
  
  
  
4. Please tell us how, in your opinion, we could improve this course, or any other comments you would like to make. Please write on the back of this sheet as needed. Your specific responses will be appreciated.

**THANK YOU FOR COMPLETING THE COURSE EVALUATION FORM!**

## **Suggested Term Paper and Homework Assignments**

Dear Lecturer, below you will find an outline for the course Term Paper and suggested homework assignments. Both are intended to be used to reinforce and extend the lessons learned in course.

### **Term paper**

Each student is required to submit a term paper which will account for 25% of the course evaluation. Following are four thematic areas for a term paper:

1. Utilizing the consumption data of contraceptives reported in LMIS, perform quantification for next fiscal year for any of the contraceptives. (The exercise will be done for real consumption data available in LMIS for the next fiscal year – July to June. An estimated growth in demand is kept at 5%)
2. Procurement assignment. Mapping the Procurement Process. Select a recent public sector procurement of a health commodity (medicines, vaccine or contraceptive) with a total value greater than 100,000,000 rupees (1 million USD). Identify and map the major steps in the procurement process from funding approval to delivery of the product. Each major step should include a narrative that describes; the actions required, the parties responsible for those actions, the regulations and procedures that must be complied with, any problems or delays encountered, and how much time was required to complete each step. A sequential timeline diagram that identifies each major step and the time for completion should be prepared.
3. Select a district store or warehouse, assess the storage conditions (temperature, humidity etc.) for all the health products available at the warehouse and recommend cost effective and feasible strategies to improve storage conditions in line with storage guidelines.
4. Analyze the pipeline and reporting for at least two important health commodities and write a report on it.

Students should select one theme as their area of research / assessment and write a detailed report on it. Each student must first develop a two to three page proposal to outline their work. The proposal should include the following components:

1. Background (includes problem statement or challenge being faced)

2. Methodology (could be qualitative research, quantitative research, and / or literature review)
3. Plan of analysis

Each proposal should be submitted to the assigned supervisor within first three weeks of the start of the course. Students will review and finalize the proposal in the light of the recommendations. Students will start implementing their project only after approval of their proposal by the supervisor.

#### Report outline

Following are the key components of the final report to be submitted

1. Background (reviewed and refined in the light of findings)
2. Methodology (a detailed explanation of actual methodology employed)
3. Results (should be a meaningful analysis of the challenge within the global, regional and local context)
4. Discussion (should include scientific analysis and comparisons of results and cost effective and feasible recommendations for a Pakistani context)

## Home Work

Below are some suggested homework assignments for the students taking this course. These will reinforce the lectures that you provide and are fundamental for understanding the principles of public health logistics. In order to do these each student will need to have a copy of the Logistics Handbook (2011) from USAID|DELIVER and internet access to complete the E-Learning sessions. Please include additional assignments as you wish.

### Notes for using the E-Learning Sessions

Have students complete the distance learning modules at JSI's e-learning site which can be found at <http://elearning.jsi.com/>. These are interactive and broken down into reasonable sized chunks of information. Each takes roughly one hour to get through although some can take closer to two like Module 9. It is strongly recommended that the Lecturers take these e-learning sessions themselves before assigning them.

Students will need to register first in order to get access to the modules. They will need to keep their log in and password information handy for future access to the 8 modules that they will complete for this course. The password requirements are a bit strict so have them write this down in a place they will remember to make it easy for them in the future.

The Lecturer may want to practice registering and finding the modules the first time on their own and then show students how to do this to make it easier for them. Once you have registered and logged in look for the 'Courses' tab. There you will see listed all 8 topics that are covered in these e-learning sessions.

Students must get an 80% or better to pass each module test. If desired, students can be asked to print out the results of each assessment. There is also a certificate of completion after students have gone through and successfully completed all 8 modules. Students can be asked to produce this as proof of completion and competence.

## **Homework by Session**

### **Session 2 Setting the Context of the Course: Commodity Security**

- Read Logistics Handbook – Chapter 1 Introduction to Logistics
- Take Distance Learning Session 1 Introduction to Logistics

### **Session 3 Introduction to Health Logistics Systems**

- Muhammed Tall's Field Notes with Happy Baby NGO – Read and answer questions for Memo's 1, 2, 3 and 4

### **Session 4 Logistics Management Information Systems**

- Take Distance Learning Session 2 LMIS
- Read Logistics Handbook – Chapter 4 Logistics Management Information System
- Muhammed Tall's Field Notes with Happy Baby NGO – Read and answer questions for Memo 5

### **Session 5 Health Commodity Storage and Distribution**

- Take Distance Learning Session 6 Storage of Health Commodities
- Read Logistics Handbook – Chapter 8 Storage and Distribution

### **Session 6 Assessing Stock Status**

- Take Distance Learning Session 3 Assessing Stock Status
- Muhammed Tall's Field Notes with Happy Baby NGO – Read and answer questions for Memos 6 and 7

### **Session 7 Max-Min Inventory Control Systems**

- Read Distance Learning Session 4 Max/Min Inventory Control Systems
- Take Distance Learning Session 5 Selecting Max/Min Inventory Control Systems – better for second half of the session
- Read Logistics Handbook – Chapter 10 – Logistics System Design

### **Session 9 Assessing Stock Status at Any Level**

- Read Logistics Handbook – Chapter 3 Assessing Stock Status

### **Session 11 Assessing Logistics Systems**

- Muhammed Tall's Field Notes with Happy Baby NGO – Read and answer questions for Memos 7 and 13

### **Session 13 Quantification of Health Commodities**

- Take Distance Learning Session 8 Quantification of Health Commodities – approximately 2 hours to complete
- Read Logistics Handbook - Chapter 5 Product Selection
- Read Logistics Handbook - Chapter 6 Quantification of Health Commodities

**Session 14 Procurement**

- Read Logistics Handbook – Chapter 7 Health Commodity Procurement

**Session 15 Monitoring and Evaluation**

- Read Logistics Handbook – Chapter 9 Monitoring and Evaluation of Supply Chains

Below please find the case study assignments for the Muhammed Tall and the Happy Baby NGO.

## Muhammed Tall's Field Notes with Happy Baby NGO

Welcome to Acme Pharmaceutical's headquarters. I am the Acme chief. Several days ago, our logistics expert, Muhammed Tall, disappeared while on assignment in Neighboria, where he had been working to help managers of the Happy Babies non-governmental organization (NGO) improve their logistics system. When several Acme employees and I went to his hotel room at the Center City Lodge, we discovered that he had checked out. He left his briefcase and laptop computer, but not his clothes. We printed his files on Happy Babies. Although the hotel staff remembers Muhammed leaving the hotel, they do not know where he went. Muhammed's files are almost complete. He has not, however, written a report to the NGO. I have written some important questions on the printouts. Please help us write Muhammed's report. Attached are his files, in date order. Please answer the questions that follow each memo.

This is the earliest memo we found:

### **Memo #1**

**To: Acme Chief**

**From: Muhammed Tall**

**Reference: My visit to Neighboria**

I arrived in Neighboria to assist the Happy Babies NGO in logistics for contraceptives and other medical supplies. Everyone here seems committed to improving the availability of high-quality supplies. While here, I will prepare regular progress reports for you to review. I will be traveling throughout Neighboria during the next few weeks, and it may be difficult to contact me. Please send messages to me through the office of the Director of Happy Babies.

**Before reading the memos and completing the assignments, read chapter 1 of *The Logistics Handbook*.**

## **Memo #2**

**To: Acme Chief**

**From: Muhammed Tall**

**Reference: My visit to the Happy Babies NGO Clinic in Medville**

Today, I visited Dr. Emily Lead, the director of the Happy Babies NGO clinic in Neigboria's fourth largest city, Medville. She took me on a tour of her facility. The clinic has a nice waiting area with many educational materials and several comfortable chairs.

Dr. Lead told me that they offer a wide variety of reproductive health services that focus on family planning. They also offer antenatal, pregnancy, and post-natal care, and sexually transmitted disease (STD) prevention and treatment, and immunizations.

There are four patient rooms, each set up a little differently. In the first room, Dr. Lead told me that they offer care to pregnant patients, including post-natal care (with immunizations) and pap smears. The room is equipped with a scale, exam table, autoclave, and equipment for gynaecological exams. Latex gloves, KY jelly, and antiseptics are available, and there are dozens of pregnancy test kits stacked in a corner of the room.

Two of the patient rooms are set up for contraceptive counselling. In these rooms there are contraceptives and models for counselling. HIV/STD prevention cases are seen in these rooms, as well as testing for pregnancy. While one room has gloves available for examination, the other room has none.

Dr. Lead tells me that the nurses complain that they do not have enough gloves. To respect the privacy of the patients, the nurses do not want to enter a room to take gloves from one room to another.

Dr. Lead explains that they offer condoms, oral pills, vaginal foaming tablets, intrauterine devices (IUD), and injectable contraceptive methods. I asked her about progestin-only contraceptives for women who are breastfeeding. She told me that she ordered the mini-pill Ovrette, but received only the combined oral contraceptive (COC) pill Lo-Ovral.

In the last room, they diagnose and treat STDs. Latex gloves, drugs, STD test kits, and various antiseptics were available. I saw several test kits with expired items. "We ordered too many pregnancy test kits from the hospital," Dr. Lead told me, "and now I cannot afford to replace the STD test kits." This clinic is not fulfilling all of the six rights.

**Your Assignment:**

1. For each of the six rights, state whether or not it is being followed at this clinic.
2. For each right that is not being followed, suggest how this situation could be improved.

Your Answers (Write your answers in the space below or on a separate sheet of paper.)

### **Memo # 3**

**To: Acme Chief**

**From: Muhammed Tall**

**Reference: My Visit to the Happy Babies NGO Central Office**

Today, I visited the central office of the Happy Babies NGO. They operate 25 clinics in Neighboria, including Dr. Lead's clinic in Medville, and three hospital facilities. The largest hospital, located in Neighboria's capital, Center City, also houses the NGO's administrative office and the central warehouse. Happy Babies has 300 community outreach volunteers who receive supplies from the clinics. Head pharmacist Michael Rocher, is in charge of their medical supplies. He explained that his main goal is to "make sure that the products we need are available when they are needed." He explained that he and the pharmacists from the clinics meet once each year to determine our needs for future years. "Everything changes," he told me, "and we want to be flexible in our thinking, so we can respond appropriately."

I asked him if he was familiar with the activities of a logistics system. He immediately mentioned "quality control." He said it was very important that they receive good quality supplies. He said they inspect all supplies coming from manufacturers. He also mentioned that it is important to monitor the quality of supplies leaving their warehouse. "It would be wasteful to ship supplies that are about to expire to the clinics," he explained.

He said that an important logistics activity was to ensure that they did not have either too many or too few supplies. "We do not have the money or space to store large quantities, so we want to ensure that we are making an appropriate order."

We discussed the importance of monitoring the flow of supplies in the system. "I try to always know which facilities have supplies and where shortages may occur." He also noted that money is an important consideration. "Without money, we cannot buy our supplies."

We discussed the importance of other activities in a logistics system. To make our discussion easier to follow, I drew a picture of the relationship among the activities. "This makes sense." Pharmacist Rocher told me. "Now I understand how our new policy to distribute condoms to sexually active youth might affect our logistics system. The relationship is clear."

### **Your Assignment**

1. What activities did Muhammed and the head pharmacist discuss that support the six rights? Which activities are missing from the pharmacist's explanation and discussion?
2. What is the picture that Muhammed Tall drew? What is one reason that Pharmacist Rocher said the drawing helped him understand the new policy for condom distribution?

## **Memo # 4**

**To: Acme Chief**

**From: Muhammed Tall**

**Reference: Key terms and comparisons**

Since coming to Neighboria, I realize that some terms I use might not be clear. I need to help others understand special terms or meanings. For example, Dr. Lead told me that she was concerned about serving her patients. When I used the word "customer" she was confused. I told her why we also use the term "customer."

Head Pharmacist Rocher also told me that the term "lead-time" is one he has heard, but does not know what it means. I asked him to explain the ordering procedure for the hospitals, clinics, and community-based volunteers.

He told me the following:

- At the end of each quarter, the hospitals complete their reports.
- They usually mail their requests to him, and the mail takes about 10 days.
- It takes about five days for him to review the reports and (a) distribute the supplies.
- He usually sends the hospitals what they ask for, unless there is an error in their calculations.
- It takes about three days for the trucks to go from Center City to each hospital.
- The hospital pharmacies are usually quite busy, so it may take another two days for the hospital pharmacist to put the supplies on the shelves.
- Hospitals (b) distribute some supplies directly to customers who come for service, but most supplies (c) are distributed to the clinics.
- For the clinics, he told me that the nurses take their report to the hospital each month, and they use their personal transportation.
- The pharmacist at the hospital reviews their request, calculates their needs, and (d) distributes the supplies to take back to the clinic. The nurse can return to the clinic the same day. Most nurses, however, spend the night in town and return the next morning.

- At the clinic, the nurses immediately place the supplies in their cabinets.
- Clinic supplies are (e) distributed to customers and (f) are distributed to the community-based volunteers. There are 300 community-based volunteers helping the Happy Babies NGO.
- The community-based volunteers visit the clinic many times each month. They either walk or use public buses.
- Community-based volunteers request the supplies they need and the doctor or nurse in charge of the clinic (g) distributes them, with the supplies, all in less than one day.
- Volunteers supplies (h) are distributed to customers living in the community.

Using this information, I explained the term “lead time” to Pharmacist Rocher, and calculated the lead time for the hospitals and clinics.

He seemed confused about the term “pipeline.” When I asked him what he meant by pipeline, he said that the pipeline included all the storerooms where supplies are kept. He left out an important part of the definition.

When I asked Pharmacist Rocher the number of service delivery points (SDP) for Happy Babies, he told me they have 25 clinics and also operate three hospitals. He asked me how many SDPs that would be.

### **Your Assignment**

After reading Muhammed’s report, answer the following questions on the following blank pages:

1. Why does Muhammed Tall use the term “customer” instead of “patient”?
2. What is the lead-time for hospitals from the main office? What is the lead-time for clinics from hospitals? What is the lead-time for community-based volunteers from clinics?
3. Part of Pharmacist Rocher’s definition of pipeline is missing. What is it?
4. Draw the pipeline for the Happy Babies’ logistics system.
5. How many SDPs are there in the Happy Babies’ logistics system?
6. Is the relationship a *push* system or a *pull* system for the following:
  - a. Between the central stores and the hospitals

- b. Between the hospitals and the clinics
  - c. Between the clinics and the community-based volunteers
  - d. Between the community-based volunteers and their customers
7. Muhammed's memo uses the term "distribute" in his descriptions, but the term should be "issue" or "dispense," as appropriate. Please substitute the correct term for each of the following uses in memo #4:
- a. distribute
  - b. distribute
  - c. are distributed
  - d. distributes
  - e. distributed
  - f. are distributed
  - g. distributes
  - h. are distributed
8. Is the Happy Babies logistics system integrated or vertical? Explain?

Before continuing, read chapter 2 of *The Logistics Handbook*

## **Memo # 5**

**To: Acme Chief**

**From: Muhammed Tall**

**Reference: Managing Information at the Happy Babies Clinics**

Today, I visited a rural clinic for the Happy Babies NGO in Littleton. This clinic reports to the Southland Hospital of the NGO. During my conversation with Nurse Jane Assuagme, charge-nurse for the clinic, we talked about the forms she is required to complete. "We collect so much information," she told me, "I feel like I spend half of my time completing forms! Why does the hospital ask us to collect so much information?" First, I told her why we collect information. Then, I explained there were a number of decisions that could be made from the information. These decisions could affect her clinic, the Southland Hospital, or perhaps the entire Happy Babies NGO.

She also asked me what information is essential and what information is not. I told her that while much of the information she collects is quite useful, only three pieces of information form the essential data needed to run a logistics system.

Nurse Assuagme showed me the forms she must complete for the family planning section of the NGO. I am attaching a copy of each of the forms to this report. I have some suggestions for improving these forms. We can discuss them when I return.

Nurse Assuagme mentioned that she was recently trained in completing forms for community-based volunteers, who would begin working from her clinic in the coming months. She could not remember if she should complete one re-port for all volunteers and one report for the clinic or one report for both the volunteers and the clinic, combined. I explained the difference between the two methods of reporting and why the differences are important.

The nurse was confused about a new report she receives each month, the Feedback Report. She asked me why she got this report, with a list of the other clinics that report to the Southland Hospital. and what was she supposed to do with it. I explained the report. I am attaching a copy of her most recent feedback report.

Memo 5 **Form 1**HAPPY BABIES NGO  
FAMILY PLANNING SECTION

Name of Clinic:											Month:			Year:		
-----------------	--	--	--	--	--	--	--	--	--	--	--------	--	--	-------	--	--

Method of Contraception	1 <sup>st</sup> Visit					Revists									
Lo-Femenal	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
Ovrette	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
All Other Oral	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
Condom	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
DepoProvera® Injectables	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
Vaginal Tablet	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
CuT380a IUD	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
Pregnancy Test	00000	00000	00000	00000	00000										
	00000	00000	00000	00000	00000										
Other	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
Clients Counseled	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000
	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000	00000

Notes: Tick one circle for each unit dispensed to a client.

## Memo 5 Form 2

Min. Stock: \_\_\_\_\_

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Memo 5 **Form 3****Happy Babies NGO**

Facility Name:

Section:

Facility Location:

To (issue point) :

Please issue the stores listed below to (point of use) :

Code No.	Item Description	Unit of Issue	Quantity Required	Quantity Issued	Value	Remarks Purpose

Account No.:

Date

Requisitioning Officer:

Designation:

Signature:

Issued by:

Signature:

Date

Received by:

Designation:

Signature:

MONTH:

YEAR:

Memo 5 **Form 4**

MONTH:	YEAR:
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**HAPPY BABIES NGO  
FAMILY PLANNING SECTION**

Clinic Location:	Hospital Location:
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**SERVICE STATISTICS**

	Lo-Femenal	Ovrette	Condom	Depo-Provera®	Vaginal Tablet	CuT380a IUD	TOTAL
1 <sup>st</sup> Visit							
Revisits							

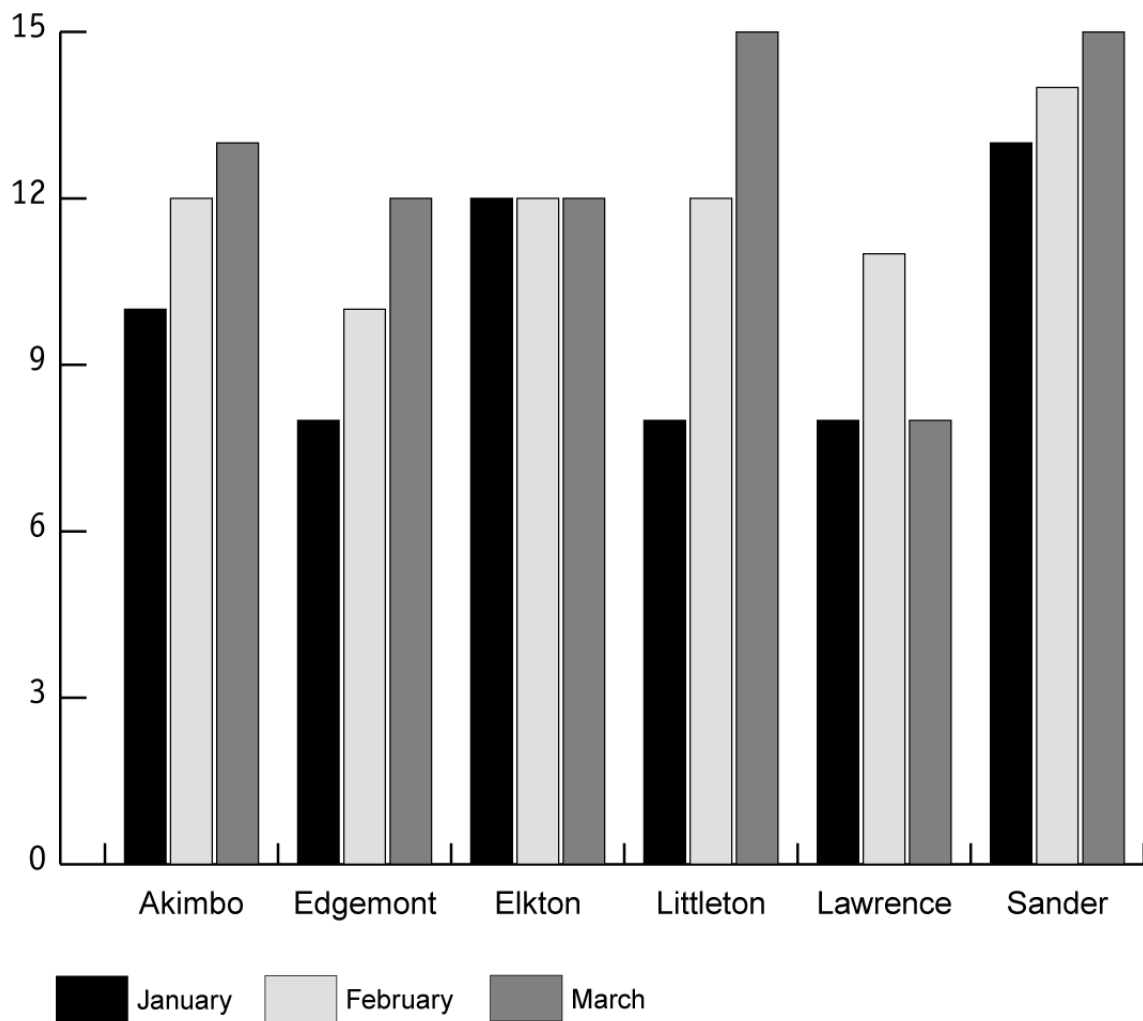
**INVENTORY CONTROL**

	Lo-Femenal	Ovrette	Condom	Depo-Provera®	Vaginal Tablet	CuT380a IUD	Pregnancy Test
Beginning Stock							
Quantity received							
Quantity dispensed							
Stock on hand							

Completed by: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

Memo 5 **Form 5**

**Quarterly consumption of iuDs by clinic, by Month, for clinics reporting to the southland hospital**



**Your Assignment:**

Answer the following questions on this page and the following blank page:

1. What do you think Muhammed said when he explained why we collect information?
2. What types of decisions can be made using logistics information?
3. What three data items are essential for managing a logistics system?
4. For each of the attached forms, answer the following questions:
  - a. What type of form is it?
  - b. What is the purpose of the form?
  - c. What essential data should be included on the form?
  - d. What change(s) could you make to the form to make it more useful?
5. When the volunteer workers begin reporting to Nurse Assuagme, should she complete one report for the volunteers and one report for the clinic or one report for both the volunteers and clinic combined? Why is the answer important?
6. Why does the nurse receive the feedback report Quarterly Consumption of IUDs by Clinic by Month for Clinics Reporting to the Southland Hospital? What should she do, if anything? What could she learn from the report?

## Memo # 6

**To: Acme Chief**

**From: Muhammed Tall**

**Reference: Assessing Stock Status**

Head Pharmacist Rocher suggested that I accompany him on a supervisory visit to the Happy Babies Clinic in Smallville. Nurse Henderson met us when we arrived. She was glad to see Pharmacist Rocher and had several questions to ask him. I made notes about what I observed during their conversation.

**Nurse Henderson:** I'm glad to see you Pharmacist Rocher. I am a recent graduate of the nursing program, and have been appointed to manage the clinic here in Smallville. When I arrived, my predecessor Nurse Rachett had already departed for her new posting at another clinic. My only source of information is an old manual I found in the desk. I read it, but I am not sure if the information is accurate. I am concerned because, starting next month, I will begin supervising community-based volunteers from the clinic. I want to make sure I do my calculations correctly.

**Pharmacist Rocher:** I would be happy to help you. May I ask you some questions? Then, I can understand your concerns and help you.

**Nurse Henderson:** That sounds great. I hope I know some of the answers to your questions!

**Pharmacist Rocher:** Do not worry too much if you do not know the answer. I am here to help you. My first question is about assessing stock status. Can you tell me what "assessing stock status" means?

**Nurse Henderson:** I think assessing stock status means knowing when to make an order.

**Pharmacist Rocher:** Can you tell me what information is needed to assess stock status?

**Nurse Henderson:** I need to know how much of each product I received this month and how much of each product I give to clients each month.

**Pharmacist Rocher:** Where can you find that information? And, how do you calculate stock status using that information?

**Nurse Henderson:** I can get all of the information I need by looking at the stock cards. To calculate the stock status, I divide the amount of stock I received by the amount of stock I dispensed to clients.

**Pharmacist Rocher:** How many months of data should you use to make this calculation?

**Nurse Henderson:** For the most accurate figure possible, I use all the data I have.

**Pharmacist Rocher:** What would you do if you discovered that consumption was rising or falling rapidly?

**Nurse Henderson:** Consumption that is rising or falling rapidly is called a “trend.” If I see a trend, I would change the amount I order.

**Pharmacist Rocher:** How would you change the amount?

**Nurse Henderson:** If the trend is an increasing one, I order twice as much, and if the trend is a decreasing one, I order half as much.

**Pharmacist Rocher:** Thank you for answering my questions. Let us review your answers, and I can show you how to improve the accuracy of your stock status assessment.

I watched Pharmacist Rocher correct the nurse for six errors. He offered her on-the-job training and Nurse Henderson was eager to learn the correct answers. I think she will be an excellent manager of supplies at this clinic, with Pharmacist Rocher’s guidance. He is an effective supervisor who listens carefully.

After they reviewed the formulas, Pharmacist Rocher and Nurse Henderson worked together to assess her stock status for four of her contraceptive products. To make sure she understood what to do, they assessed the stock status each month for the past six months.

When there was only one month of data, I suggested they use only that month’s data. I suggested that with two months of data, they use both months of data and divide by two. They agreed to continue this process, using all the available data and dividing by the number of months of available data, until they had six months of data.

I feel confident that Nurse Henderson understands how to assess stock status for her clinic.

I am attaching to my report a copy of the forms they used to assess her stock status.

**Reports for Smallville::**

Month: November	Year: 2000						
<b>HAPPY BABIES NGO</b> <b>Family Planning Section</b> <b>Monthly Planning Report</b>							
Clinic Location: Smallville	Hospital Location: Greenville						
<b>SERVICE STATISTICS</b>							
	Lo-Femenal	Ovrette	Condom	Depo-Provera®	Vaginal Tablet	CuT380a IUD	TOTAL
1st Visit	1	3	8	6	0	2	20
Revisits	9	9	12	28	0	0	58
<b>INVENTORY CONTROL</b>							
	Lo-Femenal	Ovrette	Condom	Depo-Provera®	Vaginal Tablet	CuT380a IUD	Pregnancy Test
Beginning Stock	43	388	812	89	100	10	40
Quantity Received	100	200	300	50	0	0	10
Quantity Dispensed	28	12	192	34	0	2	15
Stock on Hand	115	576	920	105	100	8	35
Completed by: E. Rachett		Date: 3/12/01					
Title: Nurse							

Month: November	Year: 2000						
<b>HAPPY BABIES NGO</b> <b>Family Planning Section</b> <b>Monthly Planning Report</b>							
Clinic Location: Smallville	Hospital Location: Greenville						
<b>SERVICE STATISTICS</b>							
	Lo-Femenal	Ovrette	Condom	Depo-Provera®	Vaginal Tablet	CuT380a IUD	TOTAL
1st Visit	2	3	6	6	0	0	17
Revisits	10	11	14	30	0	0	65
<b>INVENTORY CONTROL</b>							
	Lo-Femenal	Ovrette	Condom	Depo-Provera®	Vaginal Tablet	CuT380a IUD	Pregnancy Test
Beginning Stock	115	576	920	105	100	8	35
Quantity Received	0	0	0	0	0	0	20
Quantity Dispensed	32	14	200	36	0	0	17
Stock on Hand	83	562	720	169	100	8	38
Completed by: E. Rachett		Date: 5/1/01					
Title: Nurse							

# Supply Chain Management for Commodity Security: Course Evaluation

MONTH: January	YEAR: 2001						
<b>HAPPY BABIES NGO</b> <b>Family Planning Section</b> <b>Monthly Planning Report</b>							
Clinic Location: Smallville      Hospital Location: Greenville							
<b>SERVICE STATISTICS</b>							
	Lo-Femenal	Ovrette	Condom	Depo-Provera®	Vaginal Tablet	CuT380a IUD	TOTAL
1st Visit	5	1	6	3	0	1	14
Revisits	10	9	10	37	0	0	66
<b>INVENTORY CONTROL</b>							
	Lo-Femenal	Ovrette	Condom	Depo-Provera®	Vaginal Tablet	CuT380a IUD	Pregnancy Test
Beginning Stock	83	562	720	169	100	8	38
Quantity Received	0	0	0	0	0	0	10
Quantity Dispensed	35	10	220	40	0	1	14
Stock on Hand	48	552	500	129	100	7	34
Completed by: E. Ratchett Title: Nurse		Date: 2/2/01					

Month: November	Year: 2000						
<b>HAPPY BABIES NGO</b> <b>Family Planning Section</b> <b>Monthly Planning Report</b>							
Clinic Location: Smallville      Hospital Location: Greenville							
<b>SERVICE STATISTICS</b>							
	Lo-Femenal	Ovrette	Condom	Depo-Provera®	Vaginal Tablet	CuT380a IUD	TOTAL
1st Visit	2	3	4	2	0	3	15
Revisits	12	9	13	40	0	0	34
<b>INVENTORY CONTROL</b>							
	Lo-Femenal	Ovrette	Condom	Depo-Provera®	Vaginal Tablet	CuT380a IUD	Pregnancy Test
Beginning Stock	48	552	500	129	100	7	34
Quantity Received	100	0	200	100	0	0	12
Quantity Dispensed	38	12	204	42	0	3	15
Stock on Hand	110	540	496	187	100	4	31
Completed by: E. Ratchett Title: Nurse		Date: 6/3/01					

Month: November	Year: 2000						
<b>HAPPY BABIES NGO</b> <b>Family Planning Section</b> <b>Monthly Planning Report</b>							
Clinic Location: Smallville	Hospital Location: Greenville						
<b>SERVICE STATISTICS</b>							
	Lo-Femenal	Ovrette	Condom	Depo-Provera®	Vaginal Tablet	CuT380a IUD	TOTAL
1st Visit	10	3	7	6	0	0	26
Revisits	12	6	11	38	0	0	67
<b>INVENTORY CONTROL</b>							
	Lo-Femenal	Ovrette	Condom	Depo-Provera®	Vaginal Tablet	CuT380a IUD	Pregnancy Test
Beginning Stock	110	540	496	187	100	4	31
Quantity Received	0	0	0	0	0	1	15
Quantity Dispensed	46	9	180	44	0	0	12
Stock on Hand	64	531	316	143	100	5	34
Completed by: R. Henderson		Date: 4/3/01					
Title: Nurse							

Month: November	Year: 2000						
<b>HAPPY BABIES NGO</b> <b>Family Planning Section</b> <b>Monthly Planning Report</b>							
Clinic Location: Smallville	Hospital Location: Greenville						
<b>SERVICE STATISTICS</b>							
	Lo-Femenal	Ovrette	Condom	Depo-Provera®	Vaginal Tablet	CuT380a IUD	TOTAL
1st Visit	7	4	4	2	0	2	19
Revisits	11	10	8	45	0	0	72
<b>INVENTORY CONTROL</b>							
	Lo-Femenal	Ovrette	Condom	Depo-Provera®	Vaginal Tablet	CuT380a IUD	Pregnancy Test
Beginning Stock	64	531	316	143	100	5	34
Quantity Received	0	0	0	0	0	0	10
Quantity Dispensed	51	14	144	47	0	2	13
Stock on Hand	24	517	172	96	100	3	21
Completed by: R. Henderson		Date: 6/5/01					
Title: Nurse							

## Your Assignment

**1)** Please note what Pharmacist Rocher said to correct Nurse Henderson during the on-the-job training.

### What Nurse Henderson said:

### What Pharmacists Rocher said to correct her:

a) The purpose of assessing stock status is to know when to order

b) to assess stock status, I need to know how much of each product I received this month and how much of each product I give to clients each month.

c) I can get all of the information I need by looking at the stock cards.

d) To calculate the stock status, I divide the amount of stock I received by the amount of stock I dispensed to clients

e) I would use all of the data I have.

f) If the trend is an increasing one, I order twice as much, and if the trend is a decreasing one, I order half as much.

**2. Fill in the tables below for the stock status assessments observed by Muhammed Tall:**

<b>Lo-Femenal</b>				
<b>Date</b>	<b>Stock on hand</b>	<b>Consumption this month</b>	<b>Average monthly consumption</b>	<b>Months of stock on hand</b>
November 30, 2000				
December 31, 2000				
January 31, 2001				
February 28, 2001				
March 31, 2001				
April 30 2001				

<b>Overette</b>				
<b>Date</b>	<b>Stock on Hand</b>	<b>Consumption this month</b>	<b>Avg monthly Consumption</b>	<b>Months of stock on hand</b>
November 30, 2000				
December 31, 2000				
January 31, 2001				
February 28, 2001				
March 31, 2001				
April 30, 2001				

<b>Condoms</b>				
<b>Date</b>	<b>Stock on Hand</b>	<b>Consumption this month</b>	<b>Avg monthly Consumption</b>	<b>Months of stock on hand</b>
November 30, 2000				
December 31, 2000				
January 31, 2001				
February 28, 2001				
March 31, 2001				
April 30, 2001				

<b>Depo-Provera</b>				
<b>Date</b>	<b>Stock on Hand</b>	<b>Consumption this month</b>	<b>Avg monthly Consumption</b>	<b>Months of stock on hand</b>
November 30, 2000				
December 31, 2000				
January 31, 2001				
February 28, 2001				
March 31, 2001				
April 30, 2001				

Memo # 7

**To: Acme Chief**

**From: Muhammed Tall**

**Reference: Assessing stock status at the Happy Babies Hospital in Greenville**

After our visit to the clinic in Smallville, Pharmacist Rocher and I visited the Happy Babies Hospital in Greenville. The Smallville clinic sends its reports to this hospital. At the hospital, we met the hospital's pharmacist, Mrs. Linda Lamaison.

Pharmacist Rocher explained that Mrs. Lamaison supervises eight clinics from the Greenville Hospital. (He also told me that the Center City Hospital supervises 11 clinics, while the Southland Hospital supervises the remaining six.) Because the area around Greenville is more urban, Mrs. Lamaison clinics supervise only 86 of the nearly 300 total community-based volunteers.

Pharmacist Rocher asked Mrs. Lamaison if she could tell us about the stock status within her facilities. She showed us three summary worksheets she had prepared for the previous six months using a computerized spreadsheet: one each for the community-based volunteers, her clinics, and the hospital pharmacy.

I was concerned that it would be difficult for Pharmacist Rocher and Mrs. Lamaison to decide what data to use when assessing stock status. However, Mrs. Lamaison quickly assessed the stock status for all three levels and the entire group. She demonstrated her skills most effectively when she used the consumption data from all levels to assess the hospital storeroom's stock. "After all," she noted, "the hospital storeroom supplies not only our clinic, but all the clinics and volunteers that come for supplies." Her logistics' skills were impressive.

Attached you will find the condom reports she shared with me.

## Condom Consumption by Month:

Month	Volunteers	Clinics	Hospital Clinic	TOTAL
November 2000	2,320	1,625	385	4,330
December 2000	2,265	1,645	425	4,335
January 2001	2,410	1,685	430	4,525
February 2001	2,395	1,800	375	4,570
March 2001	2,450	1,815	410	4,675
April 2001	2,390	1,820	410	4,620
TOTAL	14,240	10,390	2,435	27,055

## Condom Stock on Hand by Month:

Month	Volunteers	Clinics (incl. hospital)	Hospital Storeroom	TOTAL
November 2000	4,710	4,600	13,300	22,610
December 2000	4,570	4,800	13,200	22,570
January 2001	4,830	4,900	13,400	23,130
February 2001	4,730	5,200	13,500	23,430
March 2001	4,200	5,400	13,200	22,800
April 2001	3,900	5,900	12,300	22,100
TOTAL	26,940	30,800	78,900	136,840

## Hospital Condom Issues by Month:

Month	Quantity Issued
November 2000	6,500
December 2000	5,300
January 2001	4,800
February 2001	4,900
March 2001	5,400
April 2001	6,200
TOTAL	33,100

**Your Assignment**

1. Complete the following table to assess the condom stock status at the end of April. Be sure to use the appropriate data.

Level	Stock on Hand	Average Monthly Consumption	No. of Months of Stock on Hand
Volunteers			
Clinics			
Hospital Storeroom			
Entire Area			

2. Complete the following table, based on your assessment of stock status for each level and the entire area.

Level	Order Interval	Situation: Understocked/ Adequately Stocked/ Overstocked
Volunteers	Monthly	
Clinics	Monthly	
Hospital Storerooms	Quarterly	
Entire Area	Monthly/Quarterly	

3. Which assessment of stock status is preferred— only the stock status of the hospital storeroom or the stock status of the entire area? Why?

**Memo # 13**

**To: Acme Chief**

**From: Muhhamed Tall**

**Reference: My initial assessment of Happy Babies**

While writing my report for the visit to Happy Babies, I found my initial assessment. I realized that, while I knew something about logistics, I was just learning to be a good consultant. Happy Babies was a very different place then.

The first visit was very confusing. I remember taking a long time to write down what I thought was the purpose of the assessment visit. I am glad that the visit resulted in so many improvements, both for Happy Babies and myself.

My job was easier because some important people at Happy Babies showed their interest in making improvements. This is a quote from my original report:

In my initial assessment, I found the staff at Happy Babies to be very interested in logistics. There are several people at the central offices that want to see more done to improve the logistics system. Dr. Diallo, Dr. Lopez, Dr. Smith, and Dr. Chang all seem to be anxious to see the logistics system improved. I hope they can help us. I visited as many sites as possible, but I am having trouble gathering the information I need. There does not seem to be enough time.

I know now that I would have decided differently how to gather information about the system.

The following sample from my report shows how my consultant skills needed to be strengthened:

The list of questions I developed is not resulting in the answers I need. I rephrased the questions, but people do not always understand. For example, the storerooms at the warehouses are poorly organized. I told one of the hospital pharmacists that he should monitor the shelf life better and pay better attention to his 'maxes' and 'mins.' He did not seem to know what I was saying, and he got upset with me. When I tried to show him what to do, he refused to answer any additional questions. I have collected so much data, but I do not know how to organize it.

With my current consulting skills, this would never happen. And, with my knowledge of logistics, I could easily organize the data.

I also smile when I remember the challenges they had in completing forms at the clinic level. That was an important learning experience for the managers of Happy Babies and me. This is what I said:

*I have spent a great deal of time with the clinic nurses and their forms. The forms are very difficult to fill out. Frequently, the nurses do not fill them. I have only seen a few forms, but enough to know that the nurses' math skills are unsatisfactory. Their stock cards do not match what is on the shelves. I have tried to help them, but they do not have time to listen. Their reports have a lot of mistakes. It would be better if they could easily check their math on the forms, but I do not have experience designing forms. I wonder if they are telling me the truth about what is going on. Their answers definitely do not match what I see on their shelves.*

I could have written a better initial report if I had used some logistics indicators to describe these problems. For example, I could have said, "Only 60 percent of clinic reports were received by the hospital within five days of the beginning of the following period." I could have used or created other indicators.

Then, I remembered some of the problems at the time. The nurses were discouraged with their jobs. There was a shortage of spare parts for the hospital trucks; supplies were not being delivered. Many community-based volunteers were unable to come to the clinics. Some clinic nurses were able to borrow a motorcycle or get someone in their village to drive them to the hospital to pick up supplies, but the transportation system was not working well. I am glad I included this important information in my report.

The ordering system was very confusing. This is how I described it:

*At some of the clinics, the nurses told me that they expect the pharmacist at the hospital to decide the quantity of supplies to send them. But, when I talked to the pharmacist, she told me she expected the clinics to send their reports with their request for supplies. It is not surprising that many clinics have stockouts. When I asked the clinics and hospitals how much stock they should keep, they said they should have enough to last an entire year because purchases are made annually. I was surprised when I heard this, but now I understand why some clinics have so much stock and some have none at all. Volunteers report that they do not understand how or why they receive the quantities they are issued. In talking to senior Happy Babies managers, I now know they have no system for inventory control.*

Some of the problems I cleared up immediately with a little explanation. Some problems required an improved system design and training. As before, if I had used some logistics indicators to describe this situation, I could have helped the managers understand the strengths and weaknesses of their system more clearly.

At the time of the visit, the hospital storerooms were not much better prepared in logistics than the clinics. This is what I said about them at the time:

*The hospital storerooms are no better than the clinics. Storage conditions are poor. The storerooms have evidence of rodents, and in one clinic there are old soda bottles lying around. Some of the products are expired, and these are mixed in with the good products. The rooms are dirty, and few items are labeled. Unfortunately, none of the pharmacists have been trained in logistics. They all had some training in how to complete forms, but that's all. However, they do a good job managing the reports. They are able to attach reports from all clinics to their report.*

I remember trying to list the problems with the system. Then, I remember writing the recommendations and preparing the implementation plan. I am glad that the managers at Happy Babies were interested in adopting my recommendations, with some modifications that helped my plan fit their scheduling and funding cycles.

While there are still some logistics concerns for Happy Babies, I feel this visit demonstrates that Happy Babies continues to serve its customers well.

## **YOUR ASSIGNMENT**

1. Why did Muhammed assess the logistics system?
2. How could Muhammed have eased his workload?
3. What consulting skills needed improvement during the initial visit?
4. How could Muhammed have organized his data better?
5. How could Muhammed have improved his approach when he interviewed the nurses?
6. What is one indicator Muhammed could have used to describe the problems he encountered with the forms? What steps could he take to solve the problems with the forms?
7. Was Muhammed's memory about the shortage of spare parts and transportation challenges important? How?
8. Muhammed noted that for the problems he encountered, there were two solutions, one of them short-term. What was the problem and how was he able to easily correct it? What was the second problem that needed a long-term solution?
9. What is one indicator Muhammed could have used to describe the inventory control problems he encountered?
10. How could the hospital pharmacists improve storeroom conditions?
11. What were the major problems Muhammed identified for Happy Babies?

12. For the two most important problems, make recommendations. Be sure to include all the elements of a proper recommendation (define or state the problem, state the consequences of the problem, etc.).

13. Create an implementation plan to correct the problem that staff cannot complete the forms, and the forms may be inappropriately designed. Begin by writing the problem statement and a recommendation. Be sure to include all of the elements of a proper implementation plan (list the activity to be undertaken, give an indicator/measurement of completion/ success, etc.).

14. Describe Muhammed's role in providing assistance. What skills did he use? What could Muhammed have done differently in this assessment?