Session 7. Identifying Problems with Medicine Use

Participants’ Guide
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SESSION 7. IDENTIFYING PROBLEMS WITH MEDICINE USE

Purpose and Content

The purpose of session 7 is to introduce participants to methods for identifying medicine use problems in hospitals and primary care clinics. Many medicine use problems may be difficult to detect on a day-to-day basis unless they are obvious. The use of the methodologies in this session will enable Drug and Therapeutics Committee (DTC) members to evaluate the pharmaceutical distribution system more closely and discover those medicine use problems that may have a significant impact on patient care.

This training module, which is the longest session in the DTC training series, is intended to be presented over a full day and followed by session 8, “Understanding the Problems Associated with Medicine Use—Qualitative Methods.”

Objectives

After attending this session, participants will be able to—

- Describe how indicators can be used to identify medicine use problems
- Perform a prescribing indicator study on a sample of prescriptions and explain how it can be used to identify medicine use problems
- Discuss the use of aggregate data including defined daily dose (DDD) to analyze the consumption of medicines
- Perform an ABC analysis and explain how it can be used to identify medicine use problems, reduce costs, and improve efficiency in the pharmaceutical supply system
- Discuss how VEN system for setting priorities will assist the DTC in medicine selection, purchasing, and inventory management

Preparation and Materials

Read—

- Participants’ Guide
Further Readings


Introduction

The DTC has many functions and responsibilities, including evaluation and selection of medicines for the formulary, identifying medicine use problems, and promoting strategies to improve medicine use. This session reviews the methods to identify medicine use problems in the health care system.

Inappropriate medicine use results in poor patient outcomes and wastes significant amounts of money and other resources. This problem is worldwide, especially in developing countries. The impact on the health care system of inappropriate medicine use is dramatic and can lead to—

- Reduction in the quality of pharmaceutical therapy leading to increased morbidity and mortality
- Increased cost as a result of using the wrong medicine, dose, route, or amount, and because of treatment failures
- Increased risk of unwanted effects such as adverse drug reactions (ADRs) and the emergence of antimicrobial resistance

The DTC must conduct activities to evaluate and assess medicine use in order to identify those areas that need improvement. The particular medicine problem may not become obvious until analysis of the medicine use is undertaken. Access to information about medicine use can be gained using many different methods. This session discusses the following important activities for identifying medicine use problems—

- Health care facility and hospital medicine use indicators
- Aggregate data on medicine consumption and medicine use
  - DDD
  - VEN analysis
  - ABC analysis
- In-depth investigation of medicine use
  - Prescription audit (patient record review)
  - Drug use evaluation (DUE)
  - Qualitative methods

In-depth investigations utilizing qualitative methods to understand causes of a medicine use problem will be discussed in detail in session 8, “Understanding the Problems Associated with Medicine Use—Qualitative Methods.”

Part A. Identifying Problems with Medicine Use: Indicator Studies

Indicators for Health Care Facilities

Medicine use indicators are intended to measure specific aspects of health provider behavior and medicine use in a hospital or health center. Indicators will provide information to health
care managers concerning medicine use, prescribing habits, and important aspects of patient care. They reflect the status of an important characteristic of the given health care service.

**Characteristics of Sound Indicators**

Indicators selected to assess a health care service should be relevant, easily generated and measured, valid, consistent, reliable, representative, sensitive to change, understandable, and action oriented.

- **Relevant**—An indicator should reflect progress toward stated national or program goals, objectives, or standards.

- **Easily generated and measured**—As far as possible, data for essential indicators should result from normal service and surveillance activities, and they should be found in routine records and reports.

- **Reliable**—Each indicator must give consistent results over time and with different observers. If one observer reports a certain result from a set of data, it is expected that a second observer will report the same result.

- **Valid**—Each indicator must allow a consistent and clear interpretation and have a similar meaning across different environments.

- **Action oriented**—The data needed for an indicator should be useful for those doing the recording, whether they are physicians, pharmacists, nurses, or other staff; the data must lead to necessary action to improve use of medicine.

Indicator studies can serve several useful purposes. They can—

- **Determine where medicine use problems exist**—When an indicator study shows results that are unacceptable to the DTC, then action can be taken to rectify the situation. Change is usually accomplished by comparing health care facilities indicators to determine if they exhibit a significant difference.

- **Provide a monitoring mechanism**—Repeating the study over a period of a year or several years will provide reliable information concerning the use of strategies to alleviate the medicine use problem.

- **Motivate health care providers to improve and follow established health care standards.**

Medicine use indicators have been developed by many different organizations, hospitals, and governments to identify medicine use problems. WHO and the International Network for Rational Use of Drugs (INRUD) have developed indicators for assessing health care and medicine use for primary health care (PHC) in dispensaries, clinics, and hospitals. (See “Action Programme on Essential Drugs” in the WHO manual *How to Investigate Drug Use in Health Facilities.*) These indicators of medicine use (i.e., prescribing, patient care, facility, and complementary indicators) which are basic and highly standardized have been reliably used and tested over years in many different countries. They can be used in almost any
country and, in the hands of trained personnel, will give reproducible results. The different types of indicators developed by WHO and INRUD are described in the sections below.

**Core Medicine Use Indicators**

- Prescribing indicators
  - Average number of medicines per encounter
  - Percentage of medicines prescribed by generic name
  - Percentage of encounters with an antibiotic prescribed
  - Percentage of encounters with an injection prescribed
  - Percentage of medicines prescribed from an essential medicines list (EML) or formulary

- Patient care indicators
  - Average consultation time
  - Average dispensing time
  - Percentage of medicines actually dispensed
  - Percentage of medicines adequately labeled
  - Percentage of patients who know how to take their medicines

- Health facility indicators
  - Availability of EML or formulary to practitioners
  - Availability of a key set of indicator medicines
  - Availability of standard treatment guidelines (STGs)

**Complementary Medicine Use Indicators**

- Percentage of patients treated without medicines
- Average medicine cost per encounter
- Percentage of medicine cost spent on antibiotics
- Percentage of medicine cost spent on injections
- Percentage of prescriptions in accordance with STGs
- Percentage of patients satisfied with the care they receive
- Percentage of health facilities with access to impartial information

These indicators represent a small number of core indicators that have been successfully used. Other indicators can be added as needed to be more complete, but they may not have been tested for reliability as these have. Results with these indicators should point to particular medicine use problems that need further examination in more detail and ultimately a plan to resolve the problem by the DTC.

Performing an indicator study involves planning, logistics, time, and funding. The indicator study will involve—

- Determining objectives, priorities of the study, indicators, and indicator recording forms
- Determining study design according to objectives
  - Monitoring over time and comparing facilities (cross-sectional survey, time series)
  - Evaluation of interventions (randomized controlled trial)
• Defining indicators and data collection procedures
• Pilot-testing the procedures
• Training data collectors
• Randomly selecting facilities in the region from which to collect data
• Obtaining data from approximately 30 medicine use encounters for each facility
• Analyzing data
• Providing results to the DTC for evaluation and follow-up

Typically, researchers collect medicine use data from a sample of health facilities in a region or district. The number of health care facilities from which to obtain data varies but should include at least 20 facilities with 30 prescriptions for each facility. This number would give a total sample of at least 600 prescriptions for applying the indicators to evaluate medicine use. If the objective is to perform the indicator study in one facility, at least 100 prescriptions should be collected per facility or per prescriber at any given time. It is important to perform the study in a time-series format (e.g., every quarter), so the DTC can monitor the prescribing patterns and take appropriate action as needed periodically.

For more information on study designs, sampling, and logistics concerning a particular indicator study please refer to chapter 3 “Study Design and Sample Size” in the WHO manual, *How to Investigate Drug Use in Health Facilities*.

Data collected can be compared to local medicine use statistics, regional statistics, or international statistics. The results can be used to—

• Describe current treatment practices
• Compare the performance of individual facilities or prescribers
• Conduct periodic monitoring and supervision of specific medicine use behaviors
• Identify potential medicine use problems that affect patient care
• Assess the impact of an intervention

Once a potential problem is identified, the DTC must be prepared to formulate a strategy to correct the problem. The strategies that may be used include managerial (e.g., DUE or the use of STGs or structured ordered forms), educational (e.g., face-to-face instruction or in-service education), and regulatory interventions.

**Indicators for Hospitals**

In response to antimicrobial medicine resistance problems worldwide, Management Sciences for Health (MSH) developed a manual for assessment of antimicrobial medicine use in hospitals, *How to Investigate Antimicrobial Drug Use in Hospitals: Selected Indicators* (Management Sciences for Health 2001). As a tool for hospital managers to assess antimicrobial medicine management and use, this manual was designed to contribute to reducing antibiotic misuse.
The MSH manual is intended for use by hospital DTCs, physicians, pharmacists, and managers, as well as medicine use researchers, who want to evaluate and improve antimicrobial medicine use in hospitals. It will allow basic comparisons of antimicrobial medicine use in a hospital over time and between hospitals.

The MSH manual is divided into two sections. The first describes the indicators for antimicrobial medicine use and management according to a standard format, and the second suggests procedures to apply them in a hospital study. The following indicators that were developed are presented in the MSH manual for use by hospitals.

Hospital indicators

1. Existence of STGs and a set of officially sanctioned antimicrobial medicines in a formulary list

2. Availability of a key set of indicator antimicrobial medicines in the hospital stores on the day of the study

3. Average number of days that a set of key antimicrobial medicines is out of stock in a 12-month period

4. Expenditure on antimicrobial medicines as percentage of total hospital pharmaceutical costs

Prescribing indicators

5. Percentage of hospitalizations with one or more antimicrobial medicines prescribed

6. Average number of antimicrobial medicines prescribed per hospitalization with antimicrobial medicines prescribed

7. Percentage of antimicrobial medicines prescribed consistent with the hospital formulary list (which may or may not be a part of the national EML or formulary list)

8. Average cost of antimicrobial medicines prescribed per hospitalization with antimicrobial medicines prescribed

9. Average duration of prescribed antimicrobial pharmaceutical treatment

10. Percentage of surgical patients who received antimicrobial medicine prophylaxis

11. Percentage of patients with pneumonia who are prescribed antimicrobial medicines in accordance with STGs

12. Percentage of antimicrobials prescribed by generic name
Patient care indicators

13. Percentage of doses of prescribed antimicrobial medicines actually administered

14. Average duration of hospital stay of patients who receive antimicrobials

Supplemental indicator

15. Number of antimicrobial medicine sensitivity tests reported per hospital admission including antimicrobial treatment

Other hospital-related indicators were developed in Zimbabwe and Australia and used there to monitor, evaluate, and improve the use of medicine. These indicators were implemented by DTCs in these two countries and include the following—

- Average number of days per hospital admission
- Average number of medicines prescribed per hospital admission
- Percentage of prescribed medicines consistent with hospital formulary list
- Average medicine cost per inpatient day
- Percentage of patients with morbidity due to a preventable ADR
- Percentage of inpatient deaths due to a preventable ADR
- Percentage of patients reporting adequate post-operative pain control
- Percentage surgical patients receiving appropriate antimicrobial prophylaxis
- Average number of antimicrobial sensitivity tests per hospital admission

Activity 1. Calculating Prescribing Indicators from Prescriptions

Using patient prescription records provided to you, calculate the following prescribing indicators—

- Average number of medicines per encounter
- Percentage of medicines prescribed by generic name
- Percentage of encounters with an antibiotic prescribed
- Percentage of encounters with an injection prescribed
- Percentage of medicines prescribed which are from the EML or formulary list

Use worksheet 1 to record your data and calculations. (See annex 1.)

Activity 2. Calculating Patient Care Indicators from Observing Role-Play Consultations

Calculate the following patient care indicators from the participant role-play depicting a physician and pharmacist consultation.

- Average consultation time
- Average dispensing time
- Percentage of patients who knew how to take their medications
Part B. Identifying Problems with Medicine Use: Aggregate Methods

Aggregate data on medicine use can be obtained from many sources in the health care system. Procurement records, warehouse medicine records, pharmacy stock and dispensing records, ADR and medication error records, and patient medical records are all data sources that can be used to obtain a variety of information, including the following—

- Medicine consumption
- Medicine availability
- Medicine cost data for individual medicines and for medicine classes
- Most frequently used medicines
- Per capita use of specific products
- Prevalence of ADRs (from reporting forms or from chart reviews)
- Prevalence of medication errors (from error report forms)

Careful review of these records will provide the DTC with insight concerning medicine use, cost of medicines, incidence of ADRs, errors in administration and dispensing, and other data. The DTC must promptly analyze any identified problems discovered in reviewing these data and institute a strategy to remedy each problem. The following applications can be used to help analyze aggregate data to identify medicine use problems.

**Defined Daily Dose**

Medicine consumption in terms of cost, as used in ABC analysis, can help the DTC check whether the pharmaceutical budget is spent in the most effective way and identify problem medicines to investigate further. The analysis of medicine consumption in terms of unit quantities can help the DTC identify over- and under-use of individual medications or therapeutic groups.

The DDD methodology converts and standardizes readily available product quantity data (such as packages, tablets, injection vials, and bottles) into crude estimates of clinical exposure to medicines, such as the number of daily doses. The DDD, which is the assumed average daily maintenance dose for the medication’s main indication (it is not the actual dose prescribed), is defined globally for each medicine by the WHO Collaborating Centre for Drug Statistics Methodology in Oslo, Norway—http://www.whocc.no/atcddd/—much of the following material has been adapted from the center’s work. The DDD is based on the average maintenance dose for adults, but it can be adjusted to study pediatric medicine use.

Medicines may differ in the number of units, milligrams in tablets or milliliters as oral or injection formulations, in a recommended dose. Converting aggregate quantities available from pharmacy inventory records or sales statistics into DDDs roughly indicates how many potential treatment days of a medicine have been procured, distributed, or consumed. The medicines can then be compared, using units such as—

- DDD per 1,000 inhabitants per day, for total medicine consumption
- DDD per 100 beds per day (100 bed-day), for hospital use

For instance, if the calculations for amoxicillin show that there were 4 DDDs per 1,000 inhabitants per day in 2002, this finding suggests that on any given day, for every 1,000 persons, four adults received a daily dose of 1 g of amoxicillin. If calculations of gentamicin
use are expressed as 2 DDD per 100 bed-days, this would suggest that, for every 100 beds in
the hospital, every day two patients received 240 mg of gentamicin. The assigned DDD for
amoxicillin is 1 g and that for gentamicin is 240 mg.

These DDD units can then be used to compare consumption of different medicines within the
same therapeutic group, which may have similar efficacy but different dose requirements, or
that belong to different therapeutic groups. Medicine use can be compared over time for
monitoring purposes and to measure the impact of DTC interventions to improve the use of
medicines. Consumption in different geographic areas or hospitals may also be compared,
using this methodology. Cost per DDD can also be used to compare the cost of different
medicines within the same therapeutic category, where the medicines have no treatment
duration, such as analgesics and antihypertensives.

Keep in mind the following important points concerning DDDs—

- The DDD is a technical unit of measurement, established by convention, based on
  review of the available information of the doses recommended by the manufacturer,
  published expert recommendations, and medical practice in a selection of countries.
  What is actually prescribed to a patient can vary according to both the illness treated
  and local guidelines. In such situations, the prescribed daily dose is established by
  reviewing a sample of prescriptions and then used to convert readily available
  aggregate data in the same way that the DDD is used. When what is actually
  prescribed differs significantly from the DDD, the reasons and implications should be
  understood for a correct interpretation of the findings.

- DDDs provide a unit of measurement that is independent of price and formulation,
  making it possible to assess trends in medicines consumption and to perform
  comparisons between population groups and health care systems.

- DDDs have not been established for topical medicines, vaccines, general and local
  anesthetics, contrast media, and allergen extracts.

- The DDD method should be used only in settings where reliable procurement,
  inventory, or sales data have been recorded.

The DDD can be obtained from two sources. The official list is published periodically by the
WHO Collaborating Centre for Drug Statistics Methodology in Oslo, Norway. MSH also
publishes assigned DDDs in the International Drug Price Indicator Guide, most recently
Box 1. Example of a Calculation Using DDD

District hospital and clinics use 22.5 million tablets yearly of captopril 25 mg and 3.0 million tablets yearly of captopril 50 mg. This medicine usage is for a population of 2.7 million people.

Calculating the consumption of captopril utilizing DDD methodology would be as follows—

Quantity of medicine used in 1 year multiplied by the strength of the product
\[(22.5 \text{ million} \times 25 \text{ mg}) + (3.0 \text{ million} \times 50 \text{ mg}) = 7.125 \text{ million mg} \text{ (total quantity consumed)}\]

Divide total quantity consumed by the assigned DDD for that medicine (for captopril = 50 mg)
\[7.125 \text{ million mg/50 mg} = 14.25 \text{ million DDD}\]

Divide total quantity by 2.7 million and multiply by 1,000 (this is the population denominator for this method) to obtain the DDD/1,000 inhabitants / year (divide by 365 to obtain DDD/1,000 inhabitants/day)
\[
\begin{align*}
\text{DDD/1,000 inhabitants/year} & = 5,278 \\
\text{DDD/1,000 inhabitants/day} & = 14.46
\end{align*}
\]

This calculated dose could then be used to compare consumption of this medicine to other hospitals, regions, or countries. The DDD can also be used to compare consumption in the same region over extended periods of time.

**VEN Analysis**

The VEN system, in which medicines are sorted according to their health impact into vital, essential, and nonessential categories, is a well-known method to help set priorities for purchasing medicines and keeping stock. The DTC should be involved in the application of this system to the formulary by identifying the VEN class for all medicines approved for the formulary.

- “V” medicines are vital medicines—they are potentially lifesaving, have significant withdrawal side effects (making supply mandatory) or are crucial to providing basic health services.
- “E” medicines are essential medicines—they are effective against less severe but nevertheless significant forms of illness, but not absolutely vital to providing basic health care.
- “N” medicines are nonessential medicine—they are used for minor or self-limited illnesses; they may be formulary items and may be very important, but are the least important of items stocked in the health care system.

Managers can use a number of ways to decide how to focus their efforts to improve their medicine supply. In terms of medicine procurement and inventory management, one way to identify priorities is by applying the VEN system. Regardless of how well a supply system works, there will always be more opportunities to improve the system than a DTC has time and resources to address. Therefore, the DTC and managers of pharmaceutical supply must narrow down the scope of what is manageable and what will provide the best return for their efforts.
This system helps the manager to set priorities for the selection, procurement, and use of medicines according to the potential health impact of individual medicines. The main objective is to give priority to essential, lifesaving medicines as opposed to expensive, nonessential items.

- The VEN analysis requires that managers be able to assign the medicines in inventory to a category of vital, essential, or nonessential. Assignment to the nonessential category does not mean that the medicine is no longer on the system’s formulary or EML. It indicates that the medicine may be considered a lower priority than other medicines on the list.

- VEN classification should be done on a regular basis, as the formulary or EML is updated, or as public health priorities change.

- Some people find three categories difficult and prefer to use only two categories (e.g., vital and nonessential or essential and nonessential). This preference does not matter as long as the categories used are relevant and allow for clear prioritization among medicines.

- Medicine ordering and stock monitoring should be directed at vital and essential medicines.

- Safety stocks should be higher for vital and essential items.

- VEN should be used to ensure that enough quantities of vital and essential medicines are bought first.

- Only reliable suppliers should be used for vital and essential medicines.

- Popularity of the medicine should be of minimal importance. The criteria of proven efficacy and cost-effectiveness should prevail.

The steps in conducting a VEN analysis are as follows—

1. Classify all medicines on the list as V, E, or N.

2. Analyze the N items. When possible, reduce quantities to purchase or eliminate purchases entirely.

3. Identify and limit therapeutic duplications.

4. Reconsider proposed purchased quantities.

5. Find additional funds if needed or possible.

The VEN system provides a valuable service to the health care system. No matter what the current funding is, the DTC (and procurement department) will know what the priorities are for ordering medicines.
**ABC Analysis**

ABC analysis is a method for determining and comparing medicine cost within the formulary system. The basic principles behind the ABC analysis may be applied to a variety of situations in which attention can be given to only a subset of issues or concerns.

The 80/20 rule, also known as the Pareto Principle, is based on observations made by an Italian economist, Vilfredo Pareto. It is also known as “separating the vital few from the trivial many” because for any group of things that contribute to a common effect, a relatively few contributors account for a majority of the effect.

For managers, this principle may be applied to determining which of the many potential improvement opportunities should be pursued first because they would focus their efforts on the few opportunities that would yield the greatest impact.

In terms of pharmaceutical supply, managers know that only a few inventory items account for the greatest expense or consumption. Based on the same thinking as the 80/20 rule, ABC analysis actually identifies three useful tiers for analysis: class A items are the few items that account for the highest cost, highest volume items. Taken together, they account for 70–80 percent of the value of medicines purchased or consumed; class B items comprise the next group of 15–20 percent, and class C includes low-cost or low-volume items. Managers can begin by concentrating their efforts on the relatively few class A items that will yield the greatest impact.

**Applications of ABC Analysis for a DTC**

A DTC can use the ABC analysis to—

- Measure the degree to which actual consumption reflects public health needs and morbidity
- Reduce inventory levels and costs by arranging for more frequent purchase or delivery of smaller quantities of class A items
- Seek major cost reductions by finding lower prices on class A items
- Reduce inventory of items that have limited use, but cost the system large amounts of money
- Provide information for choosing the most cost-effective alternatives and finding opportunities for therapeutic substitution
- Gather information for pharmacoeconomic analysis. ABC analysis will provide basic information for performing a cost-minimization and cost-effectiveness analysis.

Performing an ABC analysis is facilitated by the use of a spreadsheet that will perform the necessary calculations. For example, data from electronic procurement records for a particular hospital can be exported to a spreadsheet for analysis. Although a spreadsheet is not absolutely necessary, it becomes increasingly more useful as the number of line items grows and the complexity of the analysis widens.
The seven steps to perform an ABC analysis are as follows—

1. List all items purchased or consumed and enter the unit cost.
2. Enter consumption quantities for each item over a defined period (e.g., 1 year).
3. Calculate the value of consumption (using acquisition cost).
4. Sort the list in descending order by total value.
5. Calculate the percentage of total value represented by each item.
6. Calculate the cumulative percentage of the total value for each item. Beginning with the first item at the top, add the percentage to that of the item below it in the list.
7. Choose cutoff points or boundaries for A, B, and C medicines. For example—
   - Highest annual usage (accounts for 10–20 percent of items ordered and 70–80 percent of funds)
   - Moderate annual usage (accounts for 10–20 percent of items ordered and 15–20 percent of funds)
   - Lowest annual usage (accounts for 60–80 percent of items ordered and 5–10 percent of funds)

After completion of the ABC analysis, carefully evaluate the results in each class, especially class A. Data analysis will provide important information concerning medicine selection, procurement, and rational use of medicines.

**Drug Use Evaluation**

DUE (sometimes referred to as drug utilization review) is a method of obtaining information and identifying problems in medicine use. When developed and implemented properly, DUE will provide a mechanism to identify medicine use problems as well as provide a means to correct them. DUE can be defined as a system of ongoing, systematic, criteria-based medicine evaluations that will help ensure that medicine use is appropriate. If therapy is determined to be inappropriate, interventions with providers or patients will be necessary to optimize pharmaceutical therapy.

A DUE can be structured so that it will assess the actual process of administering or dispensing a medicine (e.g., appropriate indications, dose, or ADRs) or for assessing the outcomes (e.g., cured infections or decreased lipid levels). Objectives of a DUE include—

- Identifying areas in which additional information and education may be needed for health care providers
- Ensuring that the pharmaceutical therapy meets current standards of care
- Creating guidelines (criteria) for appropriate medicine use
• Enhancing responsibility and accountability in the medicine use process
• Controlling medicine cost
• Promoting optimal medication therapy
• Preventing medication-related problems
• Evaluating the effectiveness of medication therapy
• Stimulating improvements in medication use

The concepts of using DUEs are discussed in more detail in session 8 (“Understanding the Problems Associated with Medicine Use—Qualitative Methods”) and session 10 (“Standard Treatment Guidelines”). Study those sessions to obtain more information concerning this method of identifying medicine use problems.

Activity 3. Performing a VEN Analysis

The DTC and pharmaceutical supply managers can use a number of ways to decide how to focus their efforts to improve medicine supply. In terms of pharmaceutical management and procurement, one way to identify priorities is by applying the VEN system. This system helps the manager to set priorities for the selection, procurement, and use of medicines according to the potential health impact of individual medicines. The main objective is to give priority to essential, lifesaving medicines as opposed to expensive, nonessential items.

The VEN analysis requires that managers be able to assign the medicines in inventory to a category of vital, essential, or nonessential. Assignment to the nonessential category does not mean that the medicine is no longer on the system’s formulary or EML list. It indicates that the medicine may be considered a lower priority than other medicines on the list.

• Form a small group to represent a pharmaceutical selection committee. Have the partially completed worksheet 2 on hand. (See annex 1.)
• Your hospital has received the new budget for the next annual procurement. It is $250,000—$46,046 less than what was used in the previous procurement presented in the ABC analysis on the worksheet.
• Apply the VEN system to the medicines listed and answer the following questions—
  o Which medicines would you assign lower priority for next year’s procurement?
  o Would you reconsider any quantities? Why?
• Select a representative from your group to present your conclusions to the larger group.
Activity 4. Performing an ABC Analysis

Generally, a few medicine items will account for the majority of funds used, and many other medicine items will account for a smaller fraction of funds used. ABC analysis is a simple but powerful technique that can be used to critically review how medicines are used and how funds are spent in a pharmaceutical system.

In this activity, you will conduct an ABC analysis in a stepwise approach using procurement and consumption data. These data will be valuable to the DTC because they will show how certain medicines are using larger percentages of the budget and where there may be a need for closer evaluation by the DTC.

A therapeutic category analysis is also reviewed as part of this activity but may be considered optional.

- Review the seven steps for conducting an ABC analysis and then complete worksheets 2 and 3. (See annex 1.)

- Answer the following questions—
  - How many “A” items are there? “B” items? “C” items?
  - What percentage of all items do “A” items represent? “B” items? “C” items?
  - What is the value of consumption for each category?
  - What percentage of the total consumption is represented by each category?
  - What particular product(s) may need to be reviewed more closely by the DTC because of their consumption?
Activity 5. Performing an ABC/VEN Analysis Using Participants’ Data

Using data that you have brought from your hospital, perform an ABC analysis and VEN analysis on all medicines that are available. Utilize computers available at the course or if your medicine list is short, manually perform the analysis.

Prepare a brief report on your analysis including the following—

- Number of medicines
- Top 10 medicines by value
- Number of medicines in “A” category
- List of all “V” medicine
- Recommendations concerning the formulary from this ABC/VEN analysis

Summary

An important function of a DTC is to identify medicine use problems and to implement corrective measures. Methods to obtain information about medicine use are numerous. This session has discussed a few important areas, including use of health facility and hospital antimicrobial medicine use indicators, ABC/VEN analysis, utilizing DDD, and medicine use evaluation.

Performing an indicator study is useful method to—

- Identify medicine use problems at individual patient level
- Monitor medicine use by physicians
- Evaluate the impact of interventions

Indicators include ones that are useful for the following health care areas—

- Prescribing
- Patient care
- Health care facility
- Hospitals

Other useful methods to identify medicine use problems looking at aggregate data include—

- DDD analysis
- VEN analysis
- ABC analysis
- Patient chart reviews
- DUE

Actually seeing many of the medicine use problems that may occur in a particular health care setting may be difficult. Some will always be obvious, but the vast majority will take analysis and evaluation of data before their adverse effect on patient care is revealed. This close analysis will produce useful information on medicines and therapeutics that will need more in-depth evaluation and ultimately interventions to resolve.
Annex 1. Activity Worksheets

Worksheet 1. Prescribing Indicator Form

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<th>Location:</th>
<th>Investigator:</th>
<th>Date:</th>
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<td>Average</td>
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<td>% of total medicines</td>
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O = No; 1 = Yes
### Worksheet 2. ABC/VEN Analysis—Results of Calculations and Ranking

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<tr>
<th>Product Description</th>
<th>Basic Unit</th>
<th>Unit Tender Price (USD)*</th>
<th>Total Units</th>
<th>Value (USD)</th>
<th>Percentage of Total Value</th>
<th>Rank by Value</th>
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<td>Ampicillin 125 mg/5 ml powder for suspension, 100 ml</td>
<td>Bottle</td>
<td>0.5119</td>
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<td>Benzoin, compound tincture</td>
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<td>0.0067</td>
<td>532,000.00</td>
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<tr>
<td>Benzylpenicillin 1 MU injection</td>
<td>Ampoule</td>
<td>0.5276</td>
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<td>Calcium gluconate 600 mg tablet</td>
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<td>0.0032</td>
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<td>Chlorhexidine 5% solution</td>
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<td>Chlorhexidine/cetrimide 1.5% + 15% solution</td>
<td>Milliliter</td>
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<td>1,552,000.00</td>
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<td>Chloroquine 50 mg base/ml syrup</td>
<td>Milliliter</td>
<td>0.0014</td>
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<td>Chloroxylenol 5% solution</td>
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<td>Dipyrone 500 mg/ml injection, 5 ml</td>
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<td>0.0898</td>
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<td>Erythromycin 250 mg tablets</td>
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<td>Fortified procaine penicillin 4 MU injection</td>
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<td>Hydrogen peroxide 6% solution</td>
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<td>Hyoscine N-butylbromide 10 g tablets</td>
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<td>Metronidazole 200 mg tablets</td>
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<td>1,080,000.00</td>
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<td>Metronidazole 200 mg/5 ml suspension</td>
<td>Milliliter</td>
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<td>Multivitamin tablets/capsules</td>
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<td>0.0022</td>
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<td>Nitrofurantoin 100 mg tablet</td>
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<td>0.0055</td>
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<td>Oxytocin 10 IU injection, 1 ml</td>
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<td>Phenobarbital 60 mg tablets</td>
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<td>Prednisolone 8 mg tablets</td>
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<td>Propranolol 40 mg tablets</td>
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<td>Water for injection 10 ml</td>
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*USD = U.S. dollar*
### Worksheet 3. ABC Analysis—Answer Sheet

**ABC Analysis Answer Sheet**

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<th>Product Description</th>
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<th>Total Units</th>
<th>Value (USD)</th>
<th>Percentage of Total Value</th>
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*USD = U.S. dollar*