REFERENCE GUIDE FOR PHARMACY MANAGEMENT & PHARMACOECONOMICS

SECOND EDITION 2010-2011

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REFERENCE GUIDE FOR PHARMACY MANAGEMENT & PHARMACOECONOMICS

SECOND EDITION 2010-2011

Dedicated To
My beloved
grandmother

PREFACE:

I am very happy to introduce this second edition that covers the major portion of pharmacy management and pharmacoeconomics. As in recent years, FPGEE exam is putting more weight on management and the economic portion of the pharmaceutical field, which has inspired me to introduce a guide that may help students to answers questions in the exam related to these topics.

I tried to cover all the pharmacy management and pharmacoeconomics aspects in this guide. The reason to introduce this review guide is to provide foreign students with enough information regarding the management aspect of health care in the U.S.

The students must try to understand the information provided in this guide since that's the only way to apply your logic to answer management and economics related questions in the exam. You may not receive straightforward questions from this guide, however the information presented in this guide will definitely help you to guess the best logical answer for a given question.

I hope my efforts will bring you much success.

Best of luck,

Manan H. Shroff

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Social & Behavioral Aspect of Pharmaceutical Care

1- Social and Behavioral Aspect of Pharmaceutical Care

Pharmaceutical Care: It is the study of the logical consequences of the evolution of the profession of the pharmacy.

* **What is the true meaning of health?**

It is a very hard task to define health since it is not limited to a single factor. For example, if we try to define health by using medical definition, it would not be sufficient since there are sociological, epidermological, health planning, and physiological definitions as well. In short, it is hard to define health by using a single factor.

In medical terms, health may be defined as the absence of disease or the maintenance of physiological parameters within accepted norms (e.g. blood glucose, blood pressure, cholesterol).

Anderson has summarized epidermological and health planning definitions into five major categories. These are:

1. Health as a product or outcome (the result of adequate planning and utilization of resources).
2. Health as a potential or capacity to achieve goals.
3. Health as an everchanging dynamic process (the interaction between agent, host, and environment).
4. Health as something experienced by individuals.
5. Health as an attribute of an individual.

* According to the World Health Organization, health is the state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity.

* **The Quality of Pharmaceutical Care:** The quality of pharmaceutical care can be evaluated and examined by resources such as structure, process, and outcome components.

A. **Structure Resources :** Structure resources are required to obtain high-level quality care. For example, one must have laminar flow hood in order to provide the highest quality of parenterals admixtures. It does not matter how efficient or smart you are, structural resources play an important role to address the quality of care. Referring to the above example, obviously if you have a home-infusion company without laminar flow hood, the quality of parenteral preparations will be considered poor. Therefore, the structural resources would be considered necessary to obtain a high level of quality care.

B. **Process Resources:** It refers to many activities performed by a pharmacist that are considered a part of quality care. Referring to the parenteral preparation example, the use of aseptic technique while making IV admixtures is defined as a process resource.

C. **Outcomes:** It refers to the experience of a patient who receives the care. The high quality of care is assumed when the patient experiences the desirable outcomes. Thus, the structure, process, and outcomes are intended to be part of an integrated model of quality care assessment. Another example that explains the quality of care is a hospital with a CAT scanner is presumed to render a higher quality of care than a hospital without one.

Health Behavior

* Health behavior is an action taken by a healthy person for the purpose of remaining healthy or in an asymptomatic state. For example, brushing teeth, avoiding tobacco and alcohol, regular exercising, wearing a seat belt, etc. People engage in such behaviors for several reasons, including habit, attraction, fear, and death.

A. **A Model of Health Behavior or Health Belief Model**

The Health Belief Model was developed to give healthcare professions an idea as to why and under what conditions people take preventive health actions or behaviors. The Health Belief Model depends on three classes of variables:

1. The individual's psychological state of readiness to take specific action.

2. The degree to which a particular course of action is believed to have a net beneficial effect in reducing a health threat.

3. A cure to action that may trigger appropriate action when needed.

* Christensen, Fincham and Wertheimer have used the Health Belief Model to find out the patients' compliance with therapeutic regimens. Christensen also proposed that compliance with the drug therapy is a dynamic process in which patients continuously reassess the decision to comply.

* Fincham and Wertheimer used the Health Belief Model to predict the patient's initial compliance rate with drug prescriptions. By using this model, they categorized 69% of patients into a group that did not comply with the initial prescription. For example, the patient receives the prescription from the prescriber, and also drops it to a pharmacy, but never picks up the filled prescription from the pharmacy.

Barriers that affect the patient's compliance:

1. Cost of medications
2. Lack of access
3. Distance from the pharmacy
4. Transportation facilities
5. Psychological behavior of patients

Wellness and Health

* Wellness is defined as an integrated method of functioning which is oriented towards maximizing the potential of which the individual is capable, within the environment where he or she is functioning.

* Wellness normally involves the total person. The mind, body, and spirit are inseparable and constantly interact to determine one's experience and behavior.

* It is seen as one's potential for wholeness and well-being, and is strongly influenced by personal choice and environmental factors.

Illness, Sickness and Disease

* According to Eliot Friedson, illness is described as:

  "One is immediately obligated to distinguish between illness as a purely biophysical state and illness as a human, social state. Illness as a biophysical state involves changes in bones, tissues, or vital fluids of any living organism. Illness as a social state involves changes in behavior that occur only among humans and that may vary with the culture."

A distinction between illness and a disease:

* Illness is defined by laymen as a reaction to perceived biological alteration while disease is defined by physicians, and for that reason, it is perceived to be a more precise term. The following sentences may help an individual to distinguish illness from a disease.

1. A person may have a disease and not be ill.
2. A person may be ill and not have a disease.
3. Both disease and illness may be present.

* To understand more precisely, we can take the following example. Hypertension is a disease that has been defined by healthcare professionals as a combination of diastolic and systolic blood pressures outside "normal" limits. Now, it may be possible that a person with the disease of hypertension may be asymptomatic, and therefore not ill. And, as not being ill, this person may not seek care. An opposite of this can also be true. A person who experiences dizziness or headaches may perceive himself or herself as ill, seek care, and be diagnosed as disease-free.

* Practically, both these differences may have serious outcomes: failure to receive needed care in the first instance and a possible waste of medical resources in the second.

A definition of sickness:

* Sickness is defined as a social state conferred on an individual by others. It is socially defined by sociologists.

* According to Bezold, the state of health is determined by the interaction of the following variables:

1. Biology (e.g. generic determinants)
2. Behavior (e.g. smoking, drug abuse, eating habits)
3. Pre and post environments (including physical, biological, economical, and social)
4. The healthcare system

Types of Behaviors

* There are three types of health-related behaviors:

1. Health Behavior
2. Illness Behavior
3. Sick Role Behavior

* The pharmacist is most involved in the illness behavior, to a large extent in the sick role behavior, and in very few instances with the health behavior.

A. Health Behavior:

* Any activity undertaken by a person who believes himself to be healthy, for the purpose of preventing disease or detecting disease in an asymptomatic stage.

* Health behavior of people can be successfully expressed by the Health Belief Model. According to this model, people who step up to obtain preventive care or follow good nutrition and exercise in order to maintain good health are driven by the following factors:

1. The psychological effects of an individual (for example, a person whose father is suffering from diabetes will more likely be involved with preventive care than a person without such psychological effects.

2. The individual must also believe that a proposed action should be feasible and appropriate to use, and that it would reduce susceptibility to the condition or to the seriousness of the condition.

3. Some sort of cue or stimulus is needed to trigger an action response. For example, a person with poor eating habits may be convinced to pay more attention to eating habits if they are told they may cause ulcer or bowel problems in the long run.

Health Locus of Control Model and Health Behavior:

* This is another theoretical model that is widely used to explain an individual health behavior. This model is usually administered to large population samples, and can be measured by a survey instrument.

* Factors that affect individual health behavior under this model are:

1. Previous illness experience
2. Religious belief
3. Educational level
4. Economic status

The Fundamental Attribution Errors and Health (survey instrument):

* An attribute is a characteristic or property that an individual has. For example, Steve is a handsome young man. The observer can assign another characteristic to him: I think he is an honest young man. In the above example, the observer is making an attribution based on what he noticed. However, an attribution made by an observer may be true or may not be. There are three possibilities:

1. Steve may always exhibit this trait (honesty)

   or

2. Steve may exhibit this trait (honesty) only in certain situations.

   Or

3. Steve may seldom exhibit this trait (honesty)

In short, a potential difference exists between the observer's attribution and various situations that have not been observed by the observer. For example, in above case Steve may be a dishonest in most instances, however at the time when the observer is making an attribution, his behavior may likely give off an impression that he is a honest person.

* **Fundamental Attribution Error:** Normally, people tend to attribute traits to others, and to see their own behaviors in terms of the various situations in which they operate on a day to day basis. They see themselves as actors and interpret their responses as more of a response dependent on different situations while they observe others. Acting as observers, they tend to see stable characteristic in others (a stable characteristic does not vary by situations). Researchers have described this actor-observer tendency of people as "fundamental attribution error." It helps one to differentiate between acute symptoms (situations) and chronic symptoms (traits).

  Take for example a pain related to headache. Many of us experience the headache on an infrequent basis and seek situational explanation for the cause of it. The headache may be because of poor sleep or due to a lack of coffee in the morning. In this example, we are responding to a symptom by seeking a situational explanation for the pain. For some people however, the symptoms of a headache are more permanent. For example, a person suffering from migraine. For such a person, these symptoms become a characteristic of him. He is able to say he is healthy despite chronic disease (migraine headache) because he can do the things that he expects to be able to do.

Lewin's Three-Step Change Model:

* Dissatisfaction with symptoms is the driving force behind a patient's action to visit a physician or pharmacist. Symptoms that are unusual and associated with perceived risk, and that interfere with day to day function of the life, may often lead to action on the part of the patient. One way to summarize this change is with Lewin's unfreeze movement-refreeze change process.

* $PV = FC \times (1 + DR)^{-n}$ where,

PV = present value
FC = future cost
DR = discount rate
n = the number of years cost will be incurred in the future

For example, if we want to implement a new program that will take a period of 4 years with a cost of $10000 per year. By using a discount rate of 6% (0.06), the present value of the plan would be:

$PV = 10{,}000 \times (1 + .06)^{-1}$ $PV = 10{,}000 \times (1 + .06)^{-2}$
PV = $ 9433 (for the first year) PV = $ 8890 (for the second year)

Thus, with a discount rate of 6%, the cost incurred would be $34650 ($9430, $8890, $8400, and $7920, for each year respectively.

Without using an equation, the program cost would be $40,000.

Sensitivity Analysis

* **Sensitivity analysis:** The major problem facing by a study of economic analysis is an uncertainty regarding the correct value used for a given cost or benefit or whether the correct discount rate was used. To eliminate this problem, a researcher comes up with sensitivity analysis. For example if original analysis used a discount rate of 4% for calculating cost or benefit, than a sensitive analysis would use the range of discount rates (2 to 6%). For each discount rate, a sensitivity analysis would obtain cost or benefit and compare those values with the original analysis (4% discount rate). If the difference between values obtained from the original analysis and sensitivity analysis is minor, a researcher would be confident that the discount rate used originally is the most appropriate. However, if there is a significant difference between the two values, a researcher should reevaluate the whole analysis method.

Types of Economic Analysis

* There are five major methods to conduct economic analyses:

1. Cost of Illness Analysis
2. Cost Minimization Analysis
3. Cost Benefit Analysis
4. Cost Effective Analysis
5. Cost Utility Analysis

1. **Cost of Illness Analysis:** This type of evaluation method includes all costs and consequences related to treating a particular disease. It is really important to conduct Cost of Illness Analysis before initiating further economic evaluation.

   Advantages of using Cost of Illness Analysis:

1. This method allows researchers to collect and assess disease specific data.
2. It provides a true definition of the particular illness.
3. It provides researchers information about epidermology and potential outcome of illness, and the consequences associated with the illness.

* The perfect example of a cost of illness study would be a large multicenter survey conducted to obtain data regarding healthcare utilization for people suffering from diabetes. This example represents the analysis that was conducted from the perspective of the healthcare provider. The types of costs included in this type of survey would be:

1. In-patient hospitalization costs
2. Home healthcare related services costs
3. Prescription costs
4. Long-term care costs
5. Outpatient visits costs

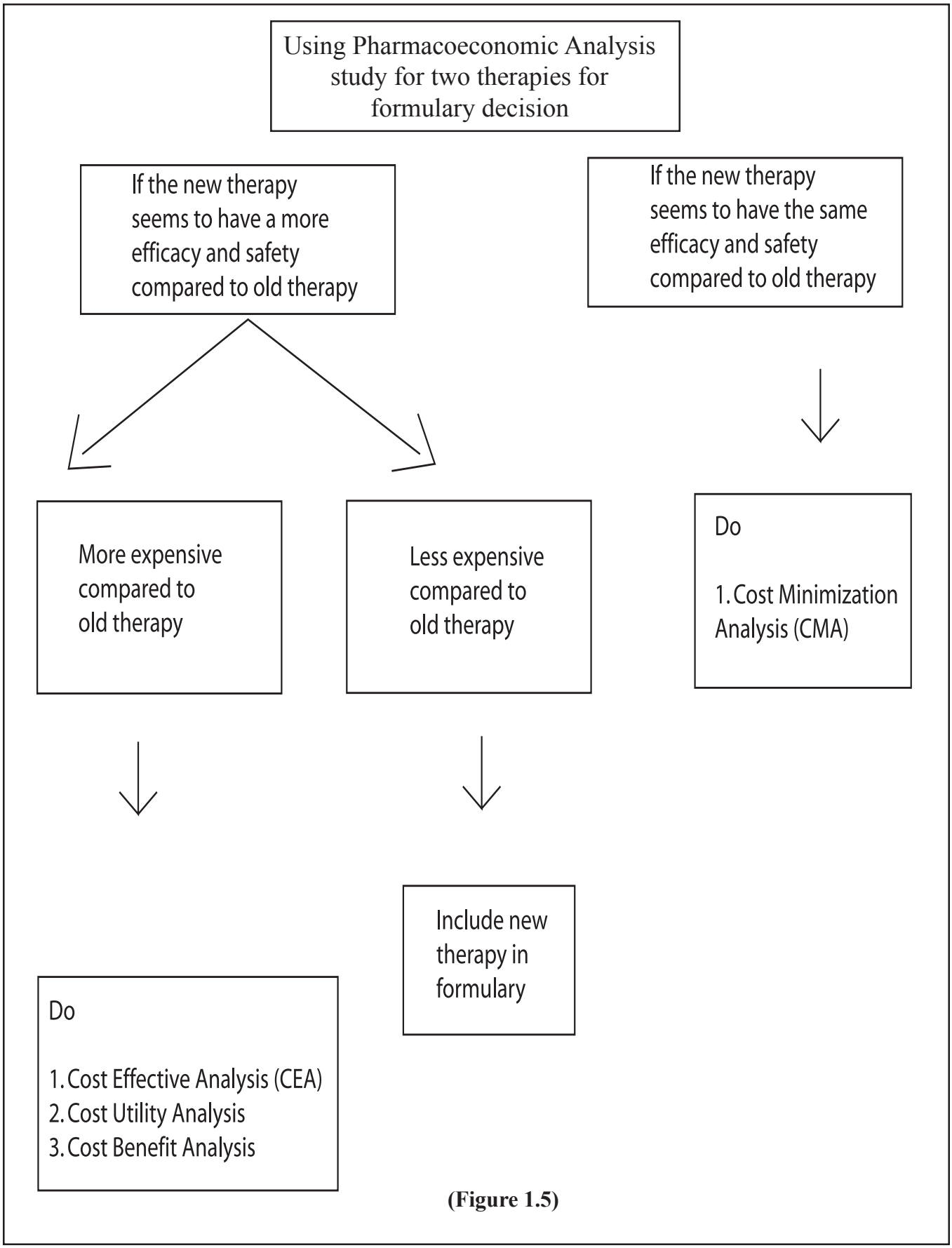
2. **Cost Minimization Analysis:** This type of analysis is used to examine the cost associated with two or more alternatives that are clinically equivalent in terms of outcomes.

* Equivalency must be established before conducting an analysis. Furthermore, equivalency studies must include not only therapeutic outcomes but also the type of adverse effects associated with therapies. Cost minimization can be calculated by using the following formula:

  Cost (dollars) of intervention A <, =, or > Cost (dollars) of intervention B

* An example of a cost minimization analysis would be a comparison of two treatments with the same drug but different routes of administration. In both cases, if the therapeutic outcomes as well as the incidence and type of adverse reactions remain the same, then one should chose the less expensive and laborious route of administration of the drug.

3. **Cost-Benefit Analysis:** It is a type of study in which all costs, outcomes or consequences are expressed in monetary terms. This type of analysis is conducted when two competing therapies or programs have different outcomes. All costs and benefits related to both therapies are compared in terms of dollar value. The only disadvantage of this analysis is that it is difficult to assign dollar values to therapeutic outcomes. For example, assigning a dollar value to quality of life or pain and suffering.


Using Pharmacoeconomic Analysis study for two therapies for formulary decision
If the new therapy seems to have a more efficacy and safety compared to old therapy
If the new therapy seems to have the same efficacy and safety compared to old therapy
More expensive compared to old therapy
Less expensive compared to old therapy
Do
1. Cost Minimization Analysis (CMA)
Include new therapy in formulary
Do
1. Cost Effective Analysis (CEA)
2. Cost Utility Analysis
3. Cost Benefit Analysis

(Figure 1.5)

* The following equation can be used for cost-benefit analysis:

1. Cost-Benefit Ratio = Cost ($) / Benefit ($)
2. Net Benefit = Benefit ($) - Cost ($)

* The perfect example of a cost-benefit analysis would be for a small clinical institution with very limited financial resources to chose from one of two programs, each used to treat different diseases. In this type of analysis, the researcher has to compare all costs that may have incurred for each program verses benefits in terms of morbidities and mortalities. The program with more net benefit should be implemented.

4. **Cost-Effective Analysis:** In this type of analysis, costs and consequences (outcomes) are simultaneously measured-costs in monetary terms (dollar value), and consequences (outcomes) in terms of an obtained unit of effectiveness.

* This type of analysis differs from the cost-benefit analysis in that the therapeutic outcomes or consequences are measured in nonmonetary terms.

Cost-Effective Ratio = Cost ($) / Therapeutic effect (natural units)

An example of a cost-effective analysis would be treating hypertensive patients with two different drugs, drug A and drug B. Drug A reduces an average blood pressure by 20 mm/hg, and drug B lower an average blood pressure by 40 mm/hg. If both drugs cost the same, than drug B would be a better choice to treat hypertension.

* There are two types of Cost Effective Analysis (CEA):

1. Classic CEA
2. Lifetime CEA

1. **Classic CEA:** In this type of CEA, the new treatment is compared with the standard treatment (usually, the best available treatment in clinical practice, e.g., the gold standard) in terms of clinical and economic value. If the treatment has just been launched on the market, and a study cannot be carried out in the practice setting, effectiveness data is obtained from published trials. In this situation, the most powerful trials (e.g., the one with the strongest methodology as well as with the largest number of patients) should be considered. An alternative would be to use the results of a meta-analysis comprising all the concluded relevant trials on the issue.

* For example, one method frequently used is to normalize both costs and outcomes values for a hypothetical population of 100 patients. If, for instance, the costs of the new treatment A is $7,000 and the cost for treatment B is $3,000 for one year, the cost for 100 patients is $70,000 and $30,000, respectively.

* Using the same methodology, if the new treatment A reduces the recurrence rate from 39% to 15% of the standard treatment B, this means that the new treatment avoids a total of 24 recurrences for 100 patients. This constitutes the clinical benefit. It is important to point out that both costs and outcomes need to refer to the same time frame, in this example, one year. Finally, to calculate the CER, the ratio between incremental cost in the numerator ($40,000) and incremental benefit in the denominator (24 recurrences) is calculated. The result is about $1,700 spent for each avoided recurrence.

* The above procedure is a very simplified example of short-term CEA over a one-year time period. The major simplification is the time frame considered. The choice of one year makes the calculation easier, but it excludes the contribution of significant events occurring later in the disease and treatment process, related to both costs and outcomes. Generally, these simplifications may be more or less acceptable, depending on the problem under study.

2. **Life CEA:** Therapeutic problems which require long term efficacy evaluations often correspond to the use of a methodology which measures the survival length on a long-term basis and which synthesizes this data through life table curves. This methodology is largely applied in oncology.

* The main difference between a classic CEA and a lifetime CEA is in the methodology of computing the benefit. The denominator is the gain in terms of survival (e.g., the incremental survival). Thus, the results of the CEA is expressed as cost per year of life saved. It is, in fact, demonstrated that the survival length of a group of patients may be determined by the calculation of the area under the curve of the actuarial survival curve as a function of time (AUC). The AUC value corresponds to the years of life (or patient-years or person-years) lived by the patients. The incremental gain in years of life is calculated from the difference between the two AUC values.

$$\text{Life time CEA} = \frac{(\text{Cost for treating 100 patients with Drug A}) - (\text{Cost for treating 100 patients with Drug B})}{\text{Years of life gained using A instead of B}}$$

* The only disadvantage associated with Cost Effective Analysis is that one cannot compare two different outcomes. For example, one cannot compare therapeutic outcomes in mm/hg for treating hypertension with mg/dl of total cholesterol.

5. **Cost-Utility Analysis:** It is defined as a method where costs are measured in terms of dollar amounts and consequences are measured in terms of quality of life. Cost effective analysis and cost utility analysis are almost same, the only difference between them is the unit of consequences or therapeutic outcomes. The former measures outcomes in natural units (e.g. reduction in blood pressure or cholesterol) while the latter relies on quantity-adjusted life gain years.

Cost-Utility Ratio: Costs ($) / Utilities (eg. QALY, Quality Adjusted Life Years)

* QALY is the number of years at full health compared to the number of years of illness. A year of perfect health would be calculated as 1.0 measured on QALY, and death would equal 0. For example, six years of perfect health would be counted as 6.0 QALY, where as six years of living with cancer, with each year having a utility of 0.4, would be valued at 2.4 QALY.

* Now, utilities for a particular disease (in our example, it is cancer) can be calculated by the following methods:

1. Through estimation
2. Through the literature
3. Through actual measurement

* Physicians, specialities, researchers or special panels can assign the utility value for a particular disease.

* There are three instruments that help to measure utility values. These are:

1. Rating scale
2. Standard gamble
3. Time-trade off

* The major advantage of a cost-utility analysis is that it is the only analysis method which calculates consequences or outcomes in terms of the quality of a patient's life. The only disadvantage associated with this method is a lack of uniform or standardized methods to calculate utility values for diseases.

* This method assumes that 10 bottles in ending inventory are the first 10 purchased, therefore:

  Ending Inventory = 10 bottles x $20 (begining inventory at price of $ 20 per bottle)
  = $200

* With the help of this method, cost of goods sold can be manipulated by buying extra units of a good at the end of accounting period.

Comparison of LIFO and FIFO

* When prices were increasing throughout the year, FIFO gave the lowest cost of goods sold, while LIFO gave the highest. The opposite is also true, if the price of goods is decreasing over a period of time, the FIFO would have given the highest cost of goods sold while LIFO would have yielded the lowest.

* During recent years costs of pharmaceutical products have increased dramatically. By using the LIFO method, a pharmaceutical company can yield the highest cost of goods sold. Because of this, LIFO would earn the lowest pretax income, and therefore the lowest tax payments. This may increase the financial cash flow as well as its actual income. Therefore it is advisable to use the LIFO method when product's prices are increasing over a period of time.

Estimating Inventory Level by Using Gross Margin Method

Beginning Inventory	$ 45000
Purchases	$ 80000
Sales	$ 100000
The Average Gross Margin Percent in past years	% 40

(Table 2.1)

* Every pharmacy normally takes its physical inventory at least once a year. Since taking an inventory is time consuming and very expensive, it is physically and economically not possible for the pharmacy to take the inventory more frequently.

* However, a pharmacy may want to find out the financial status of business more often than this. This can be done by estimating the current level of inventory without taking a physical inventory.

* To estimate an inventory level by using this method, the pharmacy has to find out the percent of cost of goods sold. It can be calculated by using the following formula:

  % cost of goods sold = 1 - % gross margin
  % cost of goods sold = 1 - 40% (from table 2.1)
  % cost of goods sold = 60% or 0.6

* From this value, we can find out a dollar amount of cost of goods sold:

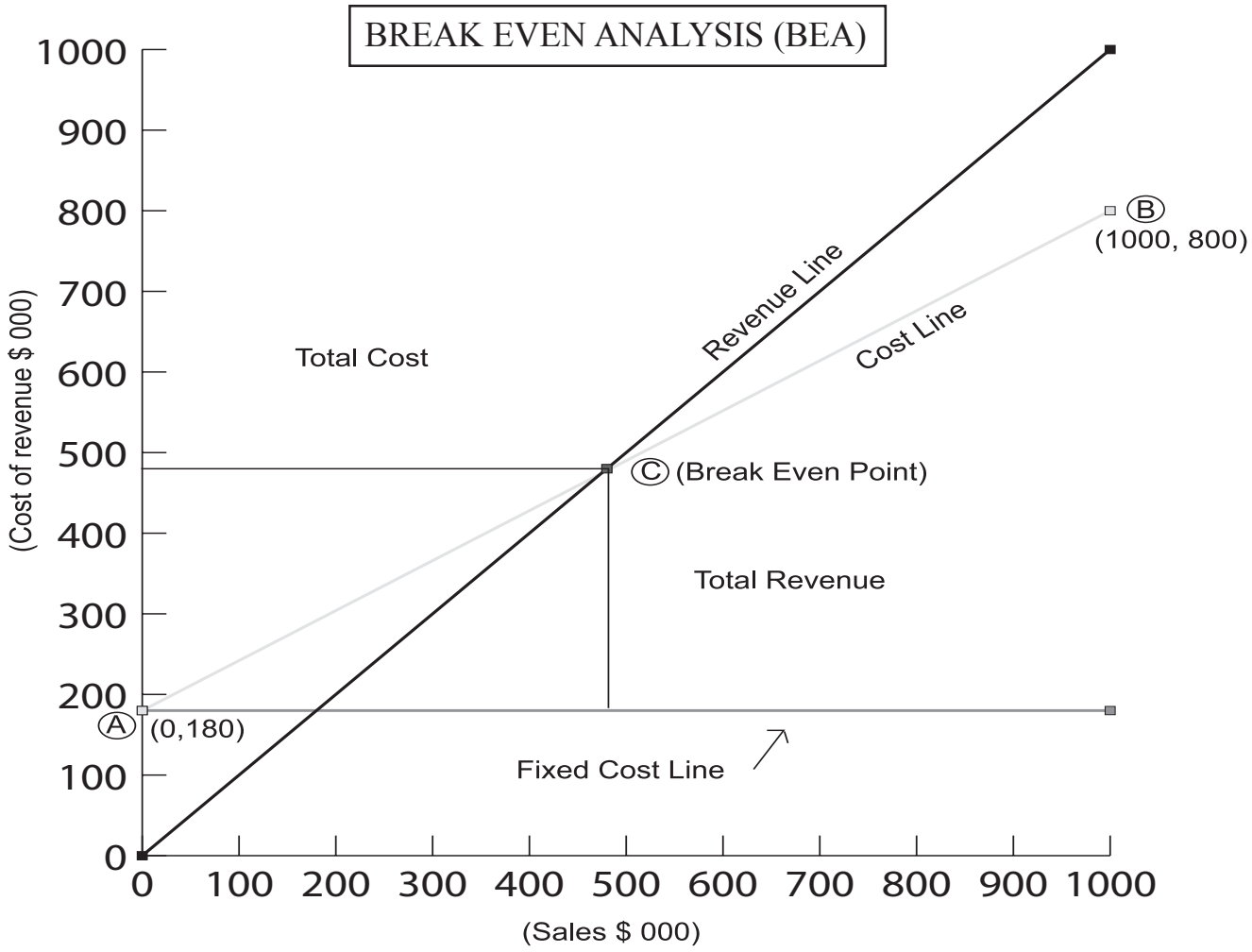
  Cost of goods sold = sales x % cost of goods sold
  = $100000 x 0.6
  = $60000

* When these values are inserted in the following equation, it gives us the value of ending inventory:

Cost of goods sold = Beginning inventory + Purchases - Ending inventory

* 60,000 = 45,000 + 80,000 - Ending inventory, therefore
  Ending inventory = $65,000

* With the help of cost of goods sold and ending inventory values, the pharmacy can generate the current financial status of the pharmacy.



(Figure 1.9)

* **Break Even Analysis:** It is a technique by which pharmacy managers can make a decision by predicting the effects of changes in costs, prices, or revenues on pharmacy profits. At the Break Even Point (BEP), total sales of the pharmacy equal total costs.

* There are three types of costs that affect overall pharmacy expenses. These are:

1. Fixed costs
2. Variable costs
3. Semi-variable costs

1. **Fixed costs:** This type of cost remains the same regardless of profit or loss in the business. Examples of fixed costs are:

1. Depreciation costs
2. Business property tax
3. Business license fees

2. **Variable costs:** They are defined as costs that are directly proportional to sale volume of the business. Examples of variable costs are:

1. The costs of goods sold. As sales increase, the cost of goods sold will also increase.
2. Costs to purchase supplies and accessories. As sales increase, more prescription bottles, prescription labels and ink cartridge are required.
3. Any commission or franchise fees. As sales increase, more franchise fees must be payed.

3. **Semi-variable costs:** These types of costs include both fixed and variable component of costs. Examples of semi-variable costs are:

1. Rent of pharmacy fees which is based on a fixed monthly fee plus some percentage of sales and utility rates.

* **BEA can be conducted by using the following methods:**

1. Graphically
2. A contribution margin approach

Manan Care Pharmacy
Financial Data

Total sales	$ 1000,000
Cost of goods sold	$ 600,000
Gross margin	$ 400,000
Fixed expenses	$ 180,000
Variable expenses	$ 620,000
Miscellanious expenses	$ 20000
Net income	$ 200,000

(Table 2.2)

1. **Graphical method to calculate the Break Even Point:**

A. **Total Revenue Line:** It is defined as a line beginning at the origin (0,0) and having a slope of 1 (figure 1.9). Total revenue line always has a slope of 1.

B. **Fixed Costs Line:** When a pharmacy has zero sales, its total costs would be equal to its fixed costs. For Manan Care Pharmacy, this would be point A (0,180) in figure 1.9.

C. **Total costs line:** From the given financial data (table 2.2), we can also find out point B on the graph. For example, when Manan Care Pharmacy's total sale volume is $1000,000, its total costs (fixed expenses + variable expenses = {costs of goods sold + miscellaneous expenses}) would be $800,000. This will give us a point B (1000, 800). Join point A and point B with a straight line. This is going to be our total costs line.

D. **Break Even Point:** The point at which the total revenue line intersects the total cost line is defined as the Break Even Point. In a given graph, this point is designated as point C (473.68, 473.68). This indicates that Manan Care Pharmacy will make a profit when its sale volume exceeds $473,000, and at a sale volume less than 473,684, the pharmacy will lose money.

2. Contribution margin approach to calculate the Break Even Point

* Under this method, a Break Even Point of business can be calculated with the help of the pharmacy's contribution margin.

Contribution Margin (CM) = Total Revenue - Variable cost (expenses)

Contribution Margin (CM) = $1000,000 - $620,000
= $ 380,000

Net Income = Contribution Margin - Fixed Costs (expenses)
= $380,000 - $180,000
= $200,000

* The contribution margin as a percent of sale can be calculated by the following formula:

$$CM\ \% = \frac{CM}{\text{Total Sales}} \times 100$$

$$CM\ \% = \frac{380000}{1000,000} \times 100$$

$$= 38\%$$

* A contribution margin is supposed to be large enough to cover fixed costs. (Net profit = contribution margin - fixed costs)

* For Manan Care Pharmacy, a contribution margin % is 38. Therefore, we can say that for every dollar of sales of Manan Care Pharmacy 38 cents is required to cover the pharmacy's net profit and fixed costs. The other 62 cents (62%) covers the variable costs of Manan Care Pharmacy.

* Therefore, Manan Care Pharmacy has to earn at least 38 cents per dollar to cover its fixed costs in order to break even.

To cover \$0.38 fixed cost → Requires \$1 sale volume

To cover \$180000 fixed costs → $= \frac{180000 \times 100}{38} = \$473684$

* This is going to be the BEP for Manan Care Pharmacy since at this sale volume, the pharmacy will earn enough to cover its fixed costs. For a sales revenue greater than \$473684, the pharmacy will make a profit of 38 cents per dollar. The other 62 cents will be used to cover variable costs due to an increased sales volume.

Stay Even Point

* When a pharmacy manager makes any changes to their pharmacy (i.e. increasing advertising, offering discount), they always look forward to maintaining the pharmacy's current profitability rather than just the break even. The predictable point at which a pharmacy maintains its current profitability even after adding services to the pharmacy is defined as the SEP or Stay Even Point.

* The SEP can be calculated by treating net income as an additional fixed cost. For example, Manan Care Pharmacy has a net income of \$200,000 with a fixed costs of \$180,000, therefore:

SEP = (fixed costs + net profit) / CM %

SEP = (180000 + 200000) / 0.38

SEP = \$1000,000

To cover \$0.38 → \$1 sale volume

To cover \$380,000 → $= \frac{380000 \times 100}{38}$

* By treating a net income as an additional cost, Manan Care Pharmacy must earn a total sales volume of \$1000,000 in order to stay above the BEP.

Example: If Manan Care Pharmacy wants to raise its advertisement costs from $5000 to $15,000 per year, what would be Stay Even Point for the pharmacy in order to maintain profitability?

Manan Care Pharmacy

Fixed Costs	$ 180,000
Net Income	$ 200,000
CM %	38 %

* An increase in advertisement cost would be $10,000 ($15000 - $5000). Therefore,

SEP = (fixed costs + net profit) / CM %

SEP = (180,000 + 10,000 (advertisement cost) + 200,000) / 38%

= $1026315.78

A new SEP would be **$1026315.78**

* Thus, if Manan Care Pharmacy wants to increase its advertising budget by $10,000 per year ($15000 - $5000), the pharmacy must earn a total sales volume of $1026315.78 in order to maintain its profitability level.

TYPES of COSTS

* There are mainly two types of costs associated with any pharmacy business. These are:

1. Direct costs
2. Indirect costs

1. Direct costs: These costs are directly affiliated with services provided by a pharmacy. Examples of such costs are:

1. Prescription containers
2. Prescription labels
3. Pharmacists' time to provide counseling
4. Pharmacy license fees
5. Continuing education programs costs
6. Patient's education material print out costs
7. Computers and software costs
8. Professional liability insurance

* All the above costs are directly affiliated with pharmacy services. For example, if a pharmacy does not dispense a prescription, then costs related to the prescription containers or labels would not occur.

2. Indirect costs: These costs are not directly associated with services provided by a pharmacy. For example, costs related to the store manager's salary, rents and utility expenses of a building would still occur even if the pharmacy does not provide prescription services. These types of costs are classified as indirect expenses. Example: By using the following data, calculate an approximate dispensing cost for Manan Care Pharmacy.

Pharmacist's Salary	$ 90,000
Equipments, prescriptions & containers costs	$ 20,000
Building-rent, utilities and maintenance costs (RX department only)	$ 10,000
Building-rent, utilities and maintenance costs (store)	$ 40,000
Other indirect costs	$ 60,000
No of rxs dispensed by pharmacy in coming year	40,000

(Table 2.3)

* The Cost To Dispense (CTD) can be calculated by using the following formula:

$$CTD = \frac{\text{(Total direct costs)} + \text{(Total indirect costs)}}{\text{No of prescriptions dispensed by pharmacy}}$$

$$CTD = \frac{(90{,}000 + 20{,}000) + (10{,}000 + 60{,}000)}{40{,}000}$$

$$CTD = \frac{(110{,}000) + (70{,}000)}{40{,}000}$$

$$= \$4.50 \text{ per prescription}$$

* Based on the data given, Manan Care Pharmacy should keep its cost of dispensing to $4.50 per prescription in order to cover its major expenses. If you notice, we have not considered indirect costs of $40,000 in our calculation. Since this figure relates to indirect expenses of the whole store, we cannot include it to count cost to dispense for prescription.

Methods for calculating the product price

* There are three principal methods by which the product price can be calculated. These are:

1. Mark-up method
2. Professional fee method
3. Sliding scale method

1. Mark-up method: This method relies on the cost of ingredients. The dispensing fees can be calculated by using the following formula:

Dispensing price = ingredient costs + (ingredient costs x % mark-up)

Example: What would be the prescription cost for dispensing 30 tablets of Ketoconazole ($120) ? The % mark-up on a prescription would be 15.

Dispensing price = 120 + (120 x 0.15)
= 120 + 18
= $138

* The dispensing price for a prescription can also be calculated by using a mark-up on the retail price method.

Example: If the ingredient costs for 30 tablets of Ketoconazole is $120 and the percentage mark-up on retail price is 15, what would be the dispensing price of the prescription?

Dispensing price (DP) =	ingredient costs + (Price x Markup %)
	or
Dispensing price (DP) =	ingredient costs / (1 — mark up % / 100)

DP = 120 / (1 - 15/100)
DP = 120/0.85
DP = $141.17

* The mark-up on retail price method is the most widely used method for determining the dispensing price. Since it determines the price on the basis of mark-up on retail, one can easily calculate the gross margin on the prescription.

Advantages of mark-up methods:

1. The principal advantage of the mark-up method is that it protects the pharmacy against the price inflation. As the ingredient cost increases, the dollar margin on the prescription also increases proportionately.

Disadvantages of mark-up methods:

1. The principal disadvantages of the % mark-up method is that it subsidizes low-cost products with high-cost products. For example, if the pharmacy sells analgesic balm for $6.00 ($5 ingredient cost + 20% mark up), the pharmacy will make a dollar margin on the prescription which is far lower than the average dispensing cost ($5.00) of the prescription.

* Now consider that the pharmacy is selling Xalatan eye drops, and the dispensing price will be $120 ($100 ingredient cost + 20% mark up on prescription). The dollar margin on this prescription is $20 which is far higher than the average dispensing cost ($5.00) of prescription.

* However, a patient will react to this high price of Xalatan eye drops and may go somewhere else to fill a prescription. On the other hand, when the patient is purchasing an inexpensive drug such as analgesic balm, he or she is unlikely to even notice that the prescription price is exceptionally low.

2. **Professional fee method:** This method is widely used by most third party prescription programmers to reimburse pharmacies. Under this method, the price of a prescription can be calculated by adding a fixed amount of predetermined fees to the ingredient costs of the medication. For example, if an ingredient cost of analgesic balm is $5 and fixed reimbursement rate for the prescription is $6, the retail price of the prescription would be $11 ($5 + $6).

* As the dispensing fee (professional fee) remains the same regardless of cost of ingredients, the dispensing price for xalatan eyedrops under this method would be $106 ($100 ingredient cost + $6 professional fee).

Disadvantages:

1. It yields low gross margin on expensive products. For example, the percentage gross margin on xalatan eye drops would be 6%, which is far lower than the average gross margin percentage on prescription (usually 15 to 20%).

2. This system discourages a pharmacy from carrying expensive drugs. Since the margin on expensive drugs is so low, then it could not even cover the cost to keep the expensive products in the inventory.

3. This system encourages overutilization of prescription drugs. For example, a patient will prefer to buy three months worth of a medication supply by paying a one-time dispensing fee rather than purchasing a month supply of the drug and paying three times for dispensing fees.

3. **Sliding scale method:** As discussed earlier, the mark-up method subsidizes low-cost drugs with high-cost ones, and the professional fee method disregards the higher inventory carrying costs associated with more expensive drugs. The sliding scale method overcomes the disadvantages of both systems.

* Under this type of reimbursement method, if a pharmacy uses a % mark-up method, it shall use a variable percentage mark-up method which allows the pharmacy to charge a low % mark-up on expensive drugs and a high % mark up on low-cost products. This will eliminate subsidization of low-cost drugs with expensive ones.

* If a pharmacy uses a professional fee method, the sliding scale method advises pharmacies to charge lower dispensing fees on expensive drug products and more for low-cost drug products. This way pharmacies may cover inventory carrying costs for expensive products and at the same time may offer reasonable prices to patients on low-cost products.

Pharmacy Administration & Jurisprudence

Pharmacy Law

A **PURE FOOD AND DRUG ACT OF 1906**

* Congress passed this law in 1906 to protect people from unsanitary and poorly labeled food.

B **FOOD, DRUG AND COSMETIC ACT OF 1938**

* This law suggests that no new drug can be marketed until proven safe by the FDA for public use.

C **DURHAM HUMPHREY AMENDMENT OF 1951**

* This law is also known as the "Prescription Drug Amendment."

* It differentiates between prescription and OTC drugs.

* It also authorizes oral prescriptions and prescription refills.

* It suggests that each drug should be labeled " Caution: Federal law prohibits dispensing without a prescription."

D **KEFAUVER HARRIS AMENDMENT OF 1962**

* It is also known as the "Drug Efficacy Amendment."

* This law indicates that new approved drugs must be safe as well as effective.

* It also establishes Good Manufacturing Practice requirements.

E **MEDICAL DEVICE AMENDMENT OF 1976**

* This law passed in 1976, and includes:

I The classification of medical devices
II Safety and efficacy of medical devices

F **ORPHAN DRUG ACT OF 1983**

* This law was passed for orphan drugs (drugs for diseases that affect very few people). Congress passed this act to provide tax relief and other incentives for the manufacturers to develop and market orphan drugs.

G **DRUG PRICE COMPETITION AND PATENT TERM RESTORATION ACT OF 1984**

* This law is also known as the Waxman Hatch Amendment.

* This law was passed to make generic drugs more readily available to the public.

* This law also provides more incentive to innovative pharmaceutical companies and encourages them to develop new drugs.

H **NATIONAL DRUG CODE NUMBER (NDC)**

* The NDC generally consists of ten to eleven letters.

I The first four characters indicate the name of the manufacturer or distributor.
II The middle four characters identify the drug name and strength.
III The last two characters identify the package.

H **OVER THE COUNTER DRUGS**

* The FDA generally classifies drugs into three categories in final monograph.

I Category I : It includes ingredients generally considered safe, effective and not misbranded.
II Category II : It includes ingredients that are not considered safe or effective, and are misbranded.
III Category III : It includes ingredients for which data is insufficient to permit the classification.

I **PATIENT PACKAGE INSERT**

* The FDA passed this law in 1970 that states certain drugs require a Patient Package Insert (PPI) indicating the uses, risks and precautions of such drugs. The list of such drugs are :

* Isotretinoin
* Oral contraceptives
* Isoproterenol
* Progesterone
* Estrogen
* Intrauterine devices

ANTIDOTES

* Activated charcoal is classified as an effective, nonspecific antidote. It absorbs a large number of materials. Below is the list of drugs/poisons and their antidotes.

	Drugs	Antidotes
1.	Heparin	Protamine
2.	Benzodiazepine	Flumazenil
3.	Beta blocker	Epinephrine, glucagon
4.	Ca-channel blocker	Glucagon, calcium chloride
5.	Digoxin	Digoxin-specific Fab antibody
6.	Potassium	Calcium chloride, sodium bicarbonate, sodium polystyrene sulfonate, glucose and insulin
7.	Acetaminophen	N-Acetylcysteine
8.	Anticholinergic	Physostigmine
9.	Organophosphorus (insectisides)	Atropine
10.	Neostigmine	Atropine
11.	Pyridostigmine	Atropine
12.	Bromide	Sodium or ammonium chloride
13.	Cyanide	Amyl nitrite
14.	Fluoride	Calcium gluconate or lactate
15.	Ethylene glycol	Ethanol
16.	Methanol	Ethanol
17.	Gold	Dimercaprol
18.	Heavy metals	Dimercaprol
19.	Copper	Penicillamine
20.	Lead	Penicillamine
21.	Mercury	Penicillamine
22.	Iron	Deferoxamine
23.	Isoniazid	Pyridoxine
24.	Phenothiazine	Diphenhydramine
25.	Warfarin	Vitamin K (Phytonadione)
26.	Tricyclic antidepressant	Physostigmine
27.	Narcotic analgesic	Naloxone, Naltrexone
28.	Salicylate	Alkaline diuresis
29.	Lithium	Sodium polystyrene sulfonate
30.	Nitrites	Methylene blue
31.	Nitrobenzene	Methylene blue
32.	Chlorates	Methylene blue

U.S Healthcare Delivery System

U.S Healthcare System

Ambulatory Care: It is defined as different types of health-related services provided to patients for which they are not required to stay overnight or be hospitalize. For example, outpatients services provided by physicians.

* In the U.S., ambulatory care services are provided by:

1. Hospital outpatient centers
2. Community health centers
3. Ambulatory surgery centers
4. Hospital emergency departments
5. Free standing emergency centers
6. Family planning centers
7. Clinical laboratory services
8. Voluntary health services
9. Hospitals
10. Long-term care services
10.a. Nursing homes services
10.b. Rehabilitation facilities
11. Home health care
12. Adult day care
13. Hospice care

1. Hospital outpatient centers: This type of ambulatory care service is normally provided by hospitals. Patients with non-urgent medical problems may visit these types of clinics.

* Clinics are normally separated from hospital emergency departments. They may be classified as general or specific according to their specialization. For example, a diabetic clinic center, oncology clinic center, etc.

* Hospitals are expanding clinics in the area away from hospitals in order to better serve the community and earn an extra income. There is also another incentive for hospitals to expand the clinic-they can build up a relationship with patients and encourage them to use a clinic's own hospitals for other major medical problems.

2. Community health centers: Community health centers began to develop in the late 1960s. Initially, funding for these centers was received from the office of economic opportunity and later from U.S. Department of Health, Education and Welfare.

* Community centers provide health-related services to a defined population of poor people. Before the existence of community health centers, the poor people and low income patients received healthcare from health departments and hospitals. However, in order to receive help, patients had to wait in a line for hours. To overcome these problems and to provide better health-related services to the poor and needy people, community health centers were developed by the U.S. Department of Health, Education and Welfare.

3. **Ambulatory surgery centers:** Due to advancement in healthcare technology and new reimbursement patterns from third parties payers, there has been an increased in the number of outpatient surgeries. In old days, the surgery that may require a stay in the hospital for at least 2 to 3 days, has now been replaced by a same day discharge. This may significantly help the cost-cutting strategy of current healthcare by avoiding unnecessary hospitalization.

* In 1999, there were over 2700 freestanding outpatient surgery centers, up from 2400 in 1996. In addition, Medicare now also covers many outpatient surgeries which may help outpatient surgery centers to compete against hospitals, and cut down unnecessary hospitalization costs.

4. **Hospital Emergency Departments:** The Emergency Room (ER) or Emergency Department (ED) is the most commonly used setting for emergency care. In 1986, the federal government passed an "antidumping law," which indicates that hospitals cannot inquire about a patient's insurance status before providing emergency medical services.

* However, this causes a major problem to ERs since most manage care organizations refuse to pay for emergency care without prior authorization. Also, most patients receive emergency medical care either insured or uninsured; this will increase the financial burden on hospitals.

* The emergency room is often described under outpatient services since most patients receive the emergency care and are discharged on the same day.

5. **Freestanding Emergency Centers:** Freestanding emergency centers are often as urgi-care centers. They provide episodic emergency care 24 hours a day for non-life threatening conditions.

* They provide most care on a "walk-in" or appointment basis. Unlike medical clinics, they require payment at the time of service provided. Most of them do not use insurance companies for reimbursements. The form of payment could be check, cash, or credit card. However, they provide complete documentation about services provided to patient to submit to insurance companies in order to receive reimbursement after payment is made to the center.

6. **Family Planning Centers:** It was first established in 1970 when Congress passed Title X of the Public Health Service Act. Under this title, the federal government provides all funding to establish family planning centers. Family planning centers provide a wide range of services which include:

1. Gynecological examinations
2. Breast or cervical screenings
3. Contraceptive information and supplies
4. Routine child health screenings
5. Sexually transmitted disease diagnosis and treatment

7. **Clinical Laboratory Services:** They provide a variety of laboratory analysis to physicians. Most times, physicians collect and send to a nearby clinical laboratory run by a license pathologist. In some instances, physicians may send patients to the lab.

* Under the 1988 Clinical Laboratory Improvement Amendment Act, all clinical laboratories are required to ensure the quality of test results.

8. **Voluntary Health Agencies:** There are many voluntary health agencies which provide ambulatory care services to patients. These agencies are focused to treat specific diseases and are funded largely by charity. Examples of such agencies are:

A. American Heart Association
B. American Diabetic Association

* The services provided by these agencies are not limited to healthcare; they often support research, arrange education programs to increase awareness of patients, and also finance health-needed services.

9. **Hospitals:** Hospitals are considered as the place where patients with acute or severe illnesses may receive medical care. It is a place where patients have access to all medical field specialists, such as physicians, pathologists, nurses, pharmacists, radiologists, and anesthetics. Generally, a hospital is classified in terms of the physical makeup and quantitative nature of services provided.

* Hospitals are classified by:

1. Ownership
2. Length of stay
3. Type of service
4. Bed capacity

1. **Ownership hospitals:** Depending on the ownership of the hospital, it can be subdivided into three major categories:

A. Nonprofit hospitals
B. For profit hospitals
C. Government hospitals

A. **Nonprofit hospitals:** These are types of hospitals where profits earned by hospitals must be turned back into the hospitals operation or community welfare. They have a board of trustees who voluntarily participate to run and operate hospitals without receiving any pay.

* They are exempt from tax requirements. However, in order to qualify for tax-exempt, hospitals must obey a certain criteria provided by federal statues such as hospitals may not refuse to provide medical care to patients who are unable to pay a fee for service. Most church-affiliated hospitals fall into this category.

B. **For Profit hospitals:** Unlike nonprofit hospitals, these hospitals operate with the goal of making a profit. The profit earned by these hospitals is distributed to their sharholders who elect the board of directors to operate the hospital.

* Due to peer pressure from shareholders and owners, for profit hospitals operate more efficiently with strict cost effectiveness. Therefore, many times for profit hospitals are criticized for paying more attention to cost-cutting strategy than to quality of care.

C. **Government hospitals:** These types of hospitals are owned and operated by federal governments. These include 27 hospitals for the Army, 19 for the Navy, 44 for the Airforce, and 144 for veterans.

2. **Length of stay:** Depending on length of stay of a patient, a hospital can be divided into two different categories:

1. Short-term hospitals
2. Long-term hospitals

* Short-term hospitals: The average length of stay is less than 30 days.
* Long-term hospitals: The average length of stay is more than 30 days.

3. **Type of service:** Depending on types of services, a hospital can be divided into two subcategories:

1. General hospital
2. Special hospital (Cancer, Psychiatric or Pediatric)

4. **Bed capacity:** Hospitals are also classified according to their bed capacity.

1. Under 50 beds
2. 50-99 beds
3. 100-199 beds
4. 200-299 beds
5. 300-399 beds
6. 400-499 beds
7. 500 beds and over

10. **Long-term care services:** As the name suggests, it offers health-related services to patients for an extended period of time. The members of long-term care are mostly patients of any age with conditions such as birth defects, spinal cord injuries, mental impairments, or any other chronic conditions that may affect a patient's ability to perform normal routine tasks.

* However, the majority of long-term patients are elderly. The health related services associated with long-term care are very expensive. Facilities that provide long-term care can be subdivided into two major categories:

a. Nursing homes services
b. Rehabilitation facilities

10(a) **Nursing homes:** They represent the large majority of long-term healthcare. The federal government divides nursing homes into two major categories:

I. A skilled nursing facility (SNF)
II. An intermediate care facility (ICF)

I. **Skilled nursing facility (SNF):** It is a nursing home that has been certified as meeting federal standards within the meaning of the Social Security Act. It provides 24-hour nursing home services with medical care which is equivalent to hospitals.

* The members of SNFs are patients who are suffering from long-term illnesses. In a recent year, a number of hospitals have their own skill nursing units. These will facilitate hospitals to use their acute care beds more efficiently.

* Hospital-based nursing homes provide better health related services due to their sufficient staffing.

II. **Intermediate care facility (ICF):** It is also a nursing home that has been certified as meeting federal standards within the meaning of the Social Security Act. They provide less extensive health related services to patients compared to SNFs.

* They have regular nursing services, however it is not 24-hour. The members of ICFs include patients who are not capable of living on their own, yet are not necessarily ill enough to need 24 hour nursing care.

Reimbursement for nursing home services

* The cost to cover nursing home care has been increased dramatically. An average premium to obtain or qualify for long-term care services ranges from $400 to $4000 per year depending on the medical condition of patients.

* Unfortunately, many patients cannot afford these high premium rates, and consequently rely on Medicare, Medicaid or state or federal granted programs for services.

* Even though Medicare does not cover nursing home related services, if a patient is required to obtain services, he should chose an intermediate care facility in order to get reimbursement from Medicare. Since the majority of patients require intermediate care services rather than extended (skilled) nursing services, Medicare is more favorable to intermediate care facilities when the time comes to pay the reimbursement.

* Prior to 1997, skilled nursing homes were reimbursed by Medicare on the basis of cost plus a margin of profit. However, after the Balance Budget Act of 1997, Medicare has started to pay nursing homes on the basis of flat rate per day. Due to this, many nursing homes are currently facing financial problems, and consequently giving poor medical care.

* Unlike Medicare, Medicaid reimburse both SNFs and ICFs. However, patients must reside below the poverty line in order to receive coverage.

* The eligibility and coverage for SNFs and ICFs under Medicaid plans depends on the states and may vary greatly. Since Medicid only covers health-related services if the patient has a very low income, many elderly use the strategy of "spending down," which involves paying out of pocket until a person becomes poor enough to qualify for Medicaid benefits.

* Some elderly also transfer their assets to relatives or trustees in order to protect their assets from Medicaid spending-down provisions.

The Eden Alternative

* It was a concept first proposed by Dr. William Tomas. According to him, the elderly faces three major obstacles:

1. Loneliness
2. Helplessness
3. Boredom

* Providing solutions for these three obstacles may increase the responsiveness that often cannot be achieved by pills or other therapeutic services. By using this concept, an assisted living facility and community based care services are evolved.

1. **Assisted Living Facilities:** Through the inspiration of Dr. Thomas concept of the "Eden Alternative," care providers have come up with assisted living facilities. They are another alternative to providing care to the elderly who cannot live independently but do not require skilled nursing care.

* Most assisted living facilities now provide an option of an independent residency in an apartment like setting with other facilities such as group meals, laundry, cleaning services, and medication monitoring. The cost associated with assisted living facilities are not covered by any insurance companies. Residents have to make their payments out of their own pocket.

2. **Community Based Care:** Many of the elderly would prefer not to go to nursing homes if the same level of healthcare is provided in the community. However, the current fee structure encourages the elderly to go to nursing homes since Medicare does not cover costs related to community based care centers but pays for nursing homes.

10(b) **Rehabilitation facilities:** They provide residential care to patients suffering from traumatic brain injury, strokes, cognitive disorders, and any other problems that may cause permanent disabilities.

* Services include nursing care, physical therapy, occupational therapy, speech therapy and personal care. Their primary goal is to provide the highest level of care to admitted patients so that they can rejoin the community or slow down the progression of disease as much as possible.

* The term "rehabilitation" also applies to mental health and substance abuse organizations.

11. **Home Health Care:** They provide care for the disabled in the community. They provide a vast range of services which include part-time skilled nursing care, physical therapy, speech therapy, occupational therapy, medical social services, medical supplies and equipment-related services.

* The social service such as the bathing and dressing of patients, changing bed linen, and cooking are also provided by home healthcare centers. The costs related to home healthcare services are covered by Medicare, and Medicaid, a small portion is covered by third party insurance companies, and the rest is out of pocket.

12. **Adult Day Care:** It is another form of long-term care service that offers the elderly the chance to remain in the community. They help improve client's overall functioning, and also increase social interaction. They are different from a senior center in that they serve adults who are physically impaired or mentally confused and require supervision.

13. **Hospice Care:** Hospice care provides palitative care and the psychological support needed by terminally ill patients near the end of their lives. They challenge traditional hospital care that often isolates patients at the time when they most need support.

* Patients residing in hospice are allowed to meet their friends and families at all times. They can wear their own choice of clothes and eat meals to their liking with very few restrictions.

* The hospital staff spends unlimited time with patients and delivers more spiritual and emotional care than regular medical care. Medicare covers costs related to hospice services but only for Medicare certified hospices.

Important Terminology Related To Pharmacy Management and Pharmacoeconomics

1. **Acute care:** It is defined as medical care of a limited duration, provided in a hospital or outpatient setting, to treat an injury or short-term illness.

2. **Capitation:** A prospective form of reimbursement in which a pharmacy receives a specific amount of money each month for each patient who is eligible to receive a prescription regardless of the service provided. For example, Manan Care Pharmacy will receive $100 per month per enrollee of an HMO regardless of services provided to its enrollees.

3. **Catastrophic coverage:** A type of insurance that pays for high-cost healthcare, usually associated with accidents and chronic illnesses and diseases, such as cancer and AIDS.

4. **Center for Medicare and Medicaid Services (CMS):** Administers Medicare, Medicaid, and the Child Health Insurance Programs. Formerly known as the Healthcare Financing Administration (HCFA).

5. **Chronic care:** Treatment or rehabilitative health services provided to individuals on a long-term basis (over 30 days), in both inpatient and ambulatory settings.

6. **Coinsurance:** It is one type of cost sharing plan in which patients pay a specified percentage (usually 20%) of all losses incurred. For example, if outpatient surgery costs $1000 to a patient and he/she has an 80/20 coinsurance plan, a predetermined amount (20%) of the total costs ($200) should be paid by the patient, and the rest ($800) will be paid by an insurance company.

7. **Consolidated Omnibus Budget Reconciliation Act of 1985 (COBRA):** A federal law that requires that all employer-sponsored health plans to offer certain employees and their families the opportunity to continue, at their persona expense, health insurance coverage under the group plan for up to 18, 24, or 36 months, depending on the qualifying event, after it would have ceased due to the death or retirement of the employee, divorce or legal separation, resignation or termination of employment, or bankruptcy of the employer.

8. **Co-payment:** It is one type of cost-sharing plan in which the patient has to pay a fixed amount each time a service is provided. (e.g. $15 for a physician's visit).

9. **Cost-sharing:** A provision that requires individuals to cover some part of their medical expenses (e.g. copayments, coinsurance, deductibles).

10. **Deductible:** It is one type of cost sharing plan in which a patient has to pay a specified amount during a specific period of time (usually one calender year) before benefits are paid by a third party. For example, if a patient has an insurance plan with a $500 annual deductible and an 80/20 fee structure, and his out patient surgery costs $1000, then according to the plan, the patient has to first pay $500 (for the year-one time only) out of his own pocket and the rest ($500) will be shared on the basis of an 80/20 fee structure.

Total outpatient surgery cost	$1000
Patient's will pay a one time deductible for the fiscal year	$500
80% of rest ($500) will be paid by insurance	$400
20% of rest ($500) will be paid by a patient	$100
Total reimbursement	$1000

Now, let's assume that the same patient within the same fiscal year is admitted to a hospital for another surgery which costs about $3000. This time the patient is not required to pay the $500 deductible since it was in the same fiscal year. Therefore, this time the fee structure would be:

Total surgery cost	$ 3000
Patient's will pay a one time deductible for the fiscal year	$ 0.00
80% of ($3000) will be paid by insurance	$ 2400
20% of ($3000) will be paid by a patient	$ 600
Total reimbursement	$ 3000

11. **Fee schedule:** A listing of accepted fees or established allowances for specified medical procedures as used in health plans; it usually represents the maximum amount the program will pay for the specified procedures.

12. **Diagnosis Related Groups (DRGs):** A prospective payment system that pays a set amount for a given diagnosis. If the treatment actually costs less, the provider keeps the excess; if the treatment costs more, the provider loses.

13. **Disproportionate Share Hospital (DSH):** A hospital that provides a large amount of uncompensated care and/or care to Medicaid and low-income Medicaid beneficiaries.

14. **Employment Retirement Income Security Act (ERISA):** Employee Retirement Income Security Act of 1974. ERISA is the basic law designed to protect the rights of beneficiaries of employee benefit plans offered by employers.

15. **Federal Employee Health Benefit Program (FEHBP):** It is also known as the Federal Employee Plan or FEP. The health plans are made available to federal employees as part of their employment benefits.

16. **Fee-For-Service:** A billing system in which a healthcare provider charges a patient a set amount for a specific service.

17. **Formulary:** A listing of drugs, prepared by The Pharmacy & Therapeutic Committee of a hospital or a manage care company, that may be prescribed by a physician or dispensed by a pharmacist. The physician and pharmacist are requested to use only formulary drugs unless there is a valid medical reason to use nonformulary drugs.

18. **Group Model HMO:** An HMO that contracts with a single or multigroup of physicians and hospitals to provide health-related services to their plan members. There are two kinds of group model HMOs.

* The first type of group model is called the closed panel, in which medical services are delivered in the HMO-owned health center or satellite clinic by physicians who belong to a specially formed but legally separate medical group that only serves the HMO. The group is paid a negotiated monthly capitation fee by the HMO, and the physicians in turn are salaried and generally prohibited from carrying on any fee-for-service practice.

* In the second type of group model, the HMO contracts with an existing, independent group of physicians to deliver medical care. Usually, an existing multispecialty group practice adds a prepaid component to its fee-for-service mode and affiliates with or forms an HMO. Medical services are delivered at the group's clinic facilities (both to fee-for-service patients and to prepaid HMO members). The group may contract with more than one HMO.

19. **Group practices:** Three or more physicians who deliver patient care, make joint use of equipment and personnel, and divide income by a pre arranged formula.

20. **Health Care Financing Administration (HCFA):** The agency of the U.S. Department of Health and Human Services that is responsible for administering the Medicare and Medicaid programs. Now it is known as the Center for Medicaid and Medicare Services (CMS).

21. **Health Maintenance Organization (HMO):** Health Maintenance Organization is a healthcare payment and delivery system involving networks of doctors and healthcare institutions. It offers consumers a comprehensive range of benefits at one annual fee (often with copayments or deductibles that vary from service to service) but they can see only providers in the network. Physicians and other health professionals are often on salary or contract with the HMO to provide services. Patients are assigned to a primary care doctor or nurse as a "gatekeeper" who decides what health services are needed and when.

22. **Indemnity insurance:** Benefits are paid in a predetermined amount in the event of a covered loss; differs with reimbursement, which provides benefits based upon actual expenses incurred.

23. **Integrated Delivery System (IDS):** A group of healthcare organizations that collectively provides a full range of health-related services in a coordinated fashion to those using the system.

24. **Joint Commission on Accrediation of Healthcare Organizations (JCAHO):** The Joint Commission On Accreditation of Healthcare Organizations, whose mission is to continuously improve the safety and quality of care provided to the public through the provision of healthcare accreditation and related services that support performance improvement in healthcare organizations. Its main purpose is to encourage the attainment of uniformly high standards of institutional medical care. It also establishes guidelines for the operation of hospitals and other health facilities and conducts survey and accreditation programs.

25. **Long-term care:** A general term for a range of services provided to the chronically ill, physically disabled, and mentally disabled patients in a nursing home or long-term home healthcare setting.

26. **Manage care:** A system of healthcare delivery that influences or controls utilization of services and costs of services.

27. **Medicaid:** A federally aided, state-operated and administered program which provides medical benefits for certain indigent or low-income persons in need of health and medical care. The program, authorized by Title XIX of the Social Security Act, is basically for the poor. It does not cover all of the poor, however, but only persons who meet specified eligibility criteria. Subject to broad federal guidelines, states determine the benefits covered, program eligibility, rates of payment for providers, and methods of administering the program.

28. **Medical savings account (MSA):** An account similar to an individual retirement account (IRA) into which employers and employees can make tax-deferred contributions and from which employees may withdraw funds to pay covered healthcare expenses.

29. **Medicare:** It is Title XVIII of the Social Security Amendment of 1965. The primary health insurance program for people age 65 and older, and those with certain disabilities. Medicare coverage provides acute hospital care, physician services, brief stays in skilled nursing facilities, and short-term skilled home care related to a medical problem. Medicare coverage is determined by the nature of services required by the patient, not the specific diagnosis. Coverage is restricted to medical care, and does not include prescription drugs or custodial care at home or in nursing homes. It is comprised of two major programs:

Hospital Insurance (Part A) and Supplementary Medical Insurance (Part B). The Medicare coverage for Part A has no premium and will pay 100% of a patient's hospital costs for the first 60 days after he/she has paid a deducible of about $720. Medicare Part B pays up to 80% of the patient's doctor bills for a monthly premium of about $50.

29.A. **Medicare Plus:** This Medicare plan gives the option to beneficiaries to chose any plan available where they live, to include fee-for-service (FFS), coordinated care through HMOs, PPOs, POS plans, and PSNs, and a $6000 deductible plan with a medical savings account, union or association plans.

29.B. **Medicare + Choice:** Medicare Part C, formerly known as "Medicare+Choice," is now known as "Medicare Advantage." The introduction of the Medicare+Choice program represents what is arguably the most significant change in the Medicare program since its inception in 1965. As its name implies, the primary goal of the Medicare + Choice program is to provide Medicare beneficiaries with a wider range of health plan choices to complement the original Medicare option. Alternatives available to beneficiaries under the Medicare+Choice program include both the traditional managed care plans (such as HMOs) that have participated in Medicare on a capitated payment, as well as a broader range of plans comparable to those now available through private insurance.

30. **Medi Gap:** It is also known as Medicare Supplement Insurance, a type of private insurance coverage that may be purchased by an individual enrolled in Medicare to cover certain needed services that are not covered by Medicare Parts A and B.

31. **Morbidity:** An episode of sickness, as defined by a health professional. A morbidity rate is the number of such episodes occurring in a given population during a given period of time.

32. **Mortality:** A death. A mortality rate is the number of deaths occurring during a given period of time.

33. **Natality:** A live birth. The natality rate is the number of live births occurring in a given population during a given period of time.

34. **Per diem payment:** An amount a payor will pay for one day of care, which includes all hospital charges associated with the inpatient day (including nursing care, surgeries, medications, etc.).

35. **Point-of-service plan (POS):** A type of managed care plan combining features of health maintenance organizations (HMOs) and preferred provider organizations (PPOs). A patient can decide whether to go to a network provider and pay a flat amount or to an out-of-network provider and pay a deductible and/or a coinsurance charge.

36. **Preferred Provider Organization (PPO or PPA):** A Preferred Provider Organization (PPO) provides a list of contracted "preferred" providers from which to choose. Patients receive the highest monetary benefit when they limit their healthcare services to those providers on the list. If they go to a doctor or hospital that is not on the preferred provider list referred to as going "out-of-network," then the plan covers a smaller percentage of their healthcare expenses or may cover none of their healthcare expenses based on the contract wording of the plan.

37. **Quality assurance:** A formal set of activities to measure the quality of service provided; these may also include corrective measures.

38. **Reinsurance:** Insurance purchased by a health plan to protect it against extremely high cost cases.

39. **Staff model HMO:** An HMO that employs providers directly, and those provider see members in the HMO's own facilities. A form of closed panel HMO.

40. **Account Receivable Collection Period:** The amount of time between when the sale is made and the cash is collected.

41. **Goodwill:** Benefits to a pharmacy arising out of its reputation, continued patronage, favorable location and similar intangible advantages.

42. **Intangible assets:** Assets which are of value to the pharmacy and which may produce income but do not have a readily determinable value, e.g. Goodwill

43. **Tangible assets:** Touchable assets which have physical form and qualities, e.g. inventory, fixtures, etc.

44. **AAC (Actual Acquisition Cost):** The actual price paid by a pharmacy after all trade, volume and cash discounts.

45. **AWP (Average Wholesale Price):** The published "list price" of a particular drug product.

46. **EAC (Estimated Acquisition Cost):** The third party's estimate of the price paid by pharmacies for a particular drug product.

47. **MAC (Maximum Allowable Cost):** The maximum amount that will be paid by a third party to a pharmacy for a particular product.

48. **Acquisition cost:** The cost at which a product is acquired from a direct or indirect source; it includes all discounts except the cash discount.

49. **Cost of dispensing:** The sum of all direct expenses, indirect expenses and losses due to reductions. When the cost of dispensing is be related to a specific professional fee, this sum is divided by the estimated number of prescriptions to be dispensed.

50. **Elasticity of demand:** A measure of the extent to which the sale of quantities of a product will change in response to a change in price or other merchandising variable.

51. **Direct expenses:** Operating costs that occur for a department only because it exists.

52. **Indirect expenses:** All facilitating operating costs generated by the business for the benefit of its department; overhead expenses.

53. **Variable expenses:** Operating costs which increase or decrease directly with sales volume change, however not always to the same degree.

54. **Differential analysis:** The process of estimating the consequences of alternative actions that decision-makers take. Differential costs are the costs that increase when taking a particular course of action. Differential revenue is the additional revenue that accrues by taking a particular course of action.

55. **Drug Utilization Review (DUR):** It is the type of study that is conducted by health plan sponsors to monitor the frequency and usage of prescription drugs. The review can range from assessing the number of prescriptions per member per month, to an evaluation of compliance with therapeutic guidelines. A review of paid claims is called "retrospective DUR," a review conducted at the time of prescription dispensing is known as "concurrent DUR", and a review that is conducted prior to dispensing the prescription is known as "prospective DUR."

56. **Earned discount:** The difference between AWP and AAC is known by earned discount. This discount is normally greater for pharmacies that buy in larger volume and have more efficient purchasing practices.

57. **Exclusive Provider Arrangement (EPA):** A managed healthcare system that limits the number of providers that may participate. It is also known as a "closed panel."

58. **Pharmacy Benefit Management (PBM):** The company which contracts with the pharmacy and manages the logistical functions of the third party program on behalf of the corporate purchaser of a prescription drug benefit program.

59. **Prospective reimbursement:** A form of reimbursement in which a pharmacy is paid in advance an amount estimated to cover prescriptions that will be dispensed to plan beneficiaries later. There are several payment methods that fall under the umbrella of PPS: DRGs (inpatient admissions); APCs (outpatient visits); RBRVS (professional services); and RUGs (skilled nursing home care).

60. **Retrospective reimbursement:** A form of reimbursement in which the pharmacy is paid after submitting a claim for a prescription dispensed to a plan beneficiary. Also called "fee-for-service."

61. **Adjusted Average Per Capita Cost (AAPCC):** It is normally used by the Healthcare Financing Administration as the calculation for funds required to care for Medicare recipients. The risk contract reimbursement is 95% of the AAPCC fee-for-service expenditures on a 5 year rolling average for a county.

62. **Agency for Healthcare Policy and Research (AHCPR):** It was created by congress in 1989 under Public Law 101-239 as a public health service agency to collect and share information to improve healthcare delivery.

63. **Capitated payment:** A contractually agreed fee (monthly, bimonthly, or annual) paid by an HMO or CMP to either an IDN, hospital, physician, or group practice, in exchange for healthcare services to enrolled members.

64. **Case mix:** A manner of describing the tendency of a group of covered lives to utilize services, in terms of the frequency and intensity of hospital admissions or services reflecting different needs and uses of hospital resources. It can be measured based on patient's diagnosis, severity of a patient's illness, the utilization of services, and the characteristics of a hospital. Case mix influences ALOS, cost, and scope of services provided by a hospital.

65. **Health risk assessment (HRA):** A health promotion or wellness program used to evaluate the health status of a patient or employee, which can either be performed on-site or off-site from the work location, through an automated or written format of questions and answers. Programs may evaluate general health status or may be more targeted toward cardiovascular health, with related risks and recommendations for how to reduce risks.

66. **Medicare Risk Contract:** The Medicare Risk Contract program was initially authorized in 1982 to allow Health Maintenance Organizations (HMOs) and similar organizations to contract with Medicare. In return for a per-capita payment, the organization is at full risk for providing medically necessary Medicare services to enrolled beneficiaries. The risk contract program has gradually grown to include 12.5 percent of beneficiaries in mid 1997. Problems with the adjusted average per capita cost and the lack of choices other than HMOs, however, appears to have limited the growth of this program and helped convince Congress to enact changes.

67. **Medical Loss Ratio (MLR):** The ratio between the cost to deliver medical care, versus how much revenue is made from premiums. Insurance companies often have a medical loss ratio of 96 percent or more. The tightly managed HMOs may have medical loss ratios of 75 percent to 85 percent. It is a common way to find out the efficiency of a given HMO or health plan.

* MLRs have been reduced during the 1990s, from low 90% to the 70% range, but in recent years, they may be swinging back up as profitability is challenged.

68. **Management Service Organization (MSO):** An organization that provides practice management, administrative, and support service to individual physicians or group practices. Also known as a Medical Service Organization or a Shared Services Organization (SSO).

69. **Per Member per Month (PMPM):** Applies to a revenue or cost for each enrolled member each month.

70. **National Committee for Quality Assurance (NCQA):** The National Committee for Quality Assurance (NCQA) is an independent, non-profit organization dedicated to measuring the quality of America's healthcare. The organization is governed by a Board of Directors that includes employers, consumer and labor representatives, health plans, quality experts, regulators, and representatives from organized medicine.

* Its mission is to improve the quality of healthcare delivered to people everywhere. To achieve this goal, NCQA's efforts are organized around two activities, accreditation and performance measurement (report cards), which are complementary strategies for producing information to guide a patient's choice.

71. **P & T Committee:** The main focus of the committee is to develop policy and educate healthcare professionals on various aspects of healthcare-related subjects. As far as development of policy concerns, most policies are related to evaluate and select drugs to be included in the formulary. The P & T committee also develops other policies pertaining to drug therapy to ensure safe and cost-effective drug therapy.

72. **Zero premium:** In some Medicare marketplaces, there is a practice of not charging any added monthly premium (also known as zero premium) to (plan members) what is already paid for coverage of the Part B Medicare program, versus the practice of an HMO getting a monthly premium in addition to what is paid to the federal government by the patient.

73 **Accelerated Death Benefit:** A benefit that allows a terminally ill insured to receive part of the face amount of their life insurance policy in advance of their death, as either in one lump sum or in installments.

74. **Psychometrics**: The science of measuring the characteristics of human behavior, personality, cognitive abilities, interests, or aptitudes.

75. **Validity:** A test is said to be valid if it measures what it claims to measure. There is no one validity coefficient for a test. A test is always valid for some purpose, and therefore is more valid in some circumstances than in others.

76. **Construct Validity:** This refers to whether a test is measuring what it claims to measure as judged by accumulated evidence. A variety of statistical techniques can be used to see if the test behaves in ways predicted by the given construct. For example, a new test of computer programming skills would be expected to correlate highly with other valid tests of computer skills. Conversely, this new test would be expected to have little correlation with a different type of test (such as a test of social intelligence).

77. **Concurrent Validity:** A test is said to have concurrent validity if it correlates highly with a "benchmark" test of the same variables.

78. **Content Validity:** This refers to tests such as skills, ability or attainment tests where the domain of items is very defined. A test with good content validity represents and samples adequately from the curriculum or content domain being tested. This kind of validity involves logical comparisons and judgments by the test developers rather than a specific statistical technique. For example, a high school biology test has content validity if it tests knowledge taken from biology textbooks assigned to students and reinforced by teachers in their instructional program.

79. **Criterion Validity:** It is the degree to which a test predicts some criterion (measure of performance), usually in the future. To ascertain this kind of validity, evaluators look at the correlation between the test and the criterion measure. For example, a college admission test has criterion validity if it can predict some aspect of college performance (e.g., grades, degree completion).

80. **Concurrent Criterion-Related Validity:** This refers to evidence of criterion validity in which predictor and criterion information are obtained at approximately the same time.

81. **Predictive Criterion-Related Validity:** This refers to evidence of criterion validity in which criterion scores are observed at a later date (e.g. after job performance).

82. **Face Validity:** An instrument is said to be face valid if it appears to be measuring what it claims to measure.

83. **Predictive Validity:** A test is said to have predictive validity if it will predict some variable.

84. **Synthetic Validity:** This refers to the practice of using validity generalization to "synthesize" the criteria for a new job through extrapolation from known predictive criteria in other jobs.

85. **Validity Generalization:** This refers to applying validity evidence obtained in one or more situations to other similar situations on the basis of simultaneous estimation, meta-analysis, or synthetic validation arguments.

86. **Validity Scales:** This refers to any of a variety of scales designed to indicate exaggeration, faking, equivocation, or deception by test participants.

87. **Reliability:** The extent to which we are measuring some attribute in a systematic and therefore repeatable way. For an instrument to be reliable, its results must be reproducible and stable under the different conditions in which it is likely to be used. Test reliability is decreased by errors of measurement. Three commonly used types of reliability include:

1. Test-retest reliability: The degree to which a score on one instrument is equivalent to the score on the same or a parallel instrument

2. Internal consistency reliability: The degree to which items within an instrument correlate to each other

3. Inter-rater reliability: The degree to which the measuring instrument yields similar results at the same time with more than one assessor

88. **Decision analysis:** A technique used to aid decision-making under conditions of uncertainty by systematically representing and examining all of the relevant information for a decision and the uncertainty around that information. The available choices are plotted on a decision tree. At each branch, or decision mode, the probabilities of each outcome that can be predicted are estimated. The relative work or preferences of decision-makers for the various possible outcomes for a decision can also be estimated and incorporated in a decision analysis.

89. **Cost minimization analysis (CMA):** It is used to define the most economical treatment among different alternatives with equal efficacy/effectiveness and safety profiles.

90. **Cost effectiveness analysis (CEA):** It compares treatment alternatives with different efficacy/effectiveness and safety profiles. While costs are calculated in monetary value, outcomes are valued in clinical terms (e.g. drop in value of HbA1c, blood pressure, number of cases cured). Moreover, in the so-called lifetime CEA, outcomes are measured as years of life gained with the new treatment as compared with the standard of care treatment.

91. **Cost-utility analysis (CUA):** In this type of analysis, the cost is measured in monetary value and outcomes in clinical terms incorporating patient preferences (e.g. quality of life measures). Often the utility measure used is a "quality adjusted life year" (QALY) gained. QALY incorporates both quantity and quality of life. The use of QALY as a measure of outcomes, allows a direct comparison among cost-utility ratios from different pharmacoeconomic analyses. The preferred treatment alternative is that with the lowest cost per QALY. Possible alternative measures are healthy year equivalents (HYE) or saved young life equivalents. The first measure is very difficult to compute, while the latter is not as broadly known and used as QALYs.

92. **Cost-benefit analysis (CBA):** Both costs and benefits of a treatment are measured in monetary values. Future costs and benefits are discounted to their current value. Although considered the best economic analysis , its application in pharmacoeconomics and healthcare in general is limited, due to the difficulties in assigning a monetary value to health outcomes and a patient's life.

93. **Ambulatory Procedure Classifications (APCs):** Enacted by the federal government in 2000, a prospective payment system for outpatient services, similar to DRGs, which reimburses a fixed amount for a bundled set of services.

94. **APC:** A flat fee payment system implemented by the federal government to control the payment for outpatient services provided to Medicare recipients.

95. **Breakeven analysis (BEA):** A technique to analyze the relationship among revenues, costs, and volume. It is also called Cost-Volume-Profit analysis (CVP).

96. **Breakeven point:** The point where total revenues equal total costs.

97. **Future Value (FV):** It is defined as what an amount invested today will be worth at a given time in the future using the compounded interest method, which accounts for the time value of money.

98. **Horizontal analysis:** A method of analyzing financial statements which look at the percentage change in a line item from one year to the next. It can be calculated by using the following formula: (subsequent year - previous year) / previous year.

99. **Trend analysis:** A type of horizontal analysis that looks at changes in line items compared to a base year. It can be calculated by using the following formula:

    [(any subsequent year - base year)/base year] x 100.

100. **Vertical analysis:** A method to analyze the financial statements which answer the general questions: What percentage of one line item is another line item? It is also known as common size analysis because it converts every line item into a percentage, thus allowing comparisons among the financial statements of different organizations.

101. **Sunk costs:** Costs incurred in the past.

102. **Sinking fund:** A fund into which monies are set aside each year to ensure that a bond can be liquidated at maturity.

103. **Pure Food and Drug Act of 1906:** Congress passed this law in 1906 to protect people from unsanitary and poorly labeled food.

104. **Food, Drug and Cosmetic Act of 1938:** This law suggests that no new drug can be marketed until proven safe by the FDA for public use.

105. **Durham Humphrey Amendment of 1951:** This law is also known as the "Prescription Drug Amendment." It differentiates between prescription and OTC drugs. It also authorizes oral prescriptions and prescription refills. It suggests that each drug should be labeled "Caution: Federal law prohibits dispensing without a prescription."

106. **Kefauver Harris Amendment of 1962:** It is also known as the "Drug Efficacy Amendment". This law indicates that new approved drugs must be safe as well as effective. It also establishes Good Manufacturing Practice requirements.

107. **Medical Device Amendment of 1976:** This law was passed in 1976, and includes:

I The classification of medical devices
II Safety and efficacy of medical devices

108. **Orphan Drug Act of 1983:** This law was passed for orphan drugs (drugs for diseases that affect very few people). Congress passed this act to provide tax relief and other incentives for the manufacturers to develop and market orphan drugs.

109. **Drug Price Competition and Patent Term Restoration Act of 1984:** This law is also known as the Waxman Hatch Amendment. This law was passed to make generic drugs more readily available to the public. This law also provides more incentive to innovative pharmaceutical companies and encourages them to develop new drugs.

110. **Poison Prevention Act:** This law was implemented to prevent the death of children from accidental poisoning. This act was passed in 1973. It indicates that all dispensed drugs are required to be in a child proof container.

Table-1

Name	Causative organism	Recommended dose
Diptheria	Corynebacterium diphtheria	Adult dose, boost every 10 years.
H.Influenza b	H.influenza	Most children have 3 to 4 doses between age 2 months to months.
Hepatitis A	HAV	3 doses at 1 month, 6 to 12 months old, and for patients age 2 years to 18 years, while 2 doses every 6 months to 1 year apart for patients age more than 18 years.
Hepatitis B	HBV	3 doses at 1 to 2 months old for infants and adults.
Influenza	Influenza	1 dose every year
Measles, Mumps	Measles, Mumps and Rubella	2 MMR vaccine at 12-15 months of age, and Rubella and again at 4 to 6 years of age.
Pertussis	B.Pertusis	It should be given to children ages 6 weeks to 7 months.
Poliomyelitis	Polio virus	It should be given at 2 months, 4 months, 12-18 months, and at 4 to 6 years.
Pneumococcal	S. pneumonia	1 dose
Tetanus	Clostridium tetani	3 to 4 doses plus booster every 10 years.

Table-2

Drugs with a prolonged half-life

* Chlorpropamide
* Corgard
* Piroxicam
* Amiodarone
* Bromocriptine
* Azithromycin
* Clofazimine

Table-3

DISULFIRAM REACTION PRODUCING DRUGS

* Metronidazole
* Chlorpropamide
* Cefotetan
* Cefoperazone
* Moxalactam
* Cefamandole
* Tolbutamide
* Acetohexamide
* Glyburide
* Glipizide
* Disulfiram

DRUGS THAT PRECIPITATE DISULFIRAM-LIKE REACTIONS WITH TABLE-3

* Alcohol
* Benadryl Elixir
* Digoxin Elixir
* Lanoxicap

PLATELET AGGREGATION INHIBITORS

* Cefamandole
* Cefoperazone
* Moxalactam
* Cefotetan
* Plicamycin
* Ketorolac
* Aspirin
* Ticlopidine
* Clopidrogel

URINE DISCOLORATION PRODUCING DRUGS

* Phenazopyridine
* Senna
* Rifampin
* Phenolphthalein
* Levodopa
* Sulfasalazine

DRUGS THAT REQUIRE A PATIENTS PACKAGE INSERT

* Isotretinoin
* Oral contraceptives
* Isoproterenol
* Ticllopidine
* Progesterone
* Estrogen
* Intrauterine devices

DRUGS CONTRAINDICATED DURING PREGNANCY

* Isotretinoin
* Tetracycline
* Chloramphenicol
* Sulfonamide
* Misoprostol
* Finasteride
* Methimazole
* Warfarine
* Metronidazole
* Valproic acid
* Lithium carbonate
* Alcohol

DRUGS & THEIR NORMAL BLOOD THERAPEUTIC CONCENTRATIONS

*	Digoxin	0.7 to 1.4	ng/ml	Primidone	04 to 12 mcg/ml
*	Phenytoin	10 to 20	mcg/ml	Vancomycin	05 to 15 mcg/ml
*	Amikacin	10	mcg/ml	Lithium	0.6 to 1.2 mEq/L
*	Carbamazepine	10 to 20	mcg/ml	Valproic acid	40 to 100 mcg/ml
*	Gentamicin	2	mcg/ml	Haloperidol	05 to 20 ng/ml
*	Tobramycin	2	mcg/ml		
*	Fosphenytoin	10 to 20	mcg/ml		
*	Theophylline	10 to 20	mcg/ml		
*	Streptomycin	5	mcg/ml		
*	Digitoxin	09 to 25	mcg/ml		
*	Quinidine	02 to 06	mcg/ml		
*	Carbamazepine	04 to 12	mcg/ml		
*	Phenobarbital	10 to 40	mcg/ml		

ANTIDOTE OF DRUGS	DRUGS
Naloxone=Narcan	Opioid
Nalmefene=Revex	Opioid
Naltrexon= Revia	Opioid
Digoxinfab=Digibind	Digoxin, Digitoxin
LeucovorinCa^{+2}= Wellcovorin	Methotrexate, Trimethoprim,
Mesna = Mesnex	Cyclophosphamide, Ifosfamide
Vitamin K	Coumadin
Protamine sulfate	Heparin
Deferoxamine = Desferal	Iron
Dimercaptol	Arsenic, Gold
Sodium thiosulfate	Cyanide
Flumazenil=Romazicon	Benzodiazepine
Physostigmine=Antilirium	Atropine, Anticholinergic
Acetylcysteine= Mucomyst	Acetaminophen
Dexrazoxane=Zinecard	Doxorubicin
Pralidoxime = Protopam cl	Organophosphorus compound
Glucagon	Insulin
Edetate disodium	Digitalis toxicity, hypercalcemia
Edetate calcium disodium	Lead
Atropine	Acetylcholine, Cholinergic agent
Hydroxocobalamin	Cyanide
LeucovorinCa^{+2}= Wellcovorin	Pyrimethamine

DRUGS THAT CAUSE PHOTOSENSITIVITY REACTION

* Accutane
* Micronase
* Retin-A
* Bactrim
* Carbamazepine
* Sulfonylureas
* Cipro
* DiaBeta
* Doxycycline
* Griseofulvin
* Methotrexate
* Noroxin
* Rheumatrex
* Sulfonamide
* Tetracycline
* Thiazide diuretic
* Tricyclic antidepressant
* Glucotrol

ABBREVIATIONS

*	aa	of each	*	D.A.W	dispense as written
*	N and V	nausea and vomiting	*	gtt	drop
*	a.c.	before meals	*	a.m.	morning
*	p.c.	after meals	*	p.m.	evening
*	a.d.	right ear	*	h.s	at bed time
*	a.s.	left ear	*	o.d.	right eye
*	a.u.	both ears or each ear	*	o.s.	left eye
*	q.d	daily	*	o.u.	both eyes or each eye
*	b.i.d.	twice daily	*	O2	both eyes
*	t.i.d	three times daily	*	p.o.	by mouth
*	q.i.d	four times daily	*	pr	per rectum
*	q.o.d	every other day	*	q.6h	every 6 hours
*	pt.	pint	*	prn	as needed

DRUGS THAT CAUSE ENZYME INDUCTION

* Rifampin
* Carbamazepine
* Phenobarbital
* Troglitazone
* Phenytoin
* Nicotine
* Omeprazole
* Rifabutin

DRUGS THAT CAUSE ENZYME INHIBITION

* Ciprofloxacin
* Cimetidine
* Erythromycin
* Fluvoxamine
* Ketoconazole
* Nelfinavir
* Clopidogrel
* Ritonavir

STOOL DISCOLOR PRODUCING DRUGS

Drug	Color
Rifampin	Red orange
Phenolphthalein	Red
Phenazopyridine	Red
Antacid	White
Kao-pectin	Black
Iron salt	Black brown
Warfarin	Black

DRUGS THAT NEED TO BE STORED IN REFRIGERATOR

Calcimar
Xalatan (opthalamic solution)
Viroptic (opthalamic solution)
Opthetic (opthalamic solution)
Fluorocaine (opthalamic solution)
Occusert Pilo
Phospholine Iodine (opthalamic solution)
Erythromycin Ethyl Succinate Suspension
Promethazine suppository
Fosphenytoin (Injection)
Bicillin-LA (Injection)
Mose (Injection)
Harvix-A (Injection)
Neupogen (Injection)
Thyrolar
Mycostatin pastilles
Fortovase capsules
Norvir Capsules
Calcitonin Salmon (Injection, nasal spray)
Bacid (dietary supplement)
Lactinex (dietary supplement)
Sterile Bacitracin powder
Diltiazem injection
Pepcid injection
Urokinase
Sus-Phrine (injection)
Dornase-alpha
Tetanus Toxoid
Hepatitis-A
MMR vaccine
Wycillin (Injection)
Bicillin (Injection)
Permapen (Injection)
Intron-A (Injection)
Epogen (Injection)
Neupogen (Injection)
Hyperstat (Injection)
Sandostatin (Injection)
Novolin (Injection)
Humulin (Injection)
Regranex (Cream)

COMMONLY USED UNITS FOR PHARMACEUTICAL CALCULATIONS

*	1 kilogram	=	1000 grams				
*	1 gram	=	1000 milligrams				
*	1 milligram	=	1000 micrograms				
*	1 microgram	=	0.001 milligrams				
*	1 microgram	=	10^{-6} grams				
*	1 nanogram	=	10^{-9} grams				
*	1 grain	=	65 milligrams				
*	1 liter	=	1000 cc				
*	1 ounce (oz)	=	30 cc				
*	16 ounce (oz)	=	480 cc	=	1 pint		
*	1 pint	=	480 cc				
*	1 quart	=	960 cc	=	2 pints		
*	1 gallon	=	3840 cc	=	8 pints	=	4 quarts
*	1 kg	=	2.2 lbs				
*	1 lb	=	454 grams				
*	1 teaspoonful	=	5 cc				
*	1 tablespoonful	=	15 cc				
*	1 teacupful	=	120 cc				
*	Density	=	weight/volume				
*	Proof gallon	=	(gal x % v/v strength) / 50% v/v				
*	% strength	=	proof spirit / 2				
*	Proof gal	=	(gal x proof spirit) / 100				
*	PV	=	nRT				
*	PV	=	W/M x R x T				
*	Equivalent wt	=	molecular weight / number of valence				
*	mEq	=	equivalent weight in mg / 1000				
*	mOsmol/L	=	(weight of substance [g/L] x no of species x 1000) / mol wt				
*	pH	=	pKa + log (salt/acid)				
*	Young (child)	=	(age in years / age + 12) x adult dose				
*	Clark's	=	(weight in lbs / 150) x adult dose				
*	Child's dose	=	(body surface area of child / 173 mm^2) x adult dose				
*	Fried's rule	=	(age in months / 150) x adult dose				
*	FP of blood	=	-0.52°C				

*	Each gm of hydrous dextrose provides	=	3.4 calories / kcal
*	Each gm of anhydrous dextrose provides	=	4 calories / kcal
*	Each gm of fat provides	=	9 calories / kcal
*	Each gm of protein/aminoacid provides	=	4 calories / kcal
*	Each gm of medium chain triglyceride (mct)	=	8.3 calories / kcal
*	Each gm of glycerol provides	=	4.3 calories / kcal
*	Each cc of alcohol provides	=	5.6 calories / kcal
*	1 cc of 10% fat emulsion provides	=	1.1 calories / kcal
*	1 cc of 20% fat emulsion provides	=	2.0 calories / kcal