**Design and implementation of TPN therapy**

The contents of TPN are customized according to the patient's condition and needs, the venous route, relevant laboratory values, and weight. Orders for the contents may be changed daily. In general you have to follow these steps:

**1. Calculate the daily fluid amount required:** The patient's daily fluid requirement can be calculated based on body weight or on energy requirements. The following formula uses the body weight:

**1500 mL for the first 20 Kg + 20 mL/Kg of actual weight**

Fluid requirements increase in fever, fistulas and diarrhea. They decrease in renal failure, congestive heart failure, cirrhotic ascites and pulmonary diseases.

**2. Calculate the daily calorie needs:** The amount of energy required to maintain the body's normal metabolic activity, such as,respiration and maintenance of body temperature, is known as ***basal energy expenditure (BEE).*** It is calculated by the **Harris-Bendict Equation*,*** which states that:

**BEE (male) = 66.67 + 13.75 W + 5H - 6.7A**

**BEE (female) = 66.51 + 9.56W +1.85H - 4.68A**

***H= height in centimeters, W= weight in kg, A= age in years***

***Note:*** In patients losing weight, nutrient calculations should be based on actual body weight. For obese patients whose body weight is more than 120% of their ideal body weight, calculations are based on ideal body weight (adipose tissue is metabolically inactive).

Adjusted IBW for obesity

 Female: ([actual weight – IBW] x 0.32) + IBW

 Male: ([actual weight – IBW] x 0.38) + IBW

Patients under various degrees of stress require larger amounts of energy to meet their metabolic demands. The total caloric needs of those patients are known as: ***resting energy expenditure (REE)*** andobtained by multiplying (BEE) by certain factors as follows:

**REE = BEE x stress factor**

|  |  |
| --- | --- |
| **Stress condition** | **Stress factor** |
| Starvation  | 0.75-1.0 |
| Normal, non-stressed, confined to bed | 1.0-1.2 |
| Post elective surgery with no complications (out of bed)  | 1.2-1.35 |
| Moderate stress (chronic illness) | 1.35-1.5 |
| Severe stress (acute illness, severe infection, trauma or ventilation)  | 1.5-1.8 6 |
| More than 20 % BSA burn  | 1.5 to 2.0 |

The calculated calories can be obtained from carbohydrates, fats or proteins, according to the patient needs.

Non protein calories:

Formed of dextrose and lipids and used to provide a patient's energy needs. The preferred mixture combines 70% - ­85% of calories from dextrose and 15% - 30% from lipids.

Total calories:

Includes protein in the calculation of energy Protein is needed for tissue synthesis and repair and thus amino acids are not routinely used for basic energy requirements, except for patient with excessive energy needs. A three-in-one solution, or total nutrition admixture, combines lipids, amino acids and dextrose. The solution is white because of lipids, which make precipitation difficult to observe.

Estimate protein needs, being sure that total protein amounts do not exceed 15% of total caloric intake.

**3. Refer to the hospital formulary:** to determine the volumes of dextrose, amino acids and proteins needed to compound your TPN base.

**4. Add sterile water** to complete the required volume and to dilute concentrated dextrose and amino acid sources to yield final concentrations of up to 5% amino acid and 25% and dextrose.

**5. Add electrolytes, vitamins and trace elements** (micronutritionals) to the protein and dextrose mixtures depending on the stability of the mixture.

***Case Study:***

A.S. is a 65 year old male who was admitted to the hospital due to losing weight, weakness with upper quadrant pain and dark urine for the last two weeks. He said he had been feeling well, with good appetite. No other complaint such as liver disease, respiratory distress or food intolerance was reported. He is currently taking no medication. He had been a heavy drinker and smoker, but quit these habits ten years ago.

He is 5 feet and 6 inches and his weight is 110 pounds (50 Kg). His medical records indicate that his weight was 160 pounds one month ago. Lab values are all within normal limits, except lymphocytes 6% (15-40) and alkaline phosphatase of 2231 IU/L (77-260).

After admission, the physician asked the pharmacist to design a TPN to deliver a non-protein calorie formula of 2000 Cal/day with 60 gram amino acid with an infusion volume of 2 liters before a possible surgery.

**PHARMACIST CALCULATIONS:**

1. Calculate the patient's daily fluid requirement

mL/day = 1500 mL for the first 20 Kg + 20 mL/Kg of actual weight.

 = 1500 mL + 20 mL X 30 kg = **2100 mL**

2. Calculate the daily caloric requirements for this patient

BEE men = 66.67+13.75 (Weight) +5 (Height) -6.76 (Age)

 = 66.67+13.75 (50Kg) +5 (165 Cm) -6.76 (65Y)

 = 66.67 + 687.5 + 825439 = 1140 Calories.

Activity factor for ambulatory patients is 1.3.

REE = 1140 X 1.3 = **1480 Calories**

The use of fat in this patient is not recommended and the physician wants a carbohydrate based nutrient formula.

1 gm dextrose = 4 Cal/gm

1 g x 3.4 Cal X = **500 gm** total dextrose

 X 2000 Cal

3. Calculate protein intake:

Patient is moderately stressed and based on his weight he needs 1-1.2 g/Kg/day 1.2gm X 50 = **60 gm** protein that can be given as synthetic amino acid (one gram of AA equals one gram of protein).

4. Hospital Formulary includes:

Dextrose 70% in water, Amino Acid (10%) and Sterile Water. Volumes needed to compound the required 2100 ml TPN base are calculated as follows:

Dextrose: 70 g x 100 mL X = **715 mL**

 500 g X

Amino acid: 10 g x 100 mL X = **600 mL**

 60 g X

Water = 2100 mL – (715 mL dextrose + 600 mL AA)

 =. **785 mL**

The physician orders the TPN therapy by filling certain forms. Beside checking the calculations and filling the order according to the directions. The pharmacist should calculate the concentrations of nutrients per TPN bag to show the differing strengths and percentages of additives for central and peripheral lines. Percentage of additives is calculated also to ensure that the mineral requirements are being met. The nurse responsibility is to check the physician's order to determine the correctness of filling the order by the pharmacy.

***Case Study:***

A.S. is a 50 year old female who was admitted to the hospital due to a burning accident with a third degree burn. No other complaint such as liver disease, respiratory distress, or food intolerance was reported. She is currently taking no medication. She is non-smoker. She is 5 feet and 1 inches and her weight is 120 pounds. Her medical records indicate that her weight was 130 pounds before the accident. Lab values are all within normal limits.

After admission, the physician asked the pharmacist to design a TPN to deliver a non-protein calorie formula of 1800 Cal/day with 70 gm amino acid with an infusion volume of 2 liters. The TPN therapy should be designed in a way that the calorie intake from the fats not more than 15% of the total calorie requirement. Stress factor for burns is 2.

**PHARMACIST CALCULATIONS:**

Calculate the patient's daily fluid requirement

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Calculate Basal Energy Expenditure (BEE) for this patient

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Calculate the amount of fats required to fill this order?

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Calculate the amount of Dextrose knowing that 1 gm dextrose provides 4 Cal

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What is the concentration of Amino acid required?

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Hospital Formulary includes: Dextrose 70% in water, Amino Acid (10%) and Sterile Water. What are the volumes (Dextrose, amino acids and water) needed to compound the whole TPN base?

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**INTREVENOUS CALCULATIONS**

Medications (additives) can be added to the IV by the manufacturer, pharmacist or nurse. The physician orders the medication, strength and amount, as well as, the type and amount of diluent. It is important that the person responsible for the IV understand the actions of the medication, flow rate, adverse reactions and antidotes. IV fluids flows directly into the vein, resulting in immediate action, and cannot be retrieved. Therefore, it is imperative that the correct calculations, medications, and flow rate be administered.

There are two steps in IV calculations:

1. The first is to find out how many ml/hr (volume) the IV is ordered to infuse.
2. The second is to calculate drops/min needed to infuse the ordered volume. Analyze the problem.

If the order reads to infuse the IV for X hours, calculate the ml/hr by beginning with step 1. If the order reads to infuse the IV at X ml/hr, begin with step 2.

ml / hr = total volume (TV)

 total time (hours)

drops / min = drop factor (DF) x total hourly volume

 time (min)

IV flow rate (drops / min) = TV x DF

 T1 T2

TV: volume to infuse

T1: time to infuse (hr or min)

T2: time in minutes. It is always 60 unless you are going to infuse for less than 60 minutes.

DF: drop factor. It is the number of drops in 1 ml (or 1 cc). Drop factors of 10, 12, 15, and 60 (microdrip) are the most common. The drop factor is determined by the manufacturer and is found on the IV tubing package.

***Example:***

Calculate the IV flow rate if D5W is to infuse at 83 ml/hr. the drop factor is 10.

drops / min = DF x total hourly volume

 time (min)

 = 10 x 83 = 13.8 or 14 drops/min

 60

Drops cannot be timed in tenths, only in whole numbers. If the decimal is greater than 0.5, round to the next higher number.

***Example:***

How many drops/min to infuse 1000 ml in 6 hours. The drop factor for the tubing is 10.

drops / min = TV x DF

 T1 T2

 = 1000 ml x 10 = 27.8 = 28 drops/min

 6 hr 60 min

The same formula may be used to calculate drop rates for fluids administered in less than 1 hour.

***Example:***

Ordered: Gentamycin 40 mg/100 ml IV q.6 h. drop factor 15 d/ml. your drug book says you can give this in 45 min. How many drops/min to will you infuse it?

drops / min = TV x DF

 T1 T2

 = 100 ml x 15 = 33 drops/min

 1 hr 45 min

Electronic infusion devices are one of the IV delivery sets used in hospitals, home care and ambulatory care settings. They are battery operated pumps that deliver a set amount of IV fluid per hour. When using an IV pump, the rate is in ml/hr. Therefore, you do not need to determine a drop factor.

***Example:***

Infuse Ancef 1 g/50 ml IV q.6 h. The IV handbook states that this can be given in 20 minutes. What rate will you set on the IV pump?

ml / hr = total volume (TV)

 total time (hours)

 = 50 ml = 150 ml/hr

 20/60 hours

You need to give 50 ml in 20 minutes, but you have to convert the minutes to hours.

When the IV tubing is microdrip (60 d/ml) the drop/min will be the same as the ml/hr

***Example:***

Ordered: 1000 ml to infuse in 8 hours with a microdrip set. Calculate the drop/min.

ml / hr = total volume (TV) = 1000 = 125 ml/hr

 total time (hours) 8 hr

drops / min = D F x V/hr = 60 x 125 = 125 drop/min

 t (min) 60

**Percentage of solute in IV bags:**

The abbreviation letters indicate the solution components, and the numbers indicate the solution strength or concentration of the components. The numbers may be written as subscripts in the medical order.

***Example:***

Suppose an order includes D5W. This abbreviation means "Dextrose 5 % in Water" and is supplied as 5 % Dextrose injection. This means that the solution strength of the solute (dextrose) is 5 %. The solvent is water. Parentral solutions expressed in a percent indicates X gm per 100 ml.

***Example:***

Suppose a physician orders D5LR*.* This abbreviation means "Dextrose 5 % in Lactated Ringer's" and is supplied as Lactated Ringer's and 5 % Dextrose injection.

***Example:***

An order states, D5NS 100 ml IV q.8 hr.This order means "administer 1000 ml 5% Dextrose in normal saline intravenously every 8 hours" and is supplied as 5% Dextrose and 0.9 % Sodium Chloride.

***Example:***

Calculate the amount of Dextrose and Sodium Chloride in the following order: D5 1/4 NS 500 ml.

D5 = Dextrose 5 % = 5 gm Dextrose per 100 ml

 5 g = X

X = 25 g

100 ml 500 ml

1/4 NS = 0.225 % NaCl = 0.225 gm NaCl per 100 ml

 0.225 g = X

X = 1.125 g

100 ml 500 ml

**IV Admixture additives**

It is required to calculating the amount of additive(s) to be admixed with large volume IV or nutrient fluid to produce an infusion containing a required quantity of a drug or combination of drugs.

***Example:***

A medication order for a patient weighing 154 lb calls for 0.25 mg Amphotericin B per kilogram of body weight to be added to 500 ml of 5 % dextrose injection. If the Amphotericin is to be obtained from a constituted injection that contains 50 mg/10 ml, how many milliliters should be added to the dextrose injection?

Weight in kg = 154 1bs / 2.2. = 70 kg

Dose = 0.25 mg x 70 = 17.5 mg

Constituted solution contains 50 mg/10 ml

50 mg = 10 ml

X = 3.5 ml

17.5 mg X

**Problems**

Ordered: Aqueous penicillin 600,000 U in 100 ml IV bag to be infused for one hour. The drop factor is 15. How many drop/min will you infuse?

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Ordered: 200 ml Foscavir to infuse for 90 min. the drop factor is microdrip.

* How many drop/min will infuse?
* How many ml/hr will you set the infusion pump?

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Ordered: 2000 ml D5W to be infused for 8 hours. The drop factor is 15 d/ml.

* How many ml/hr will infuse?
* How many drop/min will infuse?
* How many ml of dextrose will the patient receive in 8 hours?

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Tridil is infusing at 30 ml/hr. the IV label reads: 500 ml D5W with tridil 5 µg/3 ml. how many hours will it take to infuse?

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If a physician orders 5 units of insulin to be added to a 1 liter IV solution of D5W to be administered over an 8 hour period.

How many drops/min should be administered using an IV set that delivers 15 d/ml?

How many units of insulin would be administered in each 30 min period?

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Aseptic preparation in hospitals include total parentral nutrition compounding, cytotoxics reconstitution services, radiopharmaceuticals as well as, intravenous additive service for a wide range of drugs.

***Medication History Taking***

Taking medication history for patients on admission avoids many problems resulting from incomplete or inaccurate information on the medicines that patients are taking.

Pharmacists are able to take more accurate medication histories than medical staff. For planned admission to hospital such as, for routine surgery, the medication history takingoccurs in an earlier stage in preadmission clinics. These clinics assess patients' suitability for surgery and make other preparations for admission.

**Communication Skills for the Pharmacist**

The role of the pharmacist in hospitals has an increasing emphasis on talking to patients, doctors, other health care professionals and staff. Poor communication has the potential to cause a range of problems. For example, if there is incomplete communication with health care professionals on correct drug dosage or inappropriate or incomplete advice on the use of medication, potential harm to a patient may occur. Thus we will emphasize effective communication skills for pharmacist, particularly in the workspace, but remember, good communication is a life skill to be used at all times.

 **Basic Patient Interviewing Skills**

The focal point of a pharmacist's assessment of the patient in­volves asking the patient questions. To elicit useful information, the pharmacist must utilize appropriate interviewing skills.

 **1. The Environment**

Before a pharmacist talks to a patient or obtains any physical as­sessment data (e.g., blood pressure), the environment in which the interaction will take place should be prepared. The interac­tion may occur in a variety of settings, such as a community pharmacy, hospital room, or clinic examination room. However, basic environmental characteristics should be consistent from setting to setting to assist with ensuring a smooth and produc­tive pharmacist patient interaction.

**2. Opening Statements**

The opening statements between the pharmacist and the patient set the stage for the interaction. The patient should be addressed by his surname (if known). If the patient does not already know him, the pharmacist should introduce himself and explain the reason for the interaction. For example, "Mrs. Smith, I'm Dr. Mark, the pharmacist. I want to talk with you to see how you are doing on your medication. It will only take a few minutes."

 **3. Verbal Communication (Questions)**

 Following the brief introduction, the pharmacist should ask the patient various questions. For an efficient yet productive patient-pharmacist dialogue, these should include a combina­tion of open-ended and closed-ended questions. In general, open-ended questions are used first, to gather general information, and then are followed by closed-ended questions, as appropriate to gather more specific patient data.

Open-ended questions require the patient to respond with a paragraph format. These types of questions allow the patient to answer in any way that he or she wishes. Open-ended questions are useful in gathering less ­structured patient information. For example:

* How are things going for you since the last time I saw you?
* What medications are you currently taking?
* How do you take your medications?

Closed-ended questions, or direct questions, ask for specific in­formation and details. They elicit short, one or two word an­swers (e.g., yes or no). Closed-ended questions decrease the pa­tient's options in answering. In addition, they make the patient passive during the interaction, because he or she is forced to an­swer questions from the pharmacist's perspective. For example:

* Does the chest pain occur when you are sitting down?
* Did you take your blood pressure medication this morning?
* Have you ever had an allergic reaction to a medication?

**4. Verification of Patient Information**

While the patient is answering the pharmacist's questions, the pharmacist must respond appropriately to continue the dia­logue. Frequently, the pharmacist also needs to verify certain pa­tient details to ensure that he is interpreting correctly what the patient is saying. Several feedback techniques can be useful in assisting the pharmacist with both these processes: These techniques include: (1) clarification, (2) reflection, (3) empathy, (4) facilitation, (5) silence, and (6) summary.

**5. Nonverbal Communication**

Appropriate communication involves not only verbal but also nonverbal skills, in which the medium of exchange is something other than vocalized words. Nonverbal communication reflects the person's inner thoughts and feelings and is constantly at work, even if the person is unaware of it. Elements of nonverbal communication include: (1) distance, (2) body posture, (3) eye contact, (4) facial expressions, and (5) gestures. For a successful pharmacist-patient encounter, the verbal and the nonverbal communication must be in congruence. This is very important in establishing rapport with the patient.

**6. Closing Statements**

Bringing the interview to an appropriate close is a crucial part of the communication process. The pharmacist should not end the interview abruptly. An effective way to close the interaction is to provide a brief sum­mary. This allows both the pharmacist and the patient an opportunity to review what has been discussed and to clarify any misinformation. After that, the pharmacist can conclude with a simple, closed-ended question (e.g., "Do you have any questions?") or a sincere statement (e.g., "Thank you for your time. If you have any questions when you get home, please call me."). Nonverbal cues (e.g., organizing paperwork for the patient's medical record or standing up from the chair) also can be helpful when com­bined with a summary or a closing question or statement.

**Common Errors of Patient Interviewing**

When talking to patients, it is easy to fall into nonproductive communication techniques, which may restrict the patient's communication with the pharmacist. These errors may decrease the amount of data obtained from the patient and hinder the de­velopment of rapport. Because of their defeating nature, such re­sponses should be avoided when obtaining information from the patient. These include: (1) changing the subject, (2) giving advice, (3) providing false reassurance, (4) asking leading or bi­ased questions, and (5) using professional terminology.

1. **Health History**

 It is an organized summary of all known patient information.

• To provide a thorough and detailed picture of the patient at the time of the presentation.

• To summarize important information

• To provide all the information required to understand the patient case without wasting time in duplication, trivial or irrelevant information.

In the institutional setting (e.g., hospital or long term care), the health history usually is obtained by a physician or a nurse and is documented in the patient's medical record. In the ambulatory or community setting, the pharmacist may obtain the health history. For the pharmacist, the primary purpose of the health history is to evaluate the patient's drug therapy (e.g., screening for abnormal symptoms that may be caused by med­ications).

The patient usually provides his or her own health history. If the patient cannot provide reliable information, however, then a family member, friend, caregiver, or interpreter can be used as the source.

**Components of the health history:** The sequence of the health history presentation is standardized and designed to provide a logical flow of information and prevent any data overlooking.

**Patient Demographics**: Patient demographics include the patient's name, address, phone number, birthdate, sex, race, and marital status. Other items that may be included are the patient's birth­place and occupation.

**Chief Complaint** **(CC):** The chief complaint is a brief statement of why the pa­tient is seeking care. Typically, it includes one or two primary symptoms, along with their duration, and is recorded in the patient's own words. The best way to elicit the CC is by using an open-ended question (e.g., What can I do for you today?). Occasionally, the patient may not have a CC. For example, the patient may be unable to speak (e.g., comatose or a stroke. The patient can be referred for test, procedure or evaluation may not offer chief complaint and the CC is presented as "Referred for........". The patient also may present to the pharmacist for a medication refill and not identify any particular medical problems; however, on review of the patient's medication profile, the pharmacist may identify a drug-related problem and then question the patient regarding specific symptoms. Through this process, a **hidden CC** may be discovered.

*For Example: Patient is a 45 year old white female who presented to Doctor's office complaining of shortness of breath and chest pain.*

**History of Present Illness** **(HPI):** The history of present illness is a thorough description and expansion of the CC. Specific characteristics should be ob­tained regarding all the presenting symptoms. These character­istics include:

* + Timing: onset, duration, and frequency of symptoms.
	+ Location: precise area of symptoms.
	+ Quality or character: specific descriptive terms of symptoms (e.g.. sharp pain, black tarry stools).
	+ Quantity or severity: mild, moderate, or severe.
	+ Setting: what the patient was doing when the symptoms occurred.
	+ Aggravating and relieving factors: things that cause or make the symptoms worse and that relieve or make the symptoms better.
	+ Associated symptoms: other symptoms that occur with the primary symptoms.
	+ Risk factors are included (family history of the same disease, smoking, patient history of HT are risk factor for MI).
	+ Pertinent negative patient information that patient might be expected to have given the current complaint (e.g., HPI for a patient complaining of dizziness might include a statement that the patient doesn't have a history of fever, vomiting, diarrhea, blood in the stool or urine, chest pain, palpitations or head trauma).

*For Example: Mr. A.D. Has had chest pain for one week and shortness of breath since yesterday while at work, hypertension 142/96, hyperlipidemia, uncontrolled diabetes due to diet and not taking medications.*

**Past Medical History (PMH):** it includes a brief description of the patient's past medical problems, which may or may not relate to the patient's current medical condition. Hospitalization, surgical procedures, accidents, injuries also are included, along with the approximate dates and durations (if known). A common abbre­viation used in the PMH is S/P, which stands for Status Post and indicates a past event.

*For example, Mrs. T.A. had surgery to remove her uterus in 1987 is documented in the PMH as "S/P hysterectomy in1987".*

**Family History (FH):** It is a brief summary of presence or absence of illnesses in the patient's first degree relatives (parents, siblings and children). These data typically includes status (dead or alive), causes of death, age at death, current health problems of living members. There are some common abbreviations used to document the FH(e.g., M= mother, F= father, B= brother, S= sister, (↑) = alive, (↓) = dead.

**Social History (SH):** the patient's lifestyle is documented in the SH, which contains the use of alcohol (type, amount, pattern and duration), illicit drugs (amount, pattern, duration of use, start and stop dates, reason for stopping), tobacco (pack/day and pack-year, start and stop dates, reason for stopping), as well as nutrition and exercise.

 Tobacco use is quantified by the type of tobacco consumed (i.e., cigarettes, cigars, pipe, or chewing tobacco), number of packs smoked per day (ppd), and pack-years. ***A pack-year*** *is cal­culated* by multiplying the number of packs smoked per day by the number of years that the patient has been smoking. For ex­ample, a 20 pack-year smoking history may mean that the pa­tient has smoked 1 ppd for 20 years or 2 ppd for 10 years.

Information regarding the patient's education, employment, marital status, and living conditions is important as well, because these factors can influence the patient's health and medication use. The pharmacist should consider these fac­tors for both diagnostic decision making and pharmacothera­peutic planning. For example, an unemployed patient may be at high risk for noncompliance if he or she cannot afford an ex­pensive medication.

**Review of Systems (ROS) and Physical Examination (PE):** The review of systems is a general description of patient symptoms per body system. The questions to obtain this infor­mation typically are closed-ended and ask about the occurrence of common symptoms regarding each system. The order of questioning typically follows a head to toe format. The purpose of the ROS is to identify any additional symptoms or medical problems not yet revealed by the patient during the CC, HPI, or PMH. Both the presence and the absence of symptoms should be noted. Examples for the most common symptoms for some body system are:

* General health: fatigue, weakness, fever, and significant weight gain or loss.
* Skin, hair, and nails: changes in color, lesions, dryness, hair loss and changes in nail texture.
* Eyes: changes in vision, use of glasses, cataracts, and glaucoma.
* Cardiovascular system: chest pain, palpitations, high blood pressure, high cholesterol. And so on for all the body systems.

On establishing the health history form, all items should be mentioned even for negative ones (e.g., if no ROS is stated, we should write "negative except for complains noted up")

***Case Study:***

Mrs. A is 28 years old white female working as an elementary school teacher and lives alone in an apartment complained to her local doctor that she has rash. The itchy rash started yesterday and was first noticed on her chest and stomach yesterday morning, and then the rash spread to her arms and legs in the evening. The itching kept her awake all night. She felt warm but did not take her temperature. When she was examined it was found that she has a diffused maculopapular rash on her trunk and extremities. The lesions are red and flat and range in size from few millimeters to several large confluent areas on her abdomen and back. The rest of the examination is within normal limits.

She started taking Co-trimoxazole, one tablet twice a day two days ago for urinary tract infection. She is not taking any other medication and has not used any new soaps, detergents, perfumes or cosmetics. She has never taken any herbal products or alternative remedies. Mrs. A. has no known drug allergy or adverse drug reactions.

The doctor physically examined her to find that her blood pressure is 128/72 mm Hg, a heart rate of 88 bpm and a respiratory rate 10 breaths/min. Her oral temperature was 37.3oC. She is 162 cm tall & 52 Kg weight.

Mrs. A's mother is 49 years old alive and well. The father is well and alive and aged 51 years who was recently diagnosed with hypertension. Mrs. A has three brothers aged 26, 24 and 17 and all are alive and well.

Mrs. A had fractured left tibia at the age of 7 and appendectomy at age of 12. Mrs. A. smokes 10 cigarettes daily and she started smoking 7 years ago. She denies the use of illicit drugs. [Mrs. A. is](http://Mrs.A.is) a pleasant, well developed, and well nourished with no obvious distress.

**Health History Form**

|  |
| --- |
| General patient information: |
| CC: |
| HPI: |
| PMH: |
| SH: |
| FH: |
| SOP: |

1. **Medication History**

 In the past, physicians or nurses typically have obtained the medication history, because they have a high amount of direct involvement in patient care. Unfortunately, these medication histories can be incomplete (e.g., lack information concerning allergies, adverse effects and compliance). Because pharmacists are becoming more involved with direct patient care via pharmaceutical care responsibilities, the medication history now is being obtained increasingly by the pharmacist.

**Components of the medical history:** The details of the medication history need to be documented in the patient's medical record and communicated to the health care team. The information may be recorded in a standardized or a free-text format. The standardized form is well organized, easy to record, and allows specific patient information to be found quickly; however, it does not provide flexibility or needed space for pa­tients who may be taking a large number of medications. In con­trast, a free-text format allows a great deal of flexibility from pharmacist to pharmacist, but it also makes it much more difficult to find specific information. in addition, it is easier for a pharmacist to forget to ask patients for certain information and is more time consuming to use.

**Demographic Data:** Includes age, height, weight, race, ethnicity, education, occupation and lifestyle. (housing situation and the people living with the patient).

**Current Prescription Medications**: The pharmacist should ask the patient what prescription med­ications he or she is currently taking. It is best to use an open-ended question to elicit the most accurate patient information.

1. Name: Some patients may not know the names of their current medications. If this happens, have the patient describe what the medicine looks like, with as much detail as possible. This de­scription should include the dosage form; the size, shape, and color; and the numbers, letters, or words on the dosage form. When documenting this information, the pharmacist should in­clude the patient's detailed description and, if a list of prescribed medications is available, note if it is consistent with the medica­tion that he or she should be taking.
2. Dosage (strength)
3. Dosing schedule: The pharmacist also must obtain the prescribed dosing schedule (e.g., twice a day, once a day), the actual dosing sched­ule the patient uses, and the approximate times at which the pa­tient takes the medication for future assessment of the patient's medication compliance.
4. Duration of the therapy: try to determine exactly when the patient started taking the medication. Exact dates are important in determining whether an adverse or allergic reaction is a result of a specific medication and whether the prescribed medications are effectively treating or controlling specific condition
5. Reasons the patients is taking the medication: It is important to obtain the patient's reason for taking the medication because some patients may misunderstand ­or not even know why it was prescribed. Consequently, the pa­tient may take the medication for problems or conditions not treated with that particular medication.
6. Outcomes of the therapy: The pharma­cist should assess the patient's opinion of how well the medication is treating or controlling the specific condition.

**Current Nonprescription Medications:** Because nonprescription medications can interact with prescription medications, cause adverse reactions, and be used by pa­tients to treat an adverse reaction caused by a prescription med­ication, the pharmacist should obtain information concerning any nonprescription medications, including herbal products and vitamins, that the patient may be taking. This information should include the drug name and dosage, actual dosing schedule, duration of therapy, reason for taking the drug, and out­come of therapy.

**Past Prescription Medication:** Before making current recommendations, the pharmacist should obtain as much information as possible concerning past prescription medications. This information includes the name, dosage, dos­ing schedule, the reason for taking the medication, the duration and outcome of therapy, and why the patient stopped taking it. This Information helps the pharmacist to un­derstand what medications successfully (and unsuccessfully) treated past as well as current medical problems.

**Past Nonprescription Medication:** As above.

**Medication Allergies:** Allergy indicates hypersensitivity to specific substances. Drug induced allergic reactions include anaphylaxis, contact dermatitis, and serum sickness.

The first step to follow is to ask patients whether they are allergic to any medication or if they have experienced rashes or breathing problems after taking medication. After a medication has been identified as the cause of an allergic reaction, the patient should be asked to provide details regarding the time or date of the reaction, any interventions to manage the reaction. Also, patient should be asked whether medications in similar drug class have been taken without the occurrence of similar reactions.

On establishing the medication history form, if no allergy is stated, we should write "NKDA"

**Adverse Drug Reactions:** ADRs are unwanted pharmacological effects associated with medications (drowsiness with antihistamines, constipation with codeine, nausea with theophylline and diarrhea with ampicillin). The patients can be asked whether they have ever taken a medication they would rather not to take again. This question may elicit specific descriptions of ADRs and the way the patient dealt with the reaction (stop the medication, decrease the dosage, take another medication to treat the ADRs).

**Medication Compliance:** Determining patient medication compliance or adherence is one of the primary goals of the medication history. Noncompliance with medications may lead to worsening of patient symptoms, unnecessary diagnostic testing, hospitalizations, and use of addi­tional medications, especially if the noncompliance is not identified and the physician believes the patient is taking the medication as prescribed.

Questioning the patient regarding compliance can be diffi­cult; because most patients know they should be compliant and may feel guilty or ashamed if confronted on this subject by an authoritative health care professional. Therefore, the phar­macist should use open-ended questions to find out exactly what medications the patient is taking and how often he or she is tak­ing them.

Another way to assess compliance is to have patients de­scribe their daily routine for taking their medications. Patients who describe their routine with great detail are more likely to be compliant than those who provide a very vague description or have no routine at all. If noncompliance is identified, the pharmacist should determine the reason for the noncompliance so that it can be corrected, if possible (e.g., the patient cannot afford an expensive antihypertensive medication, so the pharmacist recommends a more economical alternative to the physician).

Medication compliance also can be assessed by asking the patient how often he or she needs to refill the medication or how long a single bottle of medicine usually lasts before a new sup­ply is needed. If the patient's computerized pharmacy records are accessible, the pharmacist also may review the refill pattern of the patient.

***Case Study***

Mr. M. is 52 year old man (date of birth 21/04/1954) he is diabetic and treated for hypertension. He is 180 cm and 72 Kg. He has allergic history to penicillin 250 mg, it was prescribed QID for an infection on May 1995. the allergic reaction was manifested as rash and the drug was discontinued by the doctor. He smokes l ppd for 40 years. He denies illicit drug use. He is an accountant and lives in his own home with his wife.

His current prescription medications include furosemide po 40 mg Q.a.m. for 8 years for leg swelling, captopril 25 mg TID for 10 years for BP, digoxin 0.125 mg po OD to slow down heart and metformin 850 mg TID for blood sugar for 10 years. The furosemide is working. The Captopril is controlling his BP. He rarely remembers the mid day dose for the TID drugs due to his work. His past prescription medication include hydrochlorothiazide 50 mg po Q.a.m. for leg swelling. It was stopped on 1999 by the doctor due to its adverse effect of gout and Glyburide 10 mg OD for blood sugar, it was stopped by the doctor; exact dates unclear; didn't work.

He is also buying acetaminophen 500 mg for pain PRN and it is very effective. Milk of magnesia for constipation PRN (takes 1-2 tsp about 6 times per year and done so for many years) very effective. Mr., M. takes Ginko tablets PRN before meals for 2-3 years. Mr. A was buying ibuprofen 200 mg PRN for arthritis, it was working but he discontinued it by himself due to stomach pain.

Report the drug history using the following provided medication history Form:

|  |  |
| --- | --- |
| Name: | Date: |
| Pharmacist: |
| Date of Admission: | Room: | ID number: |
| DOB: | Gender: | Height: | Weight: |
| **Current prescription medications** |
| Name | Dose | Schedule | Indication | Start date | Adverse effects | Outcomes |
|  |  |  |  |  |  |  |
| **Current nonprescription medications** |
| Name | Dose | Schedule | Indication | Start date | Adverse effects | Outcomes |
|  |  |  |  |  |  |  |
| **Past prescription medications** |
| Name | Dose | Schedule | Indication | Start date | Stop date | Outcomes |
|  |  |  |  |  |  |  |
| **Past nonprescription medications** |
| Name | Dose | Schedule | Indication | Start date | Stop date | Outcomes |
|  |  |  |  |  |  |  |
| **Allergies** |
| Name | Dose | Schedule | Indication | Start date | Type of reaction | Outcomes |
|  |  |  |  |  |  |  |
| **Compliance** |