

PHARMACISTS' WORKUP OF DRUG THERAPY (PWDT)

The PWDT is a *thought process* which is meant to serve as a systemic guideline for the documentation of clinical pharmacy activities and is ***NOT*** intended as a form to be completed on each patient seen by the pharmacist.

Step

1. Student pharmacist responsible work-up
2. Collect data and identify issues with the patient's drug therapy
 - A. CC: Chief complaint
Patient demographics and recent events which caused patient to seek medical care
 - i) Age, sex and race:
 - a) Is patient at increased risk of side effects because of age, sex or race?
 - b) Is metabolism/elimination of certain drugs likely to be affected because of age, sex or race?
 - ii) Ht: Lean body weight calculation is dependent on height
 - iii) Wt: Does patient's weight affect dosage calculations or drug distribution?
 - iv) LBW: Are kinetic parameters and dosage recommendations calculated by lean body weight?
 - B. HPI: History of present illness
 - C. PMH: Past medical history
 - D. Problem List: Current Diagnostic list
 - E. Med Hx: Current medication list, past medications, OTC drug use, and/or prn drug use
 - F. Allergies: Drug allergies/sensitivities (include description)
 - G. Social Hx: Smoking/alcohol/recreational drug use history
 - H. Compliance: Assessment of compliance - is problem related to improper use?
 - I. Review of Systems:

GEN:	general appearance and health status
VS:	blood pressure, heart rate, temperature, respiration rate
HEENT:	head, ears, eyes, nose, throat
CV/RESP:	cardiopulmonary exam
ABD:	abdomen
EXT:	extremities
NEURO:	neurological exam
PSYCH:	mental status exam
 - J. Pertinent laboratory values
 - i) What tests are needed to determine therapeutic efficacy?
 - ii) What tests are needed to determine if present drug therapy is causing toxicity?
 - iii) What baseline laboratory values are needed in anticipation of therapeutic effectiveness and toxicity monitoring of drugs?
 - iv) Is patient receiving a drug that can alter renal function?
 - v) Is the patient's renal/liver function affecting drug elimination drugs?
3. Organize patient specific-data and create drug-related problem list
 - A. Attempt to cluster signs and symptoms into recognisable patterns.
 - B. Review side effects of each medication to determine iatrogenic potential.
 - C. Determine if onset of chief complaint is temporally related to start of new drug.
 - D. Determine which problems are you going to solve for this patient? Which problems are you (as a clinical pharmacist) going to assume responsibility for?
4. Therapeutic assessment

- A. Determine which problems are active or require maintenance therapy
 - B. Using appropriate laboratory results, physical findings, and subjective patient reports, assess drug efficacy of current regimen.
 - C. Assess potential contributing causes (e.g. non-compliance, change in renal status, change in dietary habits, disease progression, etc)
 - D. Determine presence of risk factors which may place a patient at increased risk for adverse drug effects or poor therapeutic response (e.g., increased ulcerogenic effects of NSAID's in elderly women, ulcer relapse rate in smokers)
5. Rank all drug-related
- A. Rank most serious or immediate problem highest.
6. Desired therapeutic outcomes
- A. Define measurable outcomes for the use of each drug or drug combination (e.g., blood pressure < 140/90, Blood Glucose < 140mg/dl).
7. Therapeutic alternatives
- A. List acceptable drug therapies for each problem.
 - B. Consider the following factors during drug selection:
 - i) altered physiologic parameters (e.g., renal, liver disease)
 - ii) altered pharmacokinetic parameters (e.g., Vd, clearance)
 - iii) presence of adverse drug reaction risk factors (e.g. age, influence of hypokalemia on digoxin toxicity)
 - iv) concurrent illnesses (e.g., concurrent CHF, diabetes, asthma, etc)
 - v) concurrent drug therapies (i.e., potential drug-drug interactions)
 - C. Anticipate problems and list alternative drug therapy solutions.
8. Pharmacist's drug recommendation and individualization
- A. For each problem, list the drug of choice and an individualized patient-specific drug administration regimen.
9. Therapeutic drug monitoring
- A. Determine what information is needed to ensure that the recommended drug therapy is producing the desired effect.
10. Patient education and follow-up
- A. Determine frequency and duration of drug monitoring.
 - B. Document important aspects of the patient counseling session.

PROBLEM LIST - DIAGNOSIS

1. What are the patient's medical problems or complaints?
2. Is there a specific indication for drug therapy?
3. Are these problems which can be caused by inappropriate drug therapy?
4. Does the disease affect the way the drug is handled in the body?

PRESENT MEDICATIONS

1. Considering the patient's problem and symptoms mentioned in the previous section, what medications, routes of administration, dosages, and durations has the patient been using to improve the situation? - prescribed and/or not prescribed?
2. Have the medications produced the desired therapeutic outcome?
3. Are medications contributing to some or all of the problems experienced by the patient?
4. What organ systems can be affected by the medications?

MEDICAL HISTORY (Past, Surgical, Hospital)

1. Have the present medical problems been treated previously?
2. Is a past problem defining a contraindication for a specific drug therapy?
3. Is there anything in the patient's previous medical history which could affect the action or effectiveness of drugs?

MEDICATION HISTORY

1. Is there a history of success or failure of past drug therapy for similar medical problems?
2. Has some medication in the past altered a body system that will affect the disposition of current drug therapy?

ALLERGIES

1. Do potential allergies exist (drug, food, etc)?
2. Have any allergic reactions occurred in the past?
3. What is the nature and significance of any allergic reactions?

SMOKING/ALCOHOL HISTORY

1. Is the smoking/alcohol history significant with respect to drug disposition or metabolism?
2. Is the smoking/alcohol history significant in contributing to the patient's problem?

ADHERENCE

1. Are there therapeutic drugs in the past that would suggest a lack of adherence to prescribed drug therapy?
2. What is the social history and living conditions of the patient that may affect adherence to prescribed medication regimens?
3. How reliable is my source of information?

DRUG DELIVERY SYSTEM

1. What is the evidence that the patient has received the medication as prescribed?
2. Is there any evidence to suggest problems with pharmaceutical formulations presently employed?
3. How reliable is my source of information?

VITAL SIGNS (Temp, Heart Rate, Blood Pressure, Respiration)

1. Are there deviations from normal which could be due to drug therapy?
2. Are there deviations from normal which could affect drug therapy monitoring?

PATIENT AGE

1. Is the patient at risk to experience side effects from certain drugs because of his/her age?
2. Is patient's metabolism and elimination of certain drugs affected because of his/her age?

SEX

1. Is the patient at risk to experience side effects from certain drugs because of his/her sex?
2. Is patient's metabolism and elimination of certain drugs affected because of his/her sex?

RACE

1. Is the patient at risk to experience side effects from certain drugs because of his/her race?
2. Is patient's metabolism and elimination of certain drugs affected because of his/her race?

HEIGHT

Lean body weight calculations are dependent on height

WEIGHT

Does this patient's weight affect drug distribution or dosage calculations?

IDEAL BODY WEIGHT

Kinetic parameters are calculated by ideal body weight.

Male = $50\text{kg} + (2.3)(\text{no. of inches} > 60)$

Female = 45.5kg + (2.3) (no. of inches > 60")

SYSTEM FUNCTIONS

1. Are present drugs affecting the patient by producing a pharmacologic effect?
2. Are present drugs affecting the patient by producing a toxic effect?
3. Is the condition of the patient's organ system affecting the disposition of a drug (absorption, metabolism, distribution, elimination)?
4. Is the condition of an organ system defining an indication for drug therapy?

Renal:

is the patient's renal function affecting the elimination of certain drug? Are certain drugs causing nephrotoxicity?

Renal Function Tests: BUN, serum creatinine, creatinine clearance

Liver:

Is the patient's liver function affecting the elimination of certain drugs? Are certain drugs producing toxic effects in the liver? Is the liver function altering the protein binding of certain drugs to affect the amount of free drug in the body?

Hepatic Function Tests: SGOT, SGPT, GGT, LDH, serum albumin, serum protein, coagulation tests, INR

Cardiovascular:

Does the patient have angina or recent MI which may contraindicate drugs known to increase cardiac workload? Does patient have CHF which is known to alter metabolism elimination and distribution of certain drugs? Is the patient experiencing side effects from certain drugs manifested in the cardiovascular system (arrhythmias, tachycardia)?

Cardiac Function Tests: Pulse, blood pressure, EKG reading, JVP, edema

Pulmonary:

Does the patient have COPD or asthma which may contraindicate the use of certain drugs?

Pulmonary Function Tests: Chest X-ray, arterial blood gases, pulmonary function tests

Blood:

Do hematologic tests indicate the presence of infectious disease or anemias, suggesting the need for drug therapy? Are coagulation studies needed to determine therapeutic end points?

Hematologic Function Tests: CBC, differential, Hb, HCT

Fluid Status:

Is the patient's fluid status affecting the patient's volume of distribution?

Function Tests: Electrolytes, acid-base determination, edema, skin turgor

GI:

Is the condition of the patient's tract affecting the absorption of orally administered drugs?

GU:

Musculoskeletal: How is the patient's muscle mass affecting his measured serum creatinine?

Neuro/Mental:

Determine the patient's baseline status so potential side effects may be measured.

Skin:

Determine the patient's baseline status so potential side effects may be measured.

HEENT:

Determine the patient's baseline status so potential side effects may be measured.

PERTINENT LABS

1. What tests are needed to determine efficacy of present drug therapy?
2. What test are needed to determine if present drug therapy is causing toxicity?
3. What baseline laboratory values are needed in anticipation of therapeutic effectiveness and/or toxicity monitoring of drugs?

**PHARMACIST'S ASSESSMENT OF DRUG THERAPY/
PHARMACIST'S PROBLEM LIST:**

1. Are each of the present drugs producing the desired effect?
2. Are any of the present drugs contributing to the patient's problem (toxicity, ineffective)?
3. Does any portion of the present drug therapy require changing (dose, drug, route, duration, addition, deletion)?
4. What new therapeutic indications are present in this patient?

DESIRED THERAPEUTIC OUTCOMES:

1. What are the optimal therapeutic outcomes for each of the problems identified in the pharmacist's list?

THERAPEUTIC ALTERNATIVES:

1. What other drug regimens might produce the desired response?
2. What are the risks and benefits of each of the potential alternative drug regimens?

PHARMACIST'S DRUG RECOMMENDATION AND DOSAGE INDIVIDUALIZATION:

1. Considering the therapeutic alternatives in this patient, what drug regimens should be instituted?
2. What changes need to be made in existing drug therapy (add, delete drugs)?
3. What specific dose, route of administration, dosage formulation, regimen, and duration of therapy has been selected for each drug?

PLAN AND RATIONALE FOR CONTINUED DRUG MONITORING:

1. What desired information do I need to ensure that the recommended drug therapy is producing the desired affect?
2. What information do I need to ensure that the recommended therapy is not causing problems?
3. With what frequency and for what duration do I need to collect the relevant information?