

## Chapter 01: Information Sources, Regulatory Agencies, Drug Legislation, and Prescription Writing

### Haveles: Applied Pharmacology for the Dental Hygienist, 8th Edition

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#### MULTIPLE CHOICE

1. Knowledge of pharmacology aids the dental professional in
  - a. obtaining a patient's health history.
  - b. administering drugs in the office.
  - c. handling emergency situations.
  - d. selection of a nonprescription medication.
  - e. All of the above

ANS: E

All of the choices are true. Because many of our patients are being treated with drugs, knowledge of pharmacology helps in understanding and interpreting patients' responses to health history questions. Knowledge of the therapeutic and adverse effects of medications obviously helps in their proper administration in the office. Emergency situations may be caused by drugs or treated by drugs; thus, knowledge of pharmacology is of great help, especially because a rapid response is sometimes required. A clear understanding of the concepts of drug action, drug handling by the body, and drug interactions will allow the dental practitioner to make proper judgments and grasp the concepts relevant to new drug therapies on the market.

DIF: Application REF: Role of the Dental Hygienist | p. 2 & 3

OBJ: 1 TOP: NBDHE, 6.0. Pharmacology

2. Which of the following statements is true regarding planning appointments?
  - a. Whether or not patients are taking medication for systemic diseases is of little consequence in the dental office.
  - b. Asthmatic patients should have dental appointments in the morning.
  - c. Diabetic patients usually have fewer problems with a morning appointment compared with afternoon appointments.
  - d. Both B and C are true.

ANS: D

Asthmatic patients who experience dental anxiety should schedule their appointments when they are not rushed or under pressure early in the morning. Diabetic patients usually have relatively fewer problems with a morning appointment. Patients taking medication for systemic diseases may require special handling in the dental office.

DIF: Comprehension

REF: Role of the Dental Hygienist (Appointment Scheduling) | p. 3

OBJ: 1 TOP: NBDHE, 6.0. Pharmacology

3. Nutritional or herbal supplements
  - a. carry the U.S. Food and Drug Administration (FDA) approval for disease states.
  - b. are not drugs.
  - c. can cause adverse effects.
  - d. will not interact with other drugs the patient may be taking.

ANS: C

Nutritional or herbal supplements are quite capable of causing adverse effects. The majority of nutritional or herbal supplements do not carry FDA approval for treating disease states. These supplements are drugs and can cause adverse effects and interact with different drugs.

DIF: Comprehension

REF: Role of the Dental Hygienist (Nutritional or Herbal Supplements) | p. 3

OBJ: 1 TOP: NBDHE, 6.0. Pharmacology

4. Which type of drug name usually begins with a lowercase letter?
- Brand name
  - Code name
  - Generic name
  - Trade name

ANS: C

Before any drug is marketed, it is given a generic name that becomes the “official” name of the drug. Each drug is assigned only one generic name selected by the U.S. Adopted Name Council, and the name is not capitalized. The brand name is equivalent to the trade name and is capitalized. Although the brand name is technically the name of the company marketing the product, this term is often used interchangeably with the trade name. The code name is the initial term used within a pharmaceutical company to refer to a drug while it is undergoing investigation and is often a combination of capital letters and numbers, the letters representing an abbreviation of the company name.

DIF: Comprehension

REF: Drug Names | p. 4

OBJ: 3 TOP: NBDHE, 6.0. Pharmacology

5. A drug’s generic name is selected by the
- pharmaceutical company manufacturing it.
  - Food and Drug Administration (FDA).
  - U.S. Adopted Name Council.
  - Federal Patent Office.

ANS: C

Each drug is assigned only one generic name (e.g., ibuprofen). It is selected by the U.S. Adopted Name Council. The generic name is not selected by the FDA or the Federal Patent Office. The pharmaceutical company manufacturing the drug clearly has an influence on the generic name given its drug, but the final decision is not the company’s.

DIF: Recall

REF: Drug Names | p. 4

OBJ: 3

TOP: NBDHE, 6.0. Pharmacology

6. Which of the following is true concerning generic and trade names of drugs?
- A drug may only have one generic name and one trade name.
  - A drug may only have one generic name, but it may have several trade names.
  - A drug may have several generic names, but it may only have one trade name.
  - A drug may have several generic names and several trade names.

ANS: B

Each drug has only one generic name but may have several trade names. For each drug, there is only one generic name. It is not capitalized, and it becomes the “official” name of the drug. The pharmaceutical company discovering the drug gives the drug a trade name. The trade name is protected by the Federal Patent Law for 20 years from the earliest claimed filing date, plus patent term extensions. Although the brand name is technically the name of the company marketing the product, it is often used interchangeably with the trade name.

DIF: Comprehension REF: Drug Names | p. 4  
OBJ: 3 TOP: NBDHE, 6.0. Pharmacology

7. Two drugs that are found to be chemically equivalent, but not biologically equivalent or therapeutically equivalent are said to differ in
- potency.
  - efficacy.
  - bioavailability.
  - therapeutic index.

ANS: C

A preparation can be chemically equivalent yet not biologically or therapeutically equivalent. These products are said to differ in their bioavailability. The potency of a drug is a function of the amount of drug required to produce an effect. The efficacy is the maximum intensity of effect or response that can be produced by a drug. The therapeutic index is the ratio of the lethal dose for 50% of the experimental animals divided by the effective dose for 50% of the experimental animals. If the value of the therapeutic index is small, toxicity is more likely.

DIF: Recall REF: Drug Substitution | p. 5 OBJ: 4  
TOP: NBDHE, 6.0. Pharmacology

8. How many years must pass after a drug patent expires before other drug companies can market the same compound as a generic drug?
- 20 years
  - 17 years
  - 7 years
  - 0 years

ANS: D

Once a drug patent expires, competing companies may immediately market the same compound in generic form. After 17 years, the patent of the original drug expires, and other companies can market the same compound under a generic name.

DIF: Application REF: Drug Names (Drug Substitution) | p. 5  
OBJ: 4 TOP: NBDHE, 6.0. Pharmacology

9. Two drug formulations that produce similar concentrations in the blood and tissues after drug administration are termed \_\_\_\_\_ equivalent.
- chemically
  - biologically
  - therapeutically

ANS: B

Biologic equivalence refers to identical pharmacokinetic parameters of two drug formulations (bioequivalence, for short). Chemical equivalence indicates that two formulations of a drug meet the chemical and physical standards established by the regulatory agencies. Therapeutic equivalence means that two formulations produce the same therapeutic effects over the same duration.

DIF: Application    REF: Drug Names (Drug Substitution) | p. 5  
OBJ: 4                TOP: NBDHE, 6.0. Pharmacology

10. The federal body that determines whether a drug is considered a controlled substance and to which schedule it belongs is the
- Food and Drug Administration (FDA).
  - Federal Trade Commission (FTC).
  - Drug Enforcement Administration (DEA).
  - U.S. Pharmacopeia (USP).

ANS: C

The DEA regulates the manufacture and distribution of substances with abuse potential. Hence prescriber DEA numbers must appear on prescriptions for controlled substances. The FDA does not have any special powers in regard to drugs of abuse. The FTC regulates commerce and advertising claims of foods, over-the-counter (OTC) products, and cosmetics. The USP regulates the uniformity and purity of drugs.

DIF: Comprehension  
REF: Federal Regulations and Regulatory Agencies (Drug Enforcement Administration) | p. 5  
OBJ: 5                TOP: NBDHE, 6.0. Pharmacology

11. Which federal regulatory agency decides which drugs require a prescription and which drugs may be sold over-the-counter (OTC)?
- FDA
  - OSHA
  - FTC
  - DEA

ANS: A

The Food and Drug Administration (FDA) is part of Department of Human and Health Services (DHHS), and determines what drugs may be sold by prescription and OTC and regulates the labeling and advertising of prescription drugs. The Occupational Safety and Health Administration (OSHA) ensures the safety and health of workers in the United States by setting and enforcing standards. The Federal Trade Commission (FTC) regulates the trade practices of drug companies and prohibits the false advertising of foods, nonprescription (OTC) drugs, and cosmetics. The Drug Enforcement Administration (DEA) is a part of the Department of Justice and regulates the manufacture and distribution of substances that have a potential for abuse, including opioids, stimulants, and sedatives.

DIF: Recall  
REF: Federal Regulations and Regulatory Agencies (Food and Drug Administration) | p. 5  
OBJ: 5                TOP: NBDHE, 6.0. Pharmacology

12. Which federal regulatory body regulates the trade practices of drug companies and prohibits false advertising of foods, nonprescription drugs, and cosmetics?
- FDA
  - FTC
  - DEA
  - OBRA

ANS: B

Consumers who refer to care labels on their clothes, product warranties, or stickers showing the energy costs of home appliances are using information required by the FTC. Businesses must be familiar with the laws requiring truthful advertising and prohibiting price fixing. These laws are also administered by the FTC. When the FTC was created in 1914, its purpose was to prevent unfair methods of competition in commerce. Over the years, the U.S. Congress has passed additional laws giving the agency greater authority to police anticompetitive practices. The FDA grants approval so that drugs can be marketed in the United States. Before the FDA can approve a drug, the drug must be determined to be both safe and effective. The DEA regulates the manufacture and distribution of substances that have a potential for abuse. OBRA (Omnibus Budget Reconciliation Act) is not a regulatory body; it is an act that mandates that pharmacists must provide patient counseling.

DIF: Recall

REF: Federal Regulations and Regulatory Agencies (Federal Trade Commission) | p. 5

OBJ: 5 TOP: NBDHE, 6.0. Pharmacology

13. An investigational new drug application (INDA) is submitted \_\_\_\_\_ trials.
- before preclinical trials
  - before phase 1 clinical trials
  - after phase 2 clinical trials
  - before phase 3 clinical trials

ANS: B

Preclinical testing usually lasts about 3 years. After the preclinical trials have been completed, an INDA must be filed with the FDA before a drug company can commence phase 1 clinical trials. Animal testing data must be accumulated from preclinical trials before filing an INDA. Phase 1 is the first trial using patients, and phases 2 and 3 follow phase 1. An INDA must be filed before any testing in humans can commence.

DIF: Recall

REF: Clinical Evaluation of a New Drug | p. 5

OBJ: 6

TOP: NBDHE, 6.0. Pharmacology

14. Phase 1 clinical trials involve all of the following *except* which one?
- Safe dose range
  - Toxic effects of the drug
  - Metabolism
  - Effectiveness

ANS: D

In phase 1 clinical trials, small and then increasing doses are administered to a limited number of healthy human volunteers, primarily to determine safety. This phase determines the biologic effects, metabolism, safe dose range in humans, and toxic effects of the drug. The main purpose of phase 2 is to test effectiveness. Biologic effects, metabolism, safe dose range in humans, and toxic effects of the drug are, in fact, goals of phase 1 clinical trials.

DIF: Comprehension REF: Clinical Evaluation of a New Drug | p. 5  
OBJ: 6 TOP: NBDHE, 6.0. Pharmacology

15. Which of the following is determined during a phase 3 clinical evaluation of a new drug?
- Effectiveness
  - Safety and efficacy
  - Dosage
  - Both A and B
  - Both B and C

ANS: E

Both safety and efficacy must be demonstrated during phase 3 of the clinical evaluation of a new drug. Dosage is also determined during this phase. During phase 3, clinical evaluation takes place involving a large number of patients who have the condition for which the drug is indicated. The main purpose of phase 2 clinical evaluation is to test a drug's effectiveness.

DIF: Recall REF: Clinical Evaluation of a New Drug | p. 6  
OBJ: 6 TOP: NBDHE, 6.0. Pharmacology

16. Which of the following is a schedule II controlled substance?
- Heroin
  - Propranolol
  - Amphetamine
  - Dextropropoxyphene (Darvon)

ANS: C

Amphetamine, oxycodone, morphine, and secobarbital are all schedule II controlled substances. Heroin is a schedule I substance. Propranolol is a nonscheduled prescription drug. Dextropropoxyphene is a schedule IV substance.

DIF: Recall REF: Schedules of Controlled Substances | p. 6  
OBJ: 6 TOP: NBDHE, 6.0. Pharmacology

17. Controlled substances in schedule \_\_\_\_\_ require a written prescription with the provider's signature and do not permit refills.
- II, III, and IV
  - II and III
  - III and IV
  - II only
  - III only

ANS: D



20. An “orphan drug” is
- not related to any other medication currently available.
  - developed specifically to treat a rare medical condition.
  - a drug that has been on the market for longer than 20 years and generic substitution is permitted.
  - no longer available for use as newer, more effective medications are available.

ANS: B

Rare medical conditions with orphan status refer to diseases that occur in fewer than 200,000 people in the United States. Orphan drugs may be related to other medications. Orphan drug status is not related to the time the drug has been available. Many newer drugs have been assigned orphan status.

DIF: Recall                      REF: Drug Legislation (Orphan Drugs) | p. 7  
OBJ: 7                              TOP: NBDHE, 6.0. Pharmacology

21. The word *stat* on a prescription means
- before meals.
  - at bedtime.
  - immediately.
  - every.

ANS: C

The word *stat* on a prescription means immediately (now). The abbreviation *ac* means before meals, *hs* means at bedtime, and *q* means every.

DIF: Recall                      REF: Table 1-3: Abbreviations Commonly Used in Prescriptions | p. 8  
OBJ: 7                              TOP: NBDHE, 6.0. Pharmacology

22. The abbreviation used on prescriptions for *four times a day* is
- bid*.
  - qid*.
  - qd*.
  - ud*.

ANS: B

*qid* is the abbreviation for quarter in die, or four times a day. *bid* stands for twice a day, *qd* stands for every day, and *ud* stands for as directed.

DIF: Recall                      REF: Abbreviations Commonly Used in Prescriptions | p. 8  
OBJ: 7                              TOP: NBDHE, 6.0. Pharmacology

23. The heading of a prescription contains the following information *except* the
- name and address of the prescriber.
  - name and address of the patient.
  - telephone numbers of the patient and the prescriber.
  - date of birth of the prescriber.
  - date of the prescription.

ANS: D



Including the date of birth of the patient on the prescription is important, both to determine the proper dose for age and also the patient is not confused with another family member (i.e., mother or daughter). The heading of a prescription contains the name, address, and telephone number of the prescriber, as well as the name, address, age, and telephone number of the patient, and the date of the prescription.

DIF: Comprehension                      REF: Prescription Writing (Format) | p. 7  
OBJ: 7                      TOP: NBDHE, 6.0. Pharmacology

24. Which of the following is located in the body of the prescription?
- The date of the prescription
  - The amount of the drug to be dispensed
  - Directions to the prescriber
  - Refill instructions

ANS: B

The *Rx* symbol, name and dose size or concentration of the drug, amount to be dispensed, and directions to the patient are all found in the body of the prescription. The date of the prescription is found in the heading. The directions to the patient rather than prescriber are found in the body of the prescription. Refill instructions are found in the closing of the prescription.

DIF: Recall                      REF: Prescription Writing (Format) | p. 7 & 8  
OBJ: 7                      TOP: NBDHE, 6.0. Pharmacology

25. Where is the information regarding the prescriber DEA number commonly found on the prescription?
- Superscription
  - Heading
  - Body
  - Closing

ANS: D

The signature area of the prescription is found in the closing. It should also include a space for the DEA number. The superscription is a classical description for where the patient information and the symbol *Rx* are found. The heading contains prescriber and patient contact information, the patient's date of birth, and the date of prescription. The body contains the *Rx* symbol, dosage instructions, and directions to the patient.

DIF: Recall                      REF: Prescription Writing (Format) | p. 8  
OBJ: 7                      TOP: NBDHE, 6.0. Pharmacology

26. On a prescription, the directions to the patient are preceded by
- Rx*.
  - Sig*.
  - #.
  - Disp*.

ANS: B

*Sig.* is the abbreviation for the Latin word *signa*, or write. This word precedes the instructions to the patient. *Rx* means *take thou* and precedes the prescription instructions, # denotes the number of tablets, capsules, and so forth to be dispensed. *Disp.* is short for *dispense* and precedes the amount to be dispensed, analogous to #.

DIF: Recall                      REF: Prescription Writing (Format) | p. 8  
OBJ: 7                              TOP: NBDHE, 6.0. Pharmacology

27. Each is an advantage of electronic and fax prescribing *except* one. Which is the *exception*?
- It reduces the likelihood of errors in reading handwritten prescriptions.
  - It reduces the patient's ability to tamper with a prescription.
  - There is no record of the prescription in the patient's record.
  - Prescriptions can be faxed to the pharmacy.

ANS: C

A written record of the prescription is kept in the patient's record. Electronic prescribing is the electronic transmission of a prescription to a pharmacy, which reduces the incidence of errors in reading handwritten prescriptions and the patient's ability to tamper with a prescription. Prescriptions can be faxed to the pharmacy.

DIF: Comprehension  
REF: Prescription Writing (Prescriptions [Electronic and Fax Prescribing]) | p. 9  
OBJ: 7                              TOP: NBDHE, 6.0. Pharmacology

28. Which drug legislation act was instrumental for the growth of electronic prescribing?
- Controlled Substance Act
  - Medicare Modernization Act
  - Food, Drug and Cosmetic Act
  - Harrison Narcotic Act

ANS: B

The inclusion of e-prescribing in the Medicare Modernization Act of 2003 (MMA) gave momentum to its use in provider practices across the country. The Controlled Substance Act of 1970 replaced the Harrison Narcotic Act of 1914, and the Drug Abuse Control Amendments (1965) to the Food, Drug and Cosmetic Act (1938).

DIF: Comprehension  
REF: Prescription Writing (Prescriptions [Electronic and Fax Prescribing]) | p. 9  
OBJ: 7                              TOP: NBDHE, 6.0. Pharmacology

29. What would be an advantage for a dentist to call the pharmacy with a prescription for Tylenol #3 rather than hydrocodone for a patient who calls late at night requesting medication for pain following root canal therapy?
- Tylenol #3 is available over-the-counter and does not require a prescription.
  - Tylenol #3 is a not a controlled substance and hydrocodone is a controlled substance.
  - A prescription for Tylenol #3 (Schedule III) may be telephoned, whereas hydrocodone (Schedule II) requires a written prescription.
  - Tylenol #3 has greater potency than hydrocodone.

ANS: C

Tylenol #3 has moderate abuse potential and prescriptions may be telephoned. Hydrocodone has high abuse potential and requires a written prescription with the provider's signature. Tylenol #3 is a Schedule III controlled substance. It is not available over-the-counter and requires a prescription. Hydrocodone has more potency and a higher abuse potential than Tylenol #3.

DIF: Application      REF: Schedules of Controlled Substances | p. 6  
OBJ: 7                      TOP: NBDHE, 6.0. Pharmacology

30. Clinical studies of drugs first involve human volunteers during which phase of drug testing?
- Phase 1
  - Phase 2
  - Phase 3
  - Phase 4

ANS: A

Clinical studies of drugs involve humans' right from the start of Phase 1 clinical trials. In Phase 1 clinical trials, small and then increasing doses of the prospective drug are administered to a limited number of healthy human volunteers, primarily to determine safety. Larger groups of humans are given the drug in Phase 2 clinical trials, but humans were involved in Phase 1 clinical trials. Phase 3 involves a large number of patients who have the condition for which the drug is indicated. Phase 4 involves postmarketing surveillance.

DIF: Recall                      REF: Clinical Evaluation of a New Drug | p. 5  
OBJ: 6                              TOP: NBDHE, 6.0. Pharmacology

## **MULTIPLE RESPONSE**

- How are computer and online resources enhancing printed books as a source of information about drugs? (*Select all that apply.*)
  - Web-based physicians can diagnose patient conditions and prescribe medication over the Internet.
  - Tablet computers and smart phones may be used for medication information databases.
  - Some publishers have apps that can be downloaded to smart phones.
  - Websites such as WebMD have decision trees whereby patients can identify their own health condition and determine appropriate treatment and medication.
  - Older editions of textbooks have been placed in the public domain and are useful for information about medications and drug interactions.

ANS: B, C

Tablet computers and smart phones are being used more and more for recording, storing patient information, calculating drug doses, and using medication information databases. Some online websites have apps that can be downloaded to smart phones as well as computer-based online sites. There are many legal issues with health care professionals dispensing advice over the Internet. For example, a health care provider may not be licensed to practice in the state where the person asking for information resides. Websites do not provide the means for patients to determine their own health condition. There are many sites with useful information, but most have a disclaimer recommending that the person seek help from a qualified practitioner. Medications change rapidly, and it is important to use current sources of information.

DIF: Comprehension

REF: Sources of Information (Computers and Online Resources) | p. 4

OBJ: 2 TOP: NBDHE, 6.0. Pharmacology

2. Which of the following are true of an off-label use of a drug? (*Select all that apply.*)
- Prescribers are allowed to use drugs for off-label use under certain circumstances.
  - The FDA approves the use of drugs for specific indications, which are listed or labeled on the package insert of the drug.
  - Drug manufacturers have much useful information regarding off-label uses of their drugs on their websites.
  - Off-label use of drugs is not permitted in the United States.
  - Off-label drugs are repackaged for sale by clandestine organizations outside the United States and are illegal to transport or distribute.

ANS: A, B

Practitioners are allowed to use off-label drugs if good medical practice justifies their use, the use is well documented in the medical literature, and the drug meets the current standard of medical care. The FDA approves the use of drugs for specific indications, and they are listed or labeled on the package insert of the drug. Drug manufacturers are not allowed to bring up off-label uses when speaking with the prescribing practitioner, nor can they distribute written material regarding off-label uses. The off-label use of drugs is permitted in the United States provided that several rules are followed.

DIF: Comprehension

REF: Drug Legislation (Labeled and Off-Label Uses) | p. 7 OBJ: 7

TOP: NBDHE, 6.0. Pharmacology

3. Which of the following are associated with increased patient nonadherence to medication therapy? (*Select all that apply.*)
- Some patients may fear of the side effects of the medication.
  - A longer duration of drug therapy is associated with the risk for nonadherence with medication therapy.
  - Increased dosing frequency is associated with nonadherence with medication therapy.
  - The issue of nonadherence to medication therapy is not important, as patients reliably take their medication as prescribed.

ANS: A, B, C

Many factors are associated with nonadherence to medication therapy. These include poor understanding of the disease and a need for medication to treat it, fear of side effects of the medication, distrust of health care professionals, economic factors, or forgetfulness. Longer duration of drug therapy and the number of times a day the patient must take a prescription increase the chances that a patient will not adhere to the regimen. For example, patients are more compliant with twice-a-day dosing than they are with four-times-a-day dosing. Statistics reveal that only a minority of patients will take their medication as prescribed.

DIF: Comprehension

REF: Prescription Writing (Role of the Dental Hygienist and Patient Adherence to Medication Therapy) | p. 9

OBJ: 7

TOP: NBDHE, 6.0. Pharmacology

## TRUE/FALSE

1. The body of a prescription includes directions to the patient.

ANS: T

The body of the prescription contains the *Rx* symbol, name, and dose size or concentration of the drug, amount to be dispensed, and directions to the patient.

DIF: Recall

REF: Prescription Writing (Prescriptions [Format]) | p. 7 & 8

OBJ: 7

TOP: NBDHE, 6.0. Pharmacology

2. Refill instructions are found in the body of a prescription.

ANS: F

Refill instructions are found in the closing, rather than body, of the prescription.

DIF: Recall

REF: Prescription Writing (Prescriptions [Format]) | p. 8

OBJ: 7

TOP: NBDHE, 6.0. Pharmacology