Technologies in Pharmacology

OBJECTIVES/RATIONALE

Modern health care is increasingly dependent upon technology. Health care workers must be able to select appropriate equipment and instruments and use technology for specific tasks. The student will identify technology utilized in a variety of health care settings, and use technology to assess, process, and retrieve information with appropriate supervision.

TEKS: 121.25 6A, 6B

TAKS ELA 1, 3, 4, 5, 6

KEY POINTS

Teacher Note
If possible plan a fieldtrip to a variety of pharmacies, e.g. small individually owned community pharmacy, a chain store pharmacy, and a hospital pharmacy to have students exposed to variety of technology available. Alternatively have students make their own arrangements to visit community pharmacies in small groups of 3 - 4 students.

I. Electronic technology is influencing and being influenced by the healthcare professional. It is an all-encompassing field of managing, maintaining, and manipulating data through state-of-the-art hardware and software.

II. Pharmacy practice is notably influenced by computerization.
   A. Specialized software packages help reduce medication errors by alerting to
      1. drug interactions
      2. contradictions
      3. patient allergies
      4. cross allergies
      5. special warnings
      6. dose limits
      7. duplications, and more.
   B. Databases maintain patient profiles; can be easily updated and reviewed for irregularities
   C. Computers provide consistent patient education and assist pharmacists in patient counseling.
   D. Computers enable managers to control budgets and inventory; purchasing efficient and convenient by ordering online
   E. billing third-party payers electronically saving costs
      1. paperless environment
      2. faster reimbursement
   F. new drugs easier to "create" by use of computer; any drug can be displayed in 3-D and structure can be manipulated on screen to literally see the outcome
   G. special pharmacy software developed to
      1. calculate formulas for IV solutions
      2. analyze peak and trough measurements for medication, e.g. gentamycin
3. prepare medication schedules, e.g. MARS in hospitals

H. amount of pharmacy information continuously growing; through communications software makes possible
   1. prescription ordering, e.g. prescriber to pharmacy; prescription drug orders transmitted electronically by variety of media
      a. facsimile (fax)
      b. e-mail on computer
      c. voice mail by telephone
   2. drug information storage
   3. information retrieval
   4. information transmission

III. Legal implications: data encountered will cover drugs, reimbursement, patient information. Laws protect privacy and patient confidentiality; practitioner needs to maintain ethical and professional obligations to protect patient's rights to privacy and confidentiality.

IV. Comp-utilization signifies the utilization rather than mere operation of computers.
   A. dispensing of medication automated through robotics
   B. parenteral formulations and IV admixtures are calculated, formulated, and prepared by computerized equipment known as compounders.
   C. Computers also utilized in
      1. unit dose packaging
      2. drug repackaging
      3. labeling
   D. bar codes read by scanners
   E. drug information processed by computers
   F. in clinical fields computers are utilized to
      1. collect drug data
      2. analyze drug data
      3. store the data for future retrieval or processing
   G. technology used to provide clinical and business information used to assist practitioners and management in making business decisions

V. Benefits: In addition to accurate calculations, very fast processing and extensive amounts of memory, software enable practitioner to practice with
   A. enhanced safety
   B. enhanced accuracy
   C. enhanced uniformity
   D. consistency

VI. Computers as resource: Networks of databases provide many online resources; accessible through modem hooked up into telephone line; examples:
   A. ONCOnlin provides cancer information, trials, and research
   B. sites for clinical trials, disease management, and scientific information
   C. Nationally known organizations can be accessed for latest medical news and drug information; e.g. AMA, FDA
ACTIVITIES

I. Present an oral report of the technologies discovered on the visit to the pharmacies. How did the setting in the hospital pharmacy differ from that of the community pharmacy in respect to technology? What advantages were observed? What disadvantages?

II. Write report on the one piece of equipment that seemed to have impressed you the most. What was the purpose of the equipment? Why did it have such an impact on you?

III. Conduct a round-table discussion about the benefits and disadvantages of the enormous impact of technology in the healthcare field, specifically in the pharmaceutical setting.

MATERIALS NEEDED

Medical equipment catalogues to visualize compounders, flowhoods, etc.
Computer with access to Internet
Key: Unit Quiz TECHNOLOGIES IN PHARMACOLOGY

ASSESSMENT

Unit quiz TECHNOLOGIES IN PHARMACOLOGY
Oral Presentation Rubric
Writing Rubric

ACCOMMODATIONS

For reinforcement, the student will create an educational poster emphasizing the impact of technology on the healthcare professional.

For enrichment, the student will individually create a format suitable for patient database, e.g. patient profile format, to be used in the pharmacy.

REFLECTIONS
Unit Quiz: TECHNOLOGIES IN PHARMACOLOGY

1. List 5 (five) areas of concern specialized software packages can help reduce medication errors by alerting the practitioner:
   a. ____________________________
   b. ____________________________
   c. ____________________________
   d. ____________________________
   e. ____________________________

2. What are two ways billing third-party payers electronically can save money:
   a. ____________________________
   b. ____________________________

3. Describe how computers can be utilized in “creating” new drugs more easily.

4. What is the general term for the computerized equipment that is used to calculate, formulate, and prepare parenteral formulations and IV admixtures?
   ____________________________

5. Identify three media by which prescription drug order can be transmitted electronically.
   a. ____________________________
   b. ____________________________
   c. ____________________________

6. Complete the following statement regarding the benefits of using software and computers in the pharmacy:
   In addition to accurate calculations, very fast processing and extensive amounts of memory, software enables the practitioner to practice with
   a. ____________________________
   b. ____________________________
   c. ____________________________
   d. ____________________________
7. What is the online resource site discussed in this unit that provides cancer information, trials, and research?

_______________________________

8. List two nationally known organizations that can be accessed for latest medical news and drug information.

________________
________________
Answer Key to Unit Quiz:
TECHNOLOGIES IN PHARMACY

1. - drug interactions
   - contraindications
   - patient allergies
   - cross allergies
   - special warnings
   - dose limits
   - duplications
   (any 5 in any order)

2. - paperless environment
   - faster reimbursement

3. **any drug** can be displayed in 3-D and its **structure can be manipulated** on screen to literally **see the outcome** (recommend ½ point for each key term)

4. compounder

5. - facsimile (fax)
   - e-mail on computer
   - voice mail by telephone

6. - enhanced safety
   - enhanced accuracy
   - enhanced uniformity
   - consistency

7. ONCOline

8. AMA
   FDA
   (or any other that apply)