

# IT Applications in Health Care

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**Course**

*Principles of  
Health Science*

**Unit II**

*Careers in  
Health Care*

**Essential  
Question**

*How are  
computers used  
in health care?*

**TEKS**

*130.202 (c)  
11A*

**Prior Student  
Learning**

*None*

**Estimated time**

*2-4 hours*

**Rationale**

There are many information technology (IT) applications that support workplace efficiency, especially in health care.

**Objectives**

Upon completion of this lesson, the student will be able to:

- Discuss how IT applications are used in health care
- Describe how IT applications improve efficiency
- Identify careers associated with health information management
- Identify trends in IT applications
- Analyze the use of technology in health care

**Engage**

Can you remember a time before word processing programs and the Internet? How did people write papers before word processing applications, perform accounting functions before spreadsheet applications, and modify pictures before graphics applications? There are so many information technology applications available today that are designed to improve our efficiency and accuracy with everyday tasks. Can you imagine doing your homework without a calculator, the Internet, or your computer?

**or**

Have students brainstorm answers to the question: How are computers used in healthcare?

*Some examples:*

Data analysis	Presentation of information
Internet	Databases
Patient monitoring	Medical claims
Email systems	Appointment scheduling
Telemedicine	Paperless records (pharmacy, lab results, radiology)

**Key Points**

- I. What are some of the most common IT (computer) applications used in the workplace?
  - A. Word processing
  - B. Spreadsheet
  - C. Desktop publishing

- D. Presentation
  - E. Database
  - F. Graphics
  - G. Communication
  - H. Monitoring/security
  - I. Networking
  - J. GPS
  - K. Games
  - L. Music
  - M. Web design
  - N. Search engines
- II. What do the applications do?
- A. Word processing—letters, reports, documents, mail merge documents
  - B. Spreadsheet—data analysis, financial analysis, accounting
  - C. Desktop publishing—brochures, flyers, manuals
  - D. Presentation—educational presentations, business presentations
  - E. Database—employee information, company inventory, sales history, customer information
  - F. Graphics—photo enhancement, graphic design, animation, create digital artwork
  - G. Communication—email, instant messaging, record messages
  - H. Monitoring/security—ensure secure environment, prevent hacking, troubleshooting, manage service issues
  - I. Networking—enable devices to communicate
  - J. GPS—location finder, directions, mapping
  - K. Search engines—find information on the internet
  - L. Games—fun, leisure activities, educational activities, work simulation
  - M. Music—store recorded music, create music
  - N. Web design—manage webpages, create and edit web content
- III. Computers in health care
- A. Health informatics--intersection of information technology and health care
  - B. Electronic Health Record (EHR)--an electronic version of a patient's medical history that is maintained by a provider over time

1. may include:
    - a. patient demographics
    - b. progress notes
    - c. problems
    - d. medications
    - e. vital signs
    - f. past medical history
    - g. immunizations
    - h. laboratory data
    - i. radiology reports
  2. generated and maintained within an institution, such as a hospital, clinic, or physician's office
  3. contain information from all the clinicians involved in the patient's care
  4. the information moves with the patient to the specialist, the hospital, the nursing home, or to a different state
- C. Administrative applications
- D. Billing and coding
- E. Clinical and special purpose systems
- F. Radiology and digital imaging
1. x-rays
    - a. Traditional vs. digital x-ray
    - b. Mammography
  2. ultrasound
  3. digital imaging
    - a. Computerized tomography
    - b. Magnetic resonance imaging
    - c. Positron emission tomography
  4. bloodless surgery
    - a. Interventional radiology
    - b. Stereotactic radiosurgery
    - c. Focused ultrasound surgery
- G. Other applications
1. Computer-assisted surgery
    - a. Computer-assisting surgical planning
    - b. Robotics
    - c. Minimally invasive surgery
      - i. endoscopic surgery
      - ii. laparoscopic surgery
  2. Prosthetics
    - a. Myoelectric limbs
    - b. Microprocessors
    - c. Computer technology for vision and hearing
  3. Pharmacy

- a. Prescription processing
- b. Computers and drug errors
- c. Access to patient and medicine data
- 4. Telemedicine--the use of telecommunications and information technologies to provide health care from a distance

#### IV. Health Science Pathways

- A. Therapeutic Services--Careers in the Therapeutic Services pathway are focused primarily on changing the health status of the patient over time.
  - 1. Pharmacist--how does electronically prescribing medication improve the pharmacy?
  - 2. Physician's Assistant--how do computers improve the patient's experience in the physician's office; how has technology contributed to more accurate and less invasive methods of diagnosis and treatment?
- B. Diagnostic Services--Careers in the Diagnostic Services pathway use tests and evaluations that aid in the detection, diagnosis, and treatment of diseases, injuries, or other physical conditions
  - 1. Radiologic Technologist--how has technology contributed to more accurate and less invasive methods of radiologic exams?
  - 2. Medical Technologist --how are various computer application used in the laboratory?
- C. Health Informatics--Careers in the Health Informatics pathway include many different levels of health care-related employment. This pathway includes health care administrators who manage health care agencies, as well as those individuals who are responsible for managing all of the patient data and information, financial information, and computer applications related to health care processes and procedures.
  - 1. Medical Records/ Health Information Manager--how do computers improve the patient record?
  - 2. Hospital Administrator--how has the use of computer technology in this area changed over the last 15 years? What have been the advantages to the agency and to the patients?
- D. Support Services--Careers in the Support Services pathway provide a therapeutic environment for the delivery of health care. Support Services offers a full range of career opportunities from entry level to management, including technical and professional careers.
  - 1. Computer Programmer--how are various computer applications used in this agency; how do these applications improve healthcare for patients?
  - 2. Facilities Manager--how has technology impacted quality control?
- E. Biotechnology Research and Development--Careers in the

Biotechnology Research and Development pathway involve bioscience research and development as it applies to human health. These scientists may study diseases to discover new treatments or invent medical devices used to directly assist patients or to improve the accuracy of diagnostic tests.

1. Biomedical Equipment Technician--what are examples of computerized medical instruments and equipment?
2. Biostatistician--how has technology impacted the statistical analysis of data?

#### V. Health Information Management Careers

A. Health Information Technology (HIT)--The application of information processing involving both computer hardware and software that deals with the storage, retrieval, sharing, and use of health care information, data, and knowledge for communication and decision making

B. Health Information Management--An allied health profession responsible for ensuring the availability, accuracy, and protection of the clinical information needed to deliver healthcare services and make appropriate healthcare-related decisions. \*\*\*END USER\*\*\*

1. The practice of maintenance and care of health records by paper-based and electronic means in hospitals, physician office clinics, health departments, health insurance companies, and other facilities that provide healthcare or maintenance of health records.
2. Professionals who plan information systems, develop health policy, and identify current and future information needs. In addition, they may apply the science of informatics to the collection, storage, use, and transmission of information to meet the legal, professional, ethical, and administrative records keeping requirements of healthcare delivery. They work with clinical, epidemiological, demographic, financial, reference, and coded healthcare data.

C. Health Informatics--A discipline at the intersection of Information science, computer science, and healthcare. It deals with the resources, devices, and methods required to optimize the acquisition, storage, retrieval, and use of information in health and medicine. Health informatics tools include not only computers but also clinical guidelines, formal medical terminologies, and information and communication systems.

1. Using technology to store, share, and analyze health information
2. The management and communication of data, information, knowledge and wisdom

#### Activity

- I. Research and report on the uses of technology in medicine. Focus on a particular technological application for each of the health care

systems. Include purpose of application, evolution of the application, and how this type of medical application can impact patients'/health care providers' lives.

- II. Develop a detailed technology timeline beginning the year you were born focusing on health care
- III. Write a 2-3 page paper predicting the next trends in Information Technology applications

### **Assessment**

Successful completion of activities

### **Materials**

Supplies for creating timelines

Paper for printing assignments

Computers with word processing, spreadsheet, presentation, and graphics applications

Internet access

Printer

Websites that chronicle the changes and developments of computers and IT applications

<http://www.computerhistory.org/timeline/?category=sl>

[http://www.rci.rutgers.edu/~cfs/472\\_html/Intro/timeline.pdf](http://www.rci.rutgers.edu/~cfs/472_html/Intro/timeline.pdf)

Burke and Weill. Information Technology for the Health Professions, Prentice-Hall, New Jersey, (latest edition).

Gerdin, Judith. Health Careers Today. Mosby, St. Louis. (latest edition).

### **Accommodations for Learning Differences**

For reinforcement, the student will design a poster illustrating technological advances in health care. Focus on the five systems.

For enrichment, the student will interview a pharmacist about the impact of technology in the pharmacy. Focus on electronic prescriptions, drug databases, etc. Present findings to class.

**National and State Education Standards**

National Health Science Cluster Standards

HLC 10.01 Technical Skills

Healthcare workers will apply technical skills required for all career specialties. They will demonstrate skills and knowledge as appropriate.

**TEKS**

130.202 (c)(11)(A) identify technological equipment used in each of the five systems and relate findings to identified societal risk factors;

Texas College and Career Readiness Standards

English Language Arts

III. B. Develop effective speaking styles for both group and one on one situations.

Science Standards

IV. A. 1. Recognize how scientific discoveries are connected to technological innovations.

IV. C. 1. Understand the historical development of major theories in science.

IV. C. 1. Recognize the role of people in important contributions to scientific knowledge.

Social Studies Standards

Interrelated Disciplines and Skills

I. B. 2. Identify and evaluate sources and patterns of change and continuity across time and place.

Cross-Disciplinary Standards

I. E. 1. Work independently.

I. E. 2. Work collaboratively.

II. E. 1. Use technology to gather information.