IT affects all aspects of pharmacy (drug design, testing, and administering).

The U.S. Food and Drug Administration (FDA) is supposed to oversee the safety and effectiveness of medications.

- Since the 1992, passage of Prescription Drug User Fees Act (PDUFA) renewed in 1997, 2002, and 2007, which requires drug companies to pay fees to support the drug review process and also to pay annual fees, more and more of the FDA budget has come from private companies.
  - Between 1998 and 2005 user fees doubled; they now comprise over 50 percent of the FDA’s drug review budget.
  - Congressional oversight has declined since 1992.
  - Some of the FDA’s advisory panels have ties to the drug industry.
  - Two percent of the drugs on the market have not been reviewed by the FDA.

Computers are being used to help design and test new drugs. Genetic tests can be used to determine an individual’s response to a specific medication.

Biotechnology sees the human body as a collection of molecules and seeks to understand and treat disease in terms of these molecules.

- Developing drugs by design requires mapping the structure and creating a three-dimensional graphical model of the target molecule.

The application of information technology to biology is called bioinformatics.

The development of new medications is becoming more dependent on knowledge of genes. The Human Genome Project (HGP) mapped the human genome.

- HGP attempted to understand the molecular bases of genetic diseases.
- By 2006, several genes related to disease had been identified and dozens of drugs have been approved.
- Antisense technology attempts to shut off disease-producing genes.
- RNAi is a process that cells use to turn off genes. The attempt at developing drugs based on RNAi holds some promise.
- In 2006, a synthetic molecule that caused cancer cells to self-destruct was developed. However, it has not been tested.
• Stem cells are cells that can develop into different types of body cells; theoretically, they can repair the body.

- Software can help simulate drug trials.
- The Physiome Project is an international project seeking to create mathematical models of human organs. Mathematical models may in the future allow the testing of drugs, tailoring a drug to a person, and practice of surgery.
- Computers are used to help the FDA speed clinical trials.
- Pharmacies inside and outside the hospital can be computerized.
- Introducing computers into any aspect of prescription entry, the filling of orders, and dispensing of medications appear to lead to a decrease in medication errors. However, there are errors caused by computerization.
- Community and centralized hospital pharmacies that computerize use robots to dispense medication. The system should be connected to a database to allow the computer to warn of possible drug interactions, allergies, and incorrect dosage. Barcodes are used to identify medications.
- Some computerized hospital pharmacies are using point-of-use dispensing of drugs—a decentralized automated system.
- Intravenous administration errors are very serious. Two new safety technologies being introduced in 2006 are barcode medication administration (BCMA) and smart infusion systems with dose error reduction systems (DERS).
- RFID tags can be used to identify drugs. Unlike barcodes, RFIDs do not have to be scanned by hand; RFID readers can be embedded anywhere and automatically read the RFID tag.
- Telepharmacy involves using a computer, a network connection, and a drug-dispensing unit to allow patients to obtain drugs outside of a traditional pharmacy, at, for example, a doctor’s office or clinic.
- Some medications can currently be delivered on a surgically implanted chip.