FDA

- Regulates products whose annual sales account for ¼ of consumer spending in US
- Responsible for ensuring SAFETY and EFFICACY of CHEMICAL, BIOLOGICAL agents and sophisticated medical DEVICES

- Safe:
  - Probable benefits to health for intended use outweigh any probable risk of harm

- Effective:
  - Device does what it is supposed to do in a reliable fashion
History of Regulation

- **1906**
  - Food and Drug Act
  - Can’t lie on label

- **1938**
  - Food, Drug and Cosmetic Act
  - Premarket notification

- **1962**
  - Drug amendments to FD&C Act
  - Premarket approval

- **1976**
  - Medical Device Amendments to FD&C Act

- **1994**
  - Dietary Supplement Health Education Act
Today

- CANNOT mention disease
- CAN make claims that food can affect structure of function of body
- Examples:
  - CANNOT say that a product reduced cholesterol but CAN say it maintains healthy cholesterol levels
  - CANNOT say echinacea cures disease, but CAN say it has natural antibiotic activities and is considered an excellent herb for infections of all kinds
Post-Marketing Surveillance

- Vioxx – withdrawn from market
- Celebrex – black box warning
- Bextra – sales suspended

http://www.fda.gov/medwatch/
Regulation of Medical Devices

- FDA did not regulate devices before 1938
- **1938:**
  - FDA could only challenge sale of products it believed were unsafe
  - Could only remove them from the market after patient injuries
- **1960s:**
  - Rapid innovation in medical technology
  - Tried to regulate many as drugs: contact lenses, IUDs
  - Catastrophic failures of heart valves and pacemakers
- **1970s:**
  - Broad recognition that different rules were needed to regulate devices
1976

- Device amendments to FD&C Act:
  - No single policy would work for all devices
    - Tongue depressor
    - Artificial heart
1976: Device amendments to FD&C Act

Three classes of devices:

- **Class I:**
  - Pose least risk to patient
  - Not life sustaining
  - GMP, proper record keeping required
  - 30% of devices
  - X-ray film, tongue depressors, stethoscopes

- **Class II:**
  - Not life sustaining, but must meet performance standards
  - Blood pressure monitors, Catheter guide wires
  - 60% of devices

- **Class III:**
  - Pose greatest risk to patient
  - For use in supporting or sustaining human life
  - 10% of devices
  - Stents, heart valves, LVADs
  - Require GMP, failure modes analysis, animal tests, human clinical studies under IDE
Role of CDRH

- Ensure that products coming to market have more benefit than risk
- Ensure that products are labeled so that practitioners and patients know what to expect from their use
- Regulates 1,700 types of devices
- 23,000 registered manufacturers
- 1996: received 20,236 device related submissions
Device Approval Process

- Device + intended use considered together
- Manufacturer submits request for marketing approval
- Advisory panel:
  - One consumer representative (non-voting)
  - One industry representative (non-voting)
  - Physicians and scientists
- FDA not required to follow recommendations of panel, although they usually do
Investigational Device Exemption

- Enables experimental use of high risk device
- Must have positive engineering and animal data
- First give approval for feasibility studies with small number of patients
- Then proceed to multi-center trials
- Larger data sets frequently show results from small sample sets are not true
Humanitarian Use Exemption

- Device designed to treat or diagnose condition that affects <4,000 patients/year
- Device would not otherwise be available without exemption
- No comparable device is available
- Patients will not be exposed to unreasonable or significant risk of injury or illness by device
Medical Device Reporting

- System to detect device related problems in a timely manner
- Serious injuries or deaths that may have been caused by or related to a medical device must be reported to the manufacturer of the device within 10 days
- Must be reported to the FDA within 10 days
Recently Approved Devices


- NIRflex Stent System
  - http://www.fda.gov/cdrh/mda/docs/p020040.html
  - http://www.fda.gov/cdrh/PDF2/P020040.html
Types of Universities

- **Carnegie Classification**
  - Taxonomy of colleges and universities
    - Doctorate-Granting Institutions
      - Research Universities / Very High Research Activity
      - Research Universities/ High Research Activity
      - Doctoral/Research Universities
    - Master’s Colleges & Universities
    - Baccalaureate Colleges
  - [http://www.carnegieclassification-preview.org/index.aspx](http://www.carnegieclassification-preview.org/index.aspx)
R&D Funding for Biomedical Research

- **Federal government:**
  - Funds ~ 36% of all medical research in US
- **Mostly funded through NIH:**
  - Current NIH budget: $28 billion/year
  - NIH budget doubled from 1998-2003
  - This year: 0% increase
  - Focus is on basic research
21 drugs introduced between 1965 and 1992:
- Considered by experts to have had highest therapeutic impact on society
- Public funding of research was instrumental in development of 15 of the 21 drugs (71%)
- Three-captopril (Capoten), fluoxetine (Prozac), and acyclovir (Zovirax)-had more than $1 billion in sales in 1994 and 1995
- Others, including AZT, acyclovir, fluconazole (Diflucan), foscarnet (Foscavir), and ketoconazole (Nizoral), had NIH funding and research to help in clinical trials
NIH

- National Cancer Institute
- National Eye Institute
- National Heart, Lung, and Blood Institute
- National Human Genome Research Institute
- National Institute on Aging
- National Institute on Alcohol Abuse and Alcoholism
- National Institute of Allergy and Infectious Diseases
- National Institute of Arthritis and Musculoskeletal and Skin Diseases
- National Institute of Biomedical Imaging and Bioengineering
- National Institute of Child Health and Human Development
- National Institute on Deafness and Other Communication Disorders
- National Institute of Dental and Craniofacial Research
- National Institute of Diabetes and Digestive and Kidney Diseases
- National Institute on Drug Abuse
- National Institute of Environmental Health Sciences
- National Institute of General Medical Sciences
- National Institute of Neurological Disorders and Stroke
- National Institute of Nursing Research
- National Library of Medicine
The Funding Process

- **NIH →** Issues request for proposals
- **Investigator →** Writes a proposal
  - Hypothesis
  - Background & Significance
  - Preliminary Results
  - Research Design and Methods
  - Protection of Animals and Human Subjects
- **Peer-Review**
  - Score
  - Comments
- **Institutional Review**
- **Funding Decision**