Chronic Disease Epidemiology

Study of distribution in the population of chronic disease and conditions to know how to prevent and control them. Latency period is the time of exposure to the clinical signs of a chronic disease. Diseases infected by infectious agents, socioeconomic, cultural, political, and environmental factors. Chronic diseases caused by multifactorial etiology (multiple factors) ex: diet, physical inactivity, tobacco use, and intermediate (ex: blood pressure and blood glucose). 7 out of 10 Americans die from chronic diseases. 1 in 4 people experience daily activity limitations with chronic disease. Prevalence of high blood pressure, high cholesterol, arthritis, depression, Alzheimer's, osteoporosis, and asthma higher in women. The most prominent chronic disease and condition is high blood pressure, arthritis, high cholesterol, and ischemic heart disease.

Latency Periods for Selected Diseases

Latency Periods for Selected Noninfectious, Chronic Diseases:

Time from exposure ranges from minutes to years for noninfectious diseases. The latency period for chronic conditions takes years.

The Environment and Chronic Health Problems

Physical stresses such as excessive heat, cold, noise, radiation, vehicle collision, workplace injuries, climate change, ozone depletion, housing, and etc. influence health. Physical stresses cause both acute and chronic conditions. Radiation exposure causes radiation burn, nausea, fatigue, vomiting, diarrhea, damage to the central nervous system, and cancer. Radiation comes from Earth's crust, outer space, sun and some human activity such as industrial processes, medical procedures, tobacco products, misuse of radioactive substances, luminous clocks and watches, and glazed and tinted products. 3 ways people are exposed to radiation is inhalation, ingestion, and direct exposure. Radiation exposure over a time period causes benign tumors, cancer of leukemia, bladder, breast, colon, liver, lung, esophagus, ovarian, and stomach.

Ionizing radiation causes cancer, causes harm to the fetus by reducing brain size, slow growth, blindness, and mental retardation. Ultraviolet radiation is the most common cause of skin cancer. Skin carcinoma is the most common cancer in the U.S. Melanoma is the least common skin cancer, but is the most aggressive and lethal.

Chemicals and Health:

The Environment and Chronic Health Problems (cont)

Chemicals such as acids, drugs, heavy metals, poison and some enzymes in the environment contribute to risk of chronic diseases and adverse health conditions. Lead is metal found in manufactured environments and in environments such as soil, water, food, and dust. Lead exposure causes damage to organs such as kidneys, liver, brain, and nerves; and causes osteoporosis, seizures, mental retardation, behavioral disorders, memory problems, and mood changes. It affects blood pressure, increased heart disease, anemia. It affects animals and plants the same way as humans such as its effects on the neurological and reproductive functions in fishes. Social factors that influence lead intake are living in poor areas or old houses that contain lead-based paint, water contaminated with lead, and lead plumbing. Banning leaded gasoline drastically reduced blood lead levels.

Toxicokinetics:

Study how chemical substances enter and affect the body. The process of toxicokinetics is absorption, distribution, biotransformation, and excretion.

Biologic Agents in Health:

Biological agents that can cause diseases are viruses and bacteria. Infectious agents increase risk for both acute and chronic health conditions such as cancer. Vaccines and antivirals used to fight off viruses and antibiotics are used to fight off bacteria.

Social Environment in Health:

Increased risk for developing chronic health problems is poverty, low income, education, work skills, family influence on diet, community, and environment. Social problems influence chronic health problems such as acts of terroism, natural disasters, increase or decrease of war.

Behavior and Chronic Health Problems

Lifestyle conditions that increase the risk for chronic health problems are career pressures, sedentary lifestyle, high density population, poor diet, crime, drugs, gangs, poverty, pollution, stress,economic struggles, and fear. "In 1981 it was estimated that smoking explained roughly 30% of all cancer deaths, diet explained another 35%, and the remainder was due to viruses, bacteria, radiation, industrial carcinogens, family predisposition, and so on."

Smoking and Chronic Disease:

Smoking causes different types of cancers such as stomach cancer, esophageal cancer, renal cancer, bladder cancer, pancreatic cancer, lung cancer, cervical cancer, laryngeal cancer, vulvar cancer, anal cancer, penile cancer, lip and oropharyngeal cancer.

Diet and Chronic Disease:

Behavior and Chronic Health Problems (cont)

Well established diseases associated with diet are cancer, diabetes, stroke, and heart disease. The term malnutrition is used to describe people experiencing either undernutrition or overnutrition. The term undernutrition is used when an individual consumes too little of essential vitamins, minerals, and other nutrients. Undernutrition can cause severe injuries and illnesses. The term overnutrition is when there is an excessive intake of nutrients.

Body Weight and Chronic Disease:

In the textbook, “The World Health Organization (WHO) reports that obesity has nearly tripled throughout the world since 1975.” The World Health Organization(WHO) states that, “About 16% of adults aged 18 years and older worldwide were obese in 2022. The worldwide prevalence of obesity more than doubled between 1990 and 2022.” There are several health conditions associated with obesity such as heart disease, cancer, high blood pressure, injuries, obstructive sleep apnea, stroke, osteoarthritis, gallbladder disease, hyperlipidemia, diabetes mellitus, and impaired functioning of heart and lungs.

Sexual Practices and Chronic Disease:

There are increased risks for chronic disease with sexual behaviors. Sexually transmitted infections spread from being sexually active, having many sexual partners, and practicing unprotected sex. Sexually transmitted infections affect 1 in 2,000 babies and can harm the health of a fetus and newborn such as causing stillbirth, newborn death, or chronic bone defects. Some sexually transmitted infectious diseases such as HIV/AIDS and syphilis damages the body’s immune system promoting the risks of chronic conditions being developed.

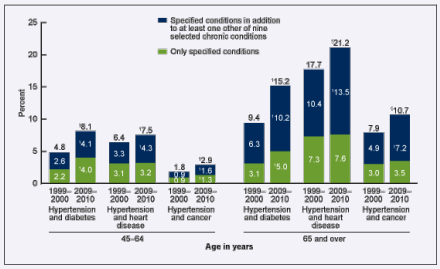
Behavior Changes for Better Health:

Behavior Risk Factor Surveillance System is a state level survey that monitors behavioral risks rather than attitudes or knowledge associated with premature morbidity and mortality. This survey information is helpful in decision making, planning, initiating, supporting, and evaluating prevention programs.

Health Belief Model:

Widely used framework for understanding health behavior, behavior change requires rational decision making process that is susceptible to illness, perceived consequences of illness, belief that recommended action will be effective to reduce risk, and belief that action outweighs the costs.

Prevalence of Nine Chronic Conditions in The U.S.



Hereditary and Chronic Health Problems

Many health illnesses and conditions can be more susceptible in individuals that have a family history of developing the disease. The development of cancer occurs in many individuals because their behaviors influence the development and hereditary factor only plays 10% to 20% in cancer. Osteoporosis is a disease that can develop with or without hereditary disease. If an individual has no family history of the disease, but lives an unhealthy lifestyle they increase the risk in developing it.

Disability

When an individual has a diminished capacity and is unable to perform within a prescribed range. Three levels of functioning are impairment, activity limitations, and participation restriction. Impairment is the term used to describe when there is any loss of an ability to perform a function such as psychological, physiologic, and anatomic functions. Activity limitation is when an individual experiences difficulty in performing activities. Participation restriction is when an individual experiences problems in their involvement in life situations. Diseases can also contribute to developing disabilities in individuals.

Priorities in Disease Prevention and Control

The effects of disease prevention are observable, but cannot always be demonstrated by empirical research. The primary purpose of epidemiology is to prevent and control diseases, injuries, disorders, death, and disabilities in the population.The main changes in lifestyle and behavior are needed to prevent and control chronic disease. By reducing and eliminating the use of tobacco, smoking, excessive alcohol and drug abuse will help reduce the risk of developing chronic diseases. Many lifestyle habits such as changing diet, increasing physical activity, weight maintenance, stress reduction, reduced stress, safe sex, and following safety measures will also promote the decrease in developing chronic diseases.

Reference

Merrill, Ray M. “Introduction to Epidemiology 9th Edition” Jones & Bartlett Learning, 2024, pp. 65 - 67.

World Health Organization “Obesity and overweight.” https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight Accessed 20 Nov. 2025.

Virginia M. Freid, M.S.; Amy B. Bernstein, Sc.D.; and Mary Ann Bush, M.S.“Multiple Chronic Conditions Among Adults Aged 45 and Over: Trends Over the Past 10 Years” Centers for Disease Control and Prevention, 2012. https://www.cdc.gov/nchs/products/databriefs/db100.htm Accessed 21 Nov. 2025.