Early Humans and Disease

Hunter-gatherers:

- Life was short, death rates were high.
- Main causes of death were accidents, food shortage, predation, infectious disease.
- Non-communicable diseases (cancer, obesity, diabetes, hypertension) were rare to non-existent.
- Early nomads lived in small bands, infrequently contacting others. Numbers were not large enough -- and bands were not dense enough -- to maintain (spread) acutely infectious diseases, e.g. measles, smallpox, polio, enteric and respiratory infections.
Early Humans and Disease

*Domestication of plants and animals (~6000 years ago):*

- Creation of first ‘urban’ areas with large populations in continuous close contact. Increase in food supply and expansion of populations.
- Main causes of death were accidents, food shortage, predation, infectious disease, with increases in communicable diseases. TB, Measles, Smallpox, Leprosy, Polio
- Diet was different from that of hunter-gatherer, but still based mainly on unrefined plant foods.
- Non-communicable diseases (cancer, obesity, diabetes, hypertension) were rare to non-existent.

Modern Humans and Disease

*Highly Developed Countries*

- Life expectancy has increased from ~50 yrs in 1950 to 86 yrs in 2000. For the first time in history a mother knows that the loss of one of her children before maturity is an unlikely event.
- Main causes of death are non-communicable diseases (cancer, obesity, diabetes, hypertension).
- Food plentiful, sedentary lifestyle.
- Acute infections decline because of improved public health information, vaccines, medical treatments, and increased resistance to infection due to nourishment.

Causes of Death in US

[Bar chart showing the percentage of deaths from various causes: Diseases of the heart (CVD) at 29%, Cancer at 23%, Cerebrovascular diseases at 7%, Chronic lower respiratory diseases at 5%, Unintentional injuries at 4%, Diabetes at 3%, Flu and pneumonia at 3%, Alzheimer's disease at 2%, Diseases of the kidney at 2%, Septicemia (blood infection) at 1%.]

_National Vital Statistics Reports, Vol. 52, No. 3, September 18, 2003_

Cardiovascular Disease: Genetic and Environmental Contributions

[Bar chart showing the percentage of heart disease patients: Inherited Lipoprotein Disorders at 80%, High Cholesterol at 20%.

Source: Dr. Thomas C. Isaacson]
Common Diseases Can Have Multiple Genetic and Environmental Contributions

Colon Cancer

Positional Cloning: Finding Associated Markers

Positional Cloning: Finding the Affected Gene
1) Use Markers (M1 and M2) to identify chromosomal interval
2) Identify genes in known genome sequence
3) Sequence to identify mutation that may be responsible for phenotype