## Topics covered so far:

➤ **What is population geography?**
➤ **History of population growth and change**
➤ **Measuring population growth**
➤ **Population projections**
➤ **Sources of population data**
➤ **Population theory**

## Next topics:

### Population Dynamics:

➤ **Mortality**
➤ **Fertility**
➤ **Migration**

# Population Dynamics
## I. Mortality Patterns and Trends

### Key terms:

- Mortality
- Age-specific death rate
- J-Shaped mortality curve
- Infant mortality
- Neonatal mortality
- Post-neonatal mortality rate
- Life tables
- Morbidity
- Epidemiologic transition

In demography, the word **mortality** refers to studies of the rates and causes of deaths for a population as a whole or a subset of it, as well as differentials between groups, across space, and over time.

Thus, the various measures of mortality are used to look at differences between localities and between groups of people. "Groups or localities with high mortality rates call out for special attention. A decline in the rates is a gauge of progress."

All of the mortality rates in use are based on simple division—the **number of people who die** by the **number at risk of dying** in that group or area.

http://en.citizendium.org/wiki/Demography,_mortality#Measuring_mortality

# **Two types** of mortality rates:

➢ **Crude**

➢ **Age-specific**

# Crude Death Rate: CDR

**Crude Death Rate (CDR) is calculated by dividing the <u>total number of deaths</u> in a given year by the average (or midyear) <u>total population</u> (times 1000).**

**The CDR is based on numbers for the <u>entire population</u>, and does not take into account the age structure of population.**

**Question: The crude death rates in two neighboring countries is 8 per thousand and 5 per thousand. One of the two countries is the US and the other is Mexico. Which of the two has the lower crude death rate of 5 per thousand ? Why ?**

**Future changes in CDR in these two countries, and the gaps between them will depend on future differences in the speed with which their respective populations continue to age.**

Watch a webcast on US population ageing

http://www.prb.org/Journalists/Webcasts/2008/mortalityandaging.aspx

# CDR:  USA

The CDR for the United States steadily declined from 17.2 deaths per 1000 in 1900 to 9.6 deaths per thousand in 1950, then stayed frozen for 20 years because, even though people were healthier, the population was getting older. Since 1990 the CDR has been steady at about 8.5 deaths per 1000 per year.

# USA
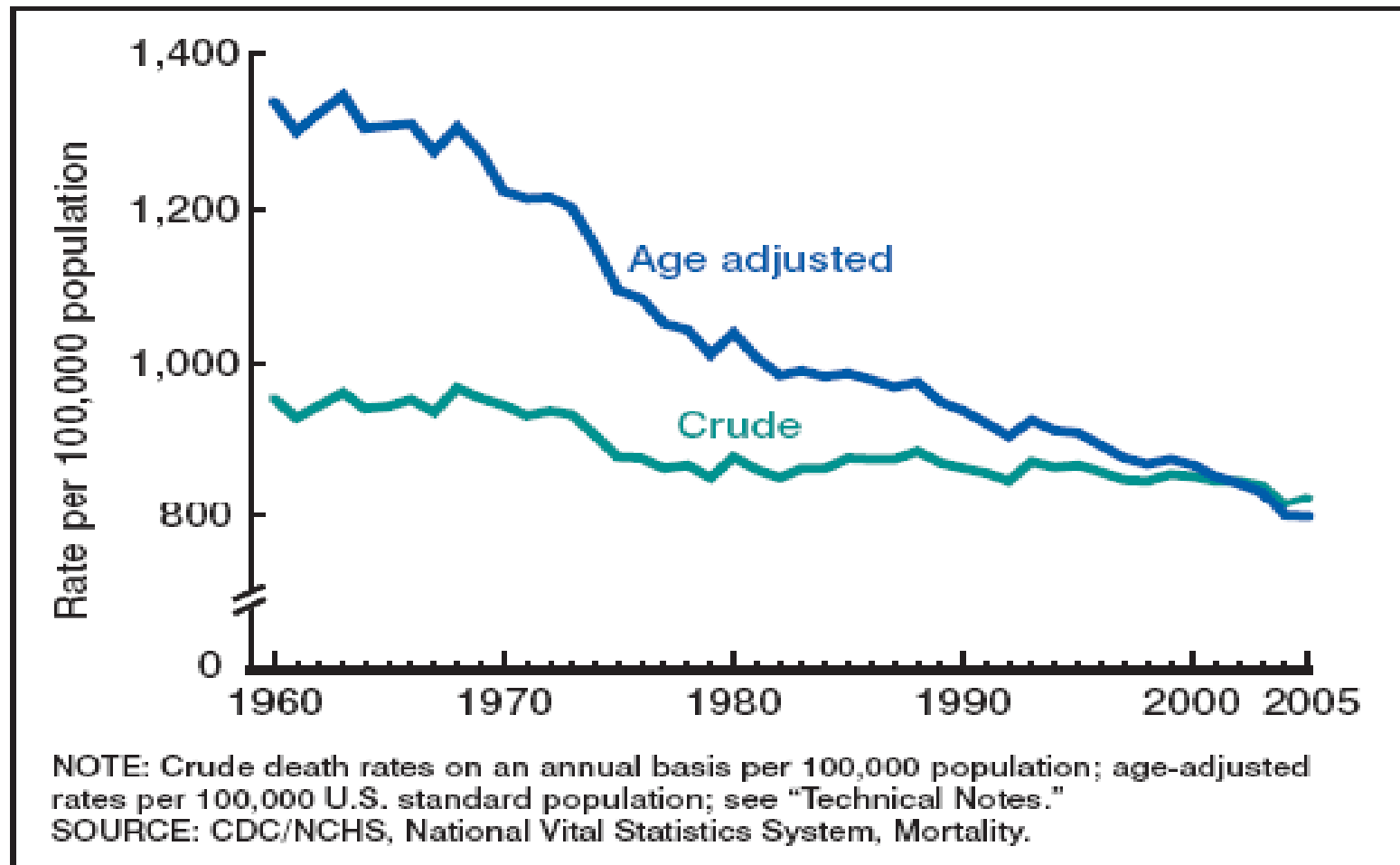


Figure 1. Crude and age-adjusted death rates: United States, 1960–2005

http://www.cdc.gov/nchs/fastats/deaths.htm
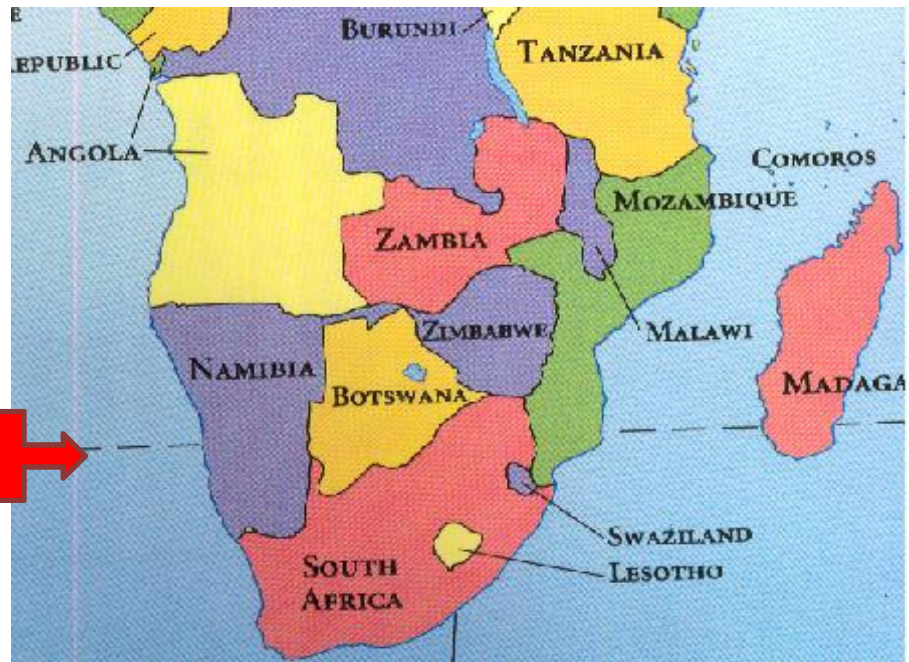
# Reminder

## Crude Death Rate:

$$CDR = \frac{D}{P} \times 1000$$

# Where:

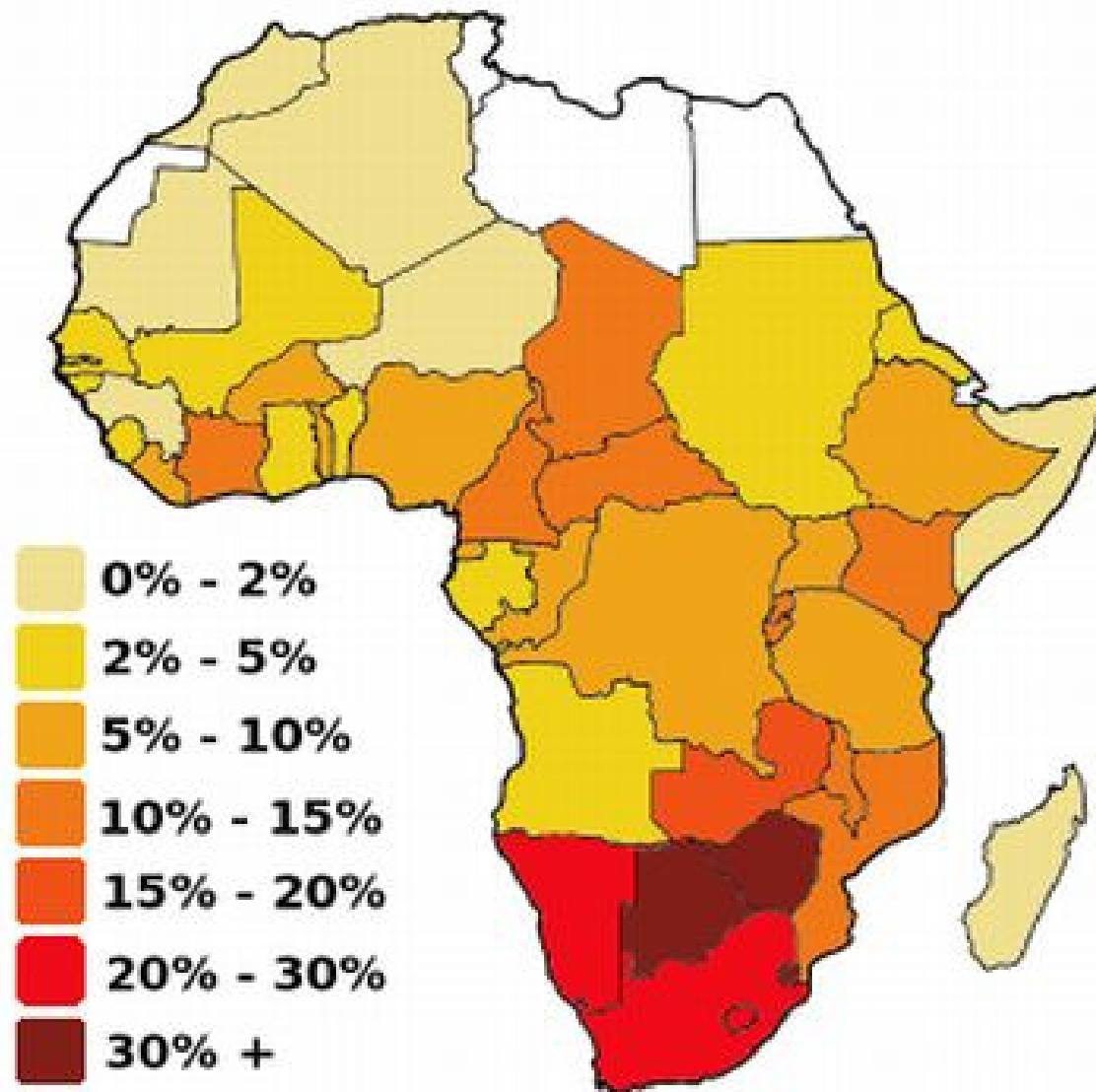D : Number of deaths in one year

P: The total mid-year population

**High CDR (2008)**

| | |
|---|---|
| Swaziland | 31 |
| Lesotho | 25 |
| Sierra Leone | 23 |
| Zambia | 22 |
| Zimbabwe | 21 |
| Angola | 21 |
| Mozambique | 20 |
| Liberia | 18 |
| Nigeria | 18 |

**Low CDR**

| | |
|---|---|
| Kuwait | 2 |
| Quatar | 2 |
| UAE | 2 |
| Brunei | 3 |
| Macao | 3 |
| Andora | 3 |

Causes

# AIDS in Africa. Percentage of the adult population (15-49) living with HIV/ADIS



Legend:
- 0% - 2%
- 2% - 5%
- 5% - 10%
- 10% - 15%
- 15% - 20%
- 20% - 30%
- 30% +

# Question:

**Do you think there is a difference in CDR between the various states of the United States?**

**If yes, what would be the determining factor (s) ?**

This would make a great topic for your term paper !

# Age-Specific Rates

➢ **The probability of dying is closely linked to AGE**

➢ Age-specific death rate (ASDR) refers to the number of deaths each year for a specific age group, divided by the mid-year population, that year, of that age group (times 1000).

➢ If two populations have different age distributions, the ASDR is a much better measure than the CDR to evaluate mortality.

➢ The calculation of the ASDR requires age data from the census in addition to vital statistics data.

➢ Assembling all the ASDR's together for every year of life produces a life table.

http://en.citizendium.org/wiki/Demography,_mortality#Age-specific_death_rate_.28ASDR.29

$$ASDR = \frac{Da}{Pa} \times 1000$$

**Where:**

Da : Number of deaths of people in the age group a (either a 1 or a 5 – year age group)

Pa : The mid-year population in age group  a

*Example :* *http://www.ethiodemographyandhealth.org/DemographicRates.html*
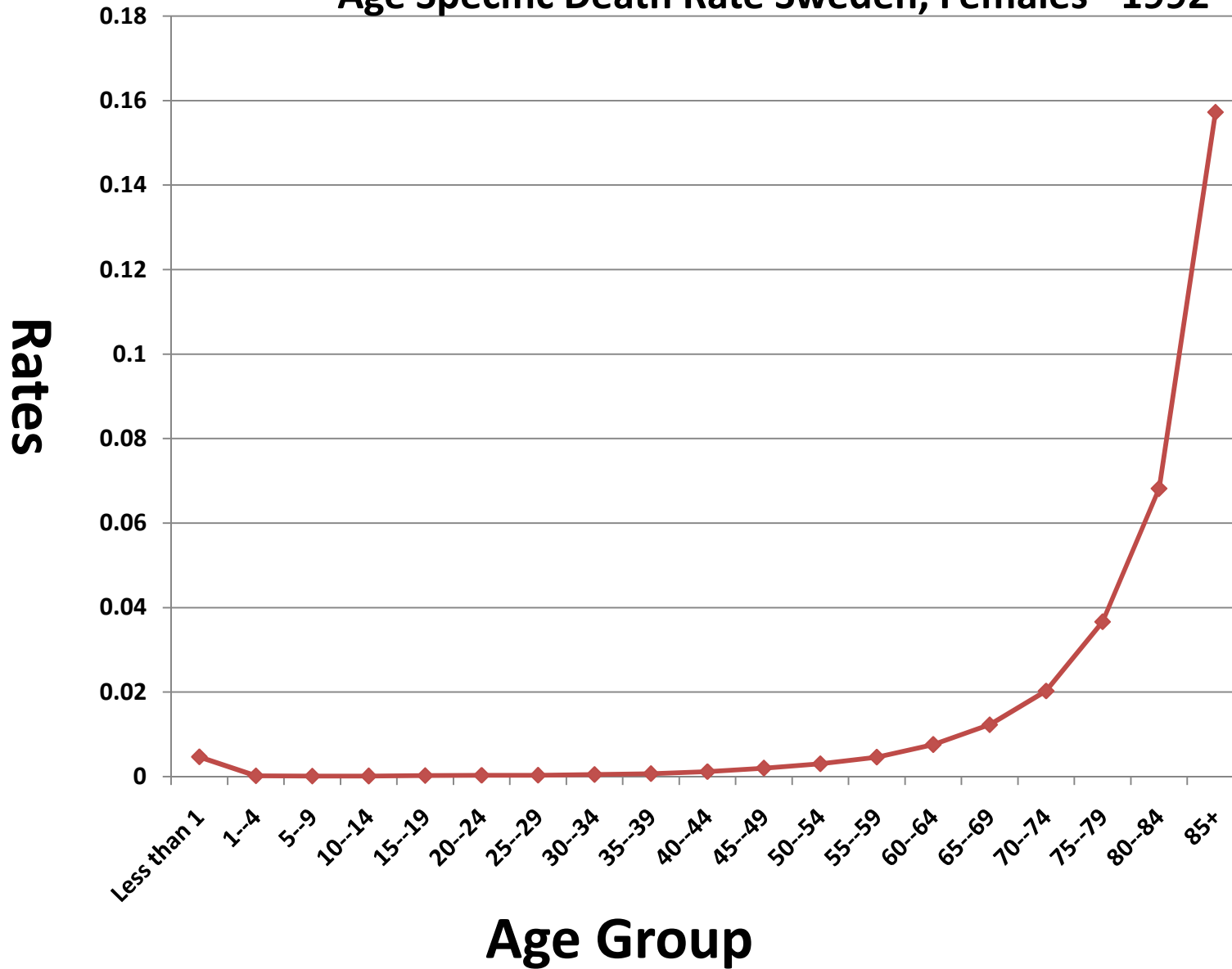
**Cohort** age-specific death rates

vs.

**Period** age-specific death rates

# The J-Shaped Age-Specific Mortality Curve

**Age Specific Death Rate Sweden, Females - 1992**

Rates vs. Age Group

| Age Group | Less than 1 | 1--4 | 5--9 | 10--14 | 15--19 | 20--24 | 25--29 | 30--34 | 35--39 | 40--44 | 45--49 | 50--54 | 55--59 | 60--64 | 65--69 | 70--74 | 75--79 | 80--84 | 85+ |

# Childhood Mortality Rates

➢**Neonatal mortality** (NN): the probability of dying within the first month of life.

➢**Post-neonatal mortality** (PNN): the difference between infant and neonatal mortality

➢**Infant mortality** ($_1q_0$): the probability of dying between birth and the first birthday

➢**Child mortality** ($_4q_1$): the probability of dying between exact age one and five

➢**Under-five mortality** ($_5q_0$): the probability of dying between birth and the fifth birthday

# Infant Mortality Rate (IMR) is defined as:

$$IMR = \frac{D_0}{B_0} \times 1000$$

## Where:

$D_0$ = annual number of <u>deaths</u> of infants between birth and age 1

$B_0$ = annual number of births

# Neonatal Mortality Rate (NMR) is defined as:

$$IMR = \frac{D_0j}{B_0} \times 1000$$

## Where:

$D_0j$ = annual number of <u>deaths</u> of infants between birth and 28 days

$B_0$ = annual number of births

# Neonatal Mortality Rate:

➢ **Varies remarkably little from country to country**

➢ **Has shown little susceptibility to reduction under pressure from modern medical science**

➢ **Low birth weight is one of the major contributors**

# Infant mortality:

➢ **Is unevenly distributed throughout the first year of life.**

➢ **Most infant deaths occur in the first six months.**

➢ **In areas where infant mortality rates are low, a high proportion of infant deaths occur <u>within the first 28 days of life</u>. These early infant deaths often result from congenital defects or injuries at birth – deaths that modern medicine can do very little about**

**U.S. has second worst newborn death rate in modern world, report says**
**Research: 2 million babies die in first 24 hours each year worldwide**
By Jeff Green
CNN

Wednesday, May 10, 2006; Posted: 12:02 p.m. EDT (16:02 GMT)

**(CNN) -- An estimated 2 million babies die within their first 24 hours each year worldwide and the United States has the second worst newborn mortality rate in the developed world, according to a new report.**

American babies are three times more likely to die in their first month as children born in Japan, and newborn mortality is 2.5 times higher in the United States than in Finland, Iceland or Norway, Save the Children researchers found.

Only Latvia, with six deaths per 1,000 live births, has a higher death rate for newborns than the United States, which is tied near the bottom of industrialized nations with Hungary, Malta, Poland and Slovakia with five deaths per 1,000 births.

# Infant mortality trends in the US 1915 to 2000

USA: In 2003 there were 28,025 infant deaths from all causes.

The 10 leading causes of death are listed below. The remaining causes classified as "All other causes" accounted for 8,796 deaths.

**1. Congenital malformation, deformations and chromosomal abnormalities**

Congenital Malformations accounted for 5,621 deaths.

**2. Disorders relating to short gestation and low birth weight (low birthweight)**

Low Birth Weight accounted for 4,849 deaths.

**3. Sudden Infant Death Syndrome (SIDS)**

Sudden infant death syndrome accounted for 2,162 deaths.

**4. Newborn affected by maternal complications of pregnancy (maternal complications)**

Maternal complications accounted for 1,710 deaths.

**5. Newborn affected by complications of placenta, cord and membranes**

Cord and placental complications accounted for 1,099 deaths.

**6. Accidents (unintentional injuries)**

Accidents or unintentional injuries accounted for 945 deaths.

**7. Respiratory distress of newborn**

Respiratory distress of newborn accounted for 831 deaths.

**8. Bacterial sepsis of newborn**

Bacterial sepsis of newborn accounted 772 deaths.

**9. Neonatal hemorrhage**

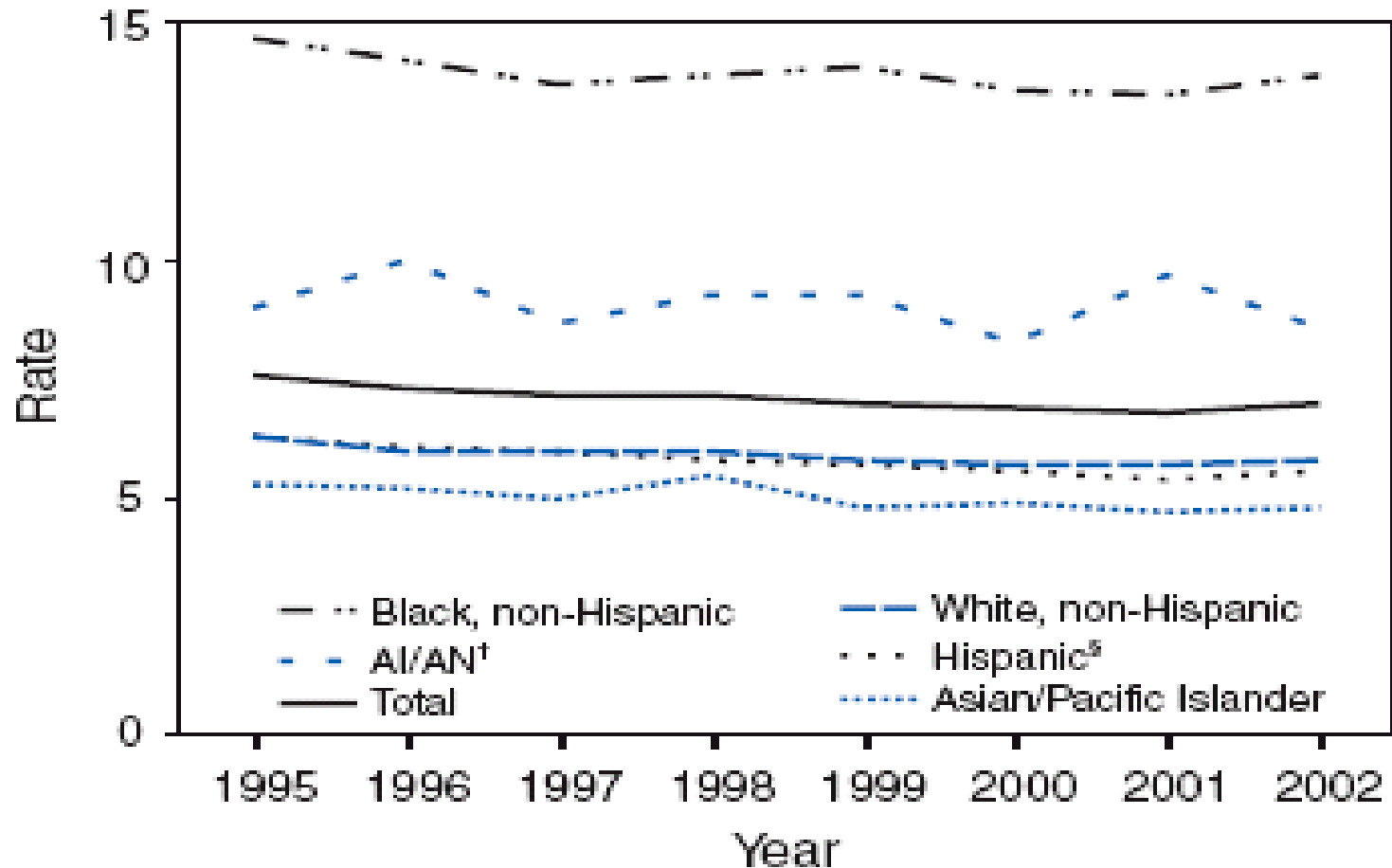Neonatal hemorrhage accounted for 649 deaths.

**10. Diseases of the circulatory system**

Diseases of the circulatory system accounted for 591 deaths.

Source: http://dying.about.com/od/causes/tp/infantdeath.htm

FIGURE. Infant mortality rate*, by race/ethnicity of mother and year — United States, 1995–2002

* Per 1,000 live births.
† American Indian/Alaska Native.
§ Hispanic mothers might be of any race.

Source: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5422a1.htm#fig

# Lowest and Highest Infant Mortality Rates 2008

## Lowest

| Country | Infant deaths per 1,000 births |
|---|---|
| China, Hong Kong SAR | 1.6 |
| Singapore | 2.4 |
| Sweden | 2.5 |
| Finland | 2.7 |
| Japan | 2.8 |
| Slovenia | 3.1 |
| Norway | 3.1 |
| Czech Republic | 3.1 |
| Ireland | 3.1 |
| Portugal | 3.5 |
| Israel | 3.5 |

## Highest

| Country | Infant deaths per 1,000 births |
|---|---|
| Afghanistan | 163 |
| Sierra Leone | 158 |
| Liberia | 133 |
| Angola | 132 |
| Guinea-Bissau | 117 |
| Somalia | 117 |
| Guinea | 113 |
| Mozambique | 108 |
| Burundi | 107 |
| Chad | 106 |

Source: Population reference bureau

**Infant mortality** as a Human Development Index (**one of the indicators** of social wellbeing).   **177 Countries listed, 2007**

Top 12 →

Iceland
Norway
Australia
Canada
Ireland
Sweden
Switzerland
Japan
Netherlands
France
Finland
United States

Bottom 12 →

Côte d'Ivoire
Burundi
Congo, Dem. Rep.
Ethiopia
Chad
Central African Republic
Mozambique
Mali
Niger
Guinea-Bissau
Burkina Faso
Sierra Leone

# The Life Table

Life tables are based on observed mortality (usually by both age and sex), and provide us with information on life expectancy and survivorship

Two types of life tables

Abridged
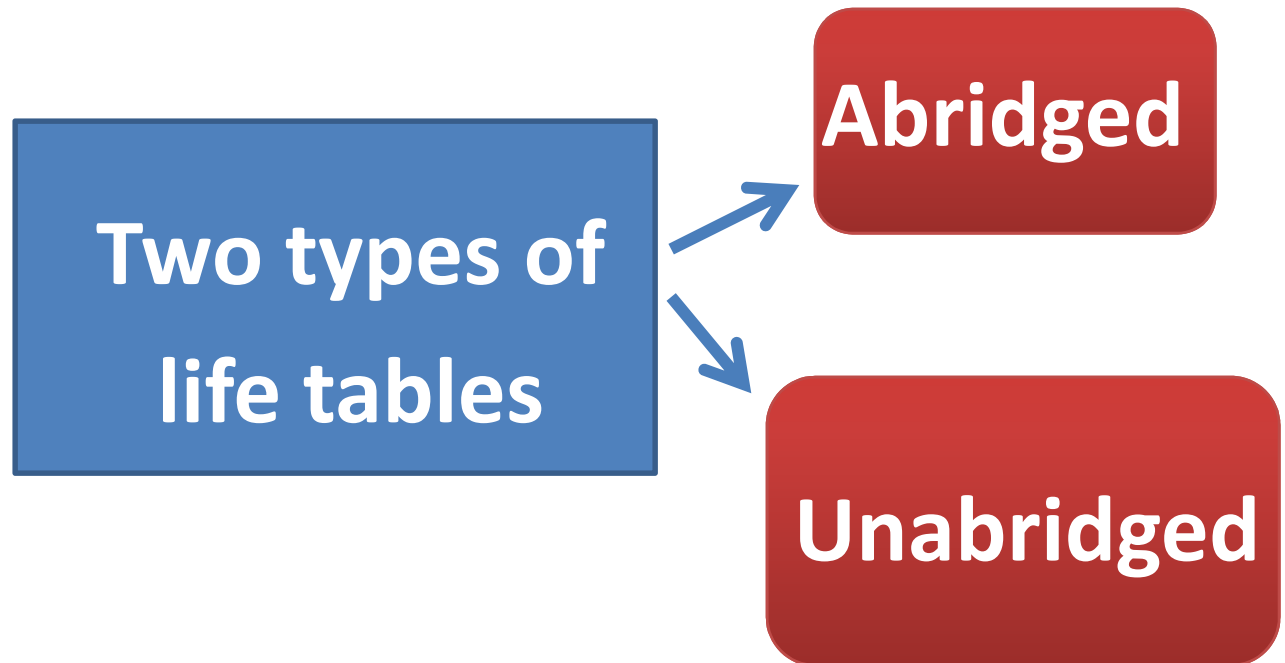
Unabridged

# Life table ...

➢ **Abridged** life tables are based on five-year age intervals.

➢ **Unabridged** life table uses a single-year age interval.

➢ The first column contains the most critical life table rate – the probability of dying between age x and x + n.

# Life table functions (text p. 124)

The $Mx$ function

Age Specific Death Rates (ASDR) can also be symbolized as:
$$Mx$$

*Thus,* $\quad Mx = \dfrac{Da}{Pa}$

$q_x$ - the probability of dying between ages $x$ and $x+n$

$$q_x = \frac{M_x}{1 + 0.5\, M_x}$$

The difference between $M_x$ and $q_x$ is simply that the denominator for the $M_x$ is the population at the middle of the year whereas the denominator for $q_x$ is the population at the start of the year.

# For a grouped data (five-year age groups)

$$_nq_x = \frac{n \times {_nM_x}}{1 + n(2.5\, {_nM_x})}$$

$_{n}p_{x}$ : **the probability of surviving between exact ages $x$ and $x+n$**

$$_{n}p_{x} = 1 - {_{n}q_{x}}$$

$l_0$ : is an arbitrary number (usually 100,000) called the radix

$$l_x = l_{x-n} \times {}_np_{x-n}$$

$_n d_x$ : the number of persons dying during the interval (this is equal to the number alive at the start of the interval multiplied by the probability of dying during the interval)

$$_n d_x = l_x - l_{x+1}$$

**also calculated as**

$$_n d_x = l_x \times {}_n q_x$$

$_nL_x$ : the number of person-years lived between Exact ages $x$ and $x+n$. Each person surviving through the interval contributes n person year, while those who die during the interval will contribute only $n \times {_na_x}$

$$_nL_x = n(l_{x+n} + 0.5\,{_nd_x})$$

*also calculated as*

$$_nL_x = \frac{n(l_x + l_{n+x})}{2}$$

$T_x$ :   the total number of person-years lived after exact age $x$. It is simply the $_nL_x$ column cumulated from the bottom

$$T_x = T_{x+n} + {_nL_x}$$

$$e_x \qquad \text{Life expectancy at birth}$$

**Since the total number of years left to be lived by $l_x$ people is $T_x$ the expectation of life is just one divided by the other. Thus life expectancy at age x ($e_x$) is:**

$$e_x = T_X / l_x$$

# Countries With the Highest and Lowest Life Expectancy

## 2007

### Highest

| Country | Years |
|---|---|
| Japan | 82 |
| Australia | 81 |
| France | 81 |
| Iceland | 81 |
| Italy | 81 |
| Sweden | 81 |
| Switzerland | 81 |
| Austria | 80 |
| Canada | 80 |
| Israel | 80 |
| Malta | 80 |
| Netherlands | 80 |
| New Zealand | 80 |
| Norway | 80 |
| Singapore | 80 |
| Spain | 80 |

### Lowest

| Country | Years |
|---|---|
| Swaziland | 33 |
| Botswana | 34 |
| Lesotho | 36 |
| Zimbabwe | 37 |
| Zambia | 38 |
| Malawi | 40 |
| Angola | 41 |
| Afghanistan | 42 |
| Central African Republic | 43 |
| Mozambique | 43 |

Source: Population Reference Bureau

# Some facts about life expectancy

It is clearly linked to levels of economic development (GNP per capita would a good independent variable to do a term paper on this)

HIV/AIDS has reduced life expectancy in several African countries

Eastern Asia led by China had made a remarkable gain of 26 years from 1950-1990 (Africa only gained 14 years during this period)

The gap between the lowest and highest is now 50 years.

# Lifespan vs. Life expectancy

**Lifespan** is "… the absolute number of years humans hope to survive"

"Jeanne Calmet died in her native France in 1997 at the age of 122, having lived longer than anyone else whose age had actually been confirmed."

**Life expectancy** is "…the average number of years a person can expect to live".

**Important facts about life span and life expectancies:**

➢Evolutionarily speaking, there is no reason why any creature should live beyond its reproductive years. We humans escape this cruel contract – no predator.

➢The world average life expectancy has more than doubled in the last 100 years, from 30 in 1900 to almost 66 in 2000 (80+ in some developed countries of the world)

➢Some societies/groups have achieved long life expectancies without much modernization at all – Sardinians, Okinawans, and some Adventists.

➢"For every living thing aging is a fact of life…only humans seek to alter the natural process"

➢Due to ongoing breakdowns on the molecular level humans will continue to age and ultimately die regardless of all efforts to control one disease or another.

➢

# Mortality vs. Morbidity

**Morbidity or illness/disease may or may not result in death.**

# Morbidity Transition

**The role of diseases in overall death rates has changed over time, leading to the emergence of the "epidemiologic transition" theory (first described by Abdel Omran in 1977)**

# Disease dichotomies:

**Congenital vs. acquired**

**Communicable/Infectious vs. degenerative**

**Chronic vs. acute**

# Epidemiologic transition

➢ **The theory focuses on the shifting web of health and disease patterns on population groups**

➢ **Many countries have undergone a significant transition (especially after World War II)**

➢ **The Old World epidemics of infection are progressively (but not completely) being replaced by degenerative diseases, diseases due to stress, and man-made diseases.**

"Thus, typhoid, tuberculosis, cholera, diphtheria, plague, and the like decline as the leading diseases and causes of death, to be replaced by heart disease, cancer, stroke, diabetes, gastric ulcer, and the like, together with increased mental illnesses, accidents, diseases due to industrial exposure, and, now, diseases which can be traced to a deteriorating environment."

## Stage 1: The age of Pestilence and Famine

Mortality is high and fluctuating, thus precluding sustained population growth; life expectancy between 20 and 40 years

## Stage 2: The age of Receding Pandemics

Mortality declines progressively, epidemic peaks become less frequent or disappear ; life expectancy 30 to 50 years

## Stage 3: The age of Degenerative and Man-made Diseases

Mortality continues to decline and eventually approaches stability at a relatively low level. Average life expectancy at birth rises gradually until it exceeds 70 years; fertility becomes the crucial factor in population growth.

# Transition continues:

➢ **Obesity/lifestyle-related diseases are on the rise in developed countries, and now in developing countries**

➢ **At least 30 previously unknown diseases have emerged in the last 30 years.**

➢ **"Old" diseases, including TB are making a strong come back, even in developed countries**

➢ **A concern about future influenza epidemics has strengthened with the emergence of the bird flu – the H5N1 virus – and many are warning that the interconnectedness of the global economy today and the thousands of daily jet flights across the globe, could make the next influenza pandemic more deadly than the ones before.**

# Causes of Death

# in Developed countries : USA

➢ **Disease of the heart and malignant neoplasms (cancer) account for half of all deaths.**

➢ **Geographic variations are evident (e.g. highest death rates from heart disease are in the South)**

➢ **Major differences exist between racial groups (see slides below)**

| USA | Top ten causes of deaths: Number of Deaths (USA) | | |
|---|---|---:|---:|
| Heart disease: | | 652091 | 222.7* |
| Cancer: | | 559312 | 187.1 |
| Stroke (cerebrovascular diseases): | | 143579 | 51.1 |
| Chronic lower respiratory diseases: | | 117809 | 42.2 |
| Accidents (unintentional injuries): | | 117809 | 37 |
| Diabetes: | | 75119 | 24.8 |
| Alzheimer's disease: | | 71599 | 22.4 |
| Influenza/Pneumonia: | | 63001 | 20.9 |
| Nephritis, nephrotic syndrome, and nephrosis: | | 43901 | 14.3 |
| Septicemia: | | 34136 | 11.2 |

http://www.cdc.gov/nchs/fastats/deaths.htm

**\* This column shows rates per 100,000.** Source: Text p. 130

# USA

| | Risk is 1 in | |
|---|---|---|
| | **Annual** | **Lifetime** |
| **Diseases of the heart** | 415 | 5 |
| **Malignant neoplasm** | 515 | 7 |
| **Cerebrovascular disease** | 1786 | 23 |
| **Chronic lower respiratory** | 2273 | 29 |
| **Accidents** | 2703 | 35 |
| **Diabetes mellitus** | 4000 | 52 |
| **Influenza and pneumonia** | 4348 | 56 |
| **Alzhemier's disease** | 5000 | 65 |
| **syndome, nephrosis** | 7143 | 92 |
| **Septicaemia** | 8333 | 108 |

http://www.medicine.ox.ac.uk/bandolier/booth/Risk/top15usa.html

# Mortality Differentials

## Age differentials

Age is the single most important determinant of a person's likelihood of dying between any given time t and a future time  t+n

However, even though young age is a time of relative "immortality" in the developed world (only 2% of the dead are children), in the developing counties  children under five account for the bulk of all deaths taking place annually (50%). This is due, primarily, to infectious diseases.

# USA (2004) Differences within...

- White population, 785.3 deaths per 100,000 U.S. standard population
- Black population, 1,016.5
- American Indian or Alaska Native (AIAN) population, 663.4
- Asian or Pacific Islander (API) population, 440.2

Source: http://www.cdc.gov/nchs/fastats/deaths.htm

# Differential in Infant Mortality
## Racial/Class
### (see below):

Figure 3. Infant mortality rates by race and ethnicity: United States, 2000 and 2005

[1]Includes persons of Hispanic and non-Hispanic origin.
SOURCE: CDC/NCHS, linked birth/infant death data sets, 2000 and 2005.
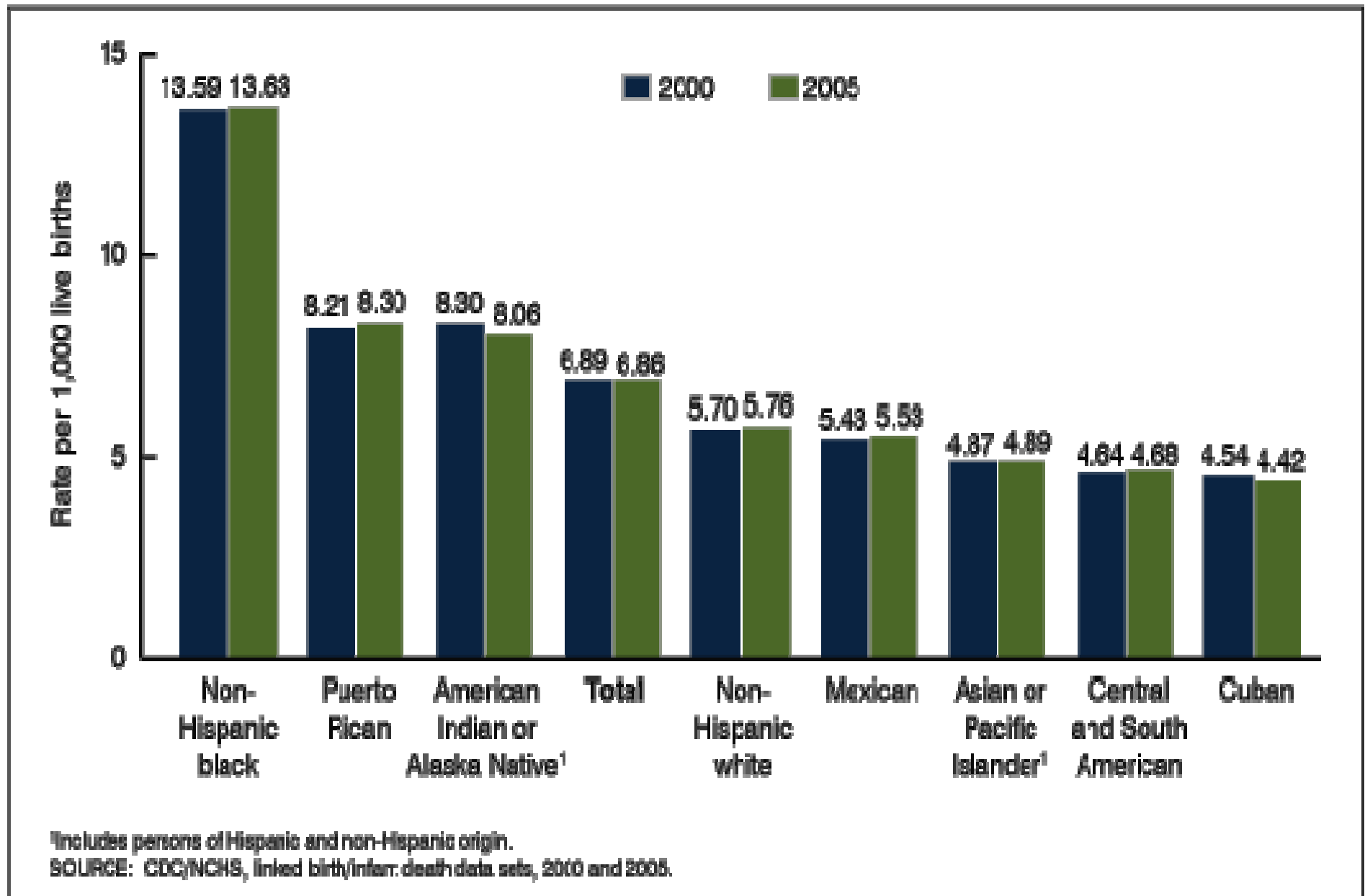
Source: http://www.cdc.gov/nchs/data/databriefs/db09.htm#arethere

➢ "In 2005, there was a **more than threefold difference** in infant mortality rates by race and ethnicity, from a high of 13.63 for non-Hispanic black women to a low of 4.42 for Cuban women."

➢ "These differences may relate in part to differences in risk factors for infant mortality such as preterm and low birth weight delivery, socioeconomic status, access to medical care, etc. However, **many of the racial and ethnic differences in infant mortality remain unexplained**."

http://www.cdc.gov/nchs/data/databriefs/db09.htm#arethere

# Sex Differentials

"The risk of death appears to be greater for males at all ages. Even among fetal deaths males are more likely to die. No simple explanation of these sex mortality differentials has been accepted…"

Theories of female biological superiority – both humans and other animals - abound.

# Sex Differentials

## Some examples: USA

➢• Between 1990 and 2003 mortality from lung cancer declined for men and increased for women. Although these trends reduced the sex differential for this cause of death, the age-adjusted death rate for lung cancer was still 74 percent higher for men than for women in 2003 (preliminary data).

➢• Since 1990 mortality from chronic lower respiratory diseases remained relatively stable for men while it increased for women. These trends reduced the gap between the sexes for this cause of death. In 1990 the age-adjusted death rate for males was more than 100 percent higher than for females. In 2003 (preliminary data) the difference between the rates had been reduced to 38 percent.

➢• In 2003 life expectancy at birth for the total population reached a record high of 77.6 years (preliminary data), up from 75.4 years in 1990.

➢• Between 1990 and 2003 life expectancy at birth increased 3.0 years for males and 1.3 years for females (preliminary data). The gap in life expectancy between males and females narrowed from 7.0 years in 1990 to 5.3 years in 2003.      [source: http://www.cdc.gov/women/natstat/deaths.htm]

**Geographical Differential**

# Medical Geography.  Geog. 496 (Next semester)

## e.g. USA

**Read newspaper article below**

# Washington Post
## 23 October 2002

## [Breast Cancer Puzzle in Marin](http://www.ourstolenfuture.org/commentary/News/2002/2002-1023-WashPost-CAbreastcancer.htm)
### California County's Rate of Disease Is Almost 40% Higher Than U.S. Norm

By Katherine Ellison
Special to The Washington Post
Page A03

SAN RAFAEL, Calif. -- Marin County, long-famed as a mecca for wealthy hot-tubbers, has recently acquired a darker distinction. Women in these scenic valleys north of San Francisco are being diagnosed with invasive breast cancer at a higher rate than experts have found anywhere else in the United States.

Over the past five years, non-Hispanic white women, the hardest-hit group in this county, have received a diagnosis of breast cancer at a rate nearly 40 percent higher than the national norm. Just as striking is how the rate steadily climbed through the 1990s, increasing 37 percent, compared with 3 percent for the rest of the San Francisco Bay Area.

➤ "The mapping of diseases has received much attention …".

➤ "The analysis of **geographical variations in health care provision and consumption** is another area of concern to geographers"

# HIV/AIDS:
## Effects on mortality rates and life expectancy

➢ More than 25 million people have died of AIDS already

➢ Sub-Sahran Africa has the highest rate of HIV infection

➢ Eastern Europe and Central Asia experiencing the fastest rate of new infections

➢ Women's rate of infection has surpassed men's especially in poor countries where women live in poverty and have low status

➢ Multiple sex partners and prostitution is helping fan the epidemic around the world

➢ Rapid growth in the number of orphans

➢ Age structures being altered, especially in southern Africa

➢ Decreased life expectancy, especially in southern Africa

- "AIDS is destined to alter history in Africa – and, in fact the world – to a degree not seen in humanity's past since the black death"
- 95% of cases in Less Developed Countries (LDCs)
- Social taboos and stigmatization following positive test results are helping keep the disease under wraps while it continues to decimate communities and tear at the basic social fabrics of family and communal life.
- The cost of treatment = $1000/mo. In the US
- Roughly 75% of HIV infections world wide are a result of unprotected sexual intercourse.

➢ **The number of orphans world wide could reach 25 million by 2010 (many of them HIV positive themselves)**

➢ **Population projections being revised to take into account the impacts of HIV/AIDS**

➢ **AIDS kills but large segments of the population in the Third World knows very little about the disease**

➢ **USA: About 45,000 new cases each year (predominantly males, except among African Americans).**

See text page 152, Table 5-13 for break downs by population sub-groups

## USA estimated number of Persons living with HIV/AIDS

|  | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|
| Data for 33 states | | | | |
| Age at end of year (yrs) | | | | |
| <13 | 4,154 | 3,700 | 3,294 | 2,867 |
| 13–14 | 1,130 | 1,238 | 1,212 | 1,139 |
| 15–19 | 3,298 | 3,627 | 4,024 | 4,539 |
| 20–24 | 12,389 | 12,826 | 13,411 | 14,301 |
| 25–29 | 26,167 | 26,924 | 28,164 | 29,600 |
| 30–34 | 49,602 | 47,577 | 45,109 | 44,189 |
| 35–39 | 80,703 | 77,871 | 75,842 | 73,634 |
| 40–44 | 92,040 | 97,109 | 100,102 | 101,764 |
| 45–49 | 71,345 | 77,490 | 83,816 | 90,283 |
| 50–54 | 45,133 | 51,033 | 56,640 | 63,195 |
| 55–59 | 22,793 | 26,610 | 31,186 | 36,008 |
| 60–64 | 10,820 | 12,642 | 14,422 | 16,658 |
| ≥65 | 8,531 | 9,959 | 11,657 | 13,551 |

http://www.cdc.gov/hiv/topics/surveillance/resources/reports/2006report/pdf/table8.pdf

| Race/ethnicity | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|
| White, not Hispanic | 145,081 | 151,694 | 158,375 | 166,000 |
| Black, not Hispanic | 202,951 | 212,425 | 221,439 | 231,957 |
| Hispanic | 72,612 | 76,503 | 80,491 | 84,720 |
| Asian/Pacific Islander | 2,234 | 2,529 | 2,858 | 3,187 |
| American Indian/Alaska Native | 1,788 | 1,889 | 2,008 | 2,119 |

| Transmission category | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|
| **Male adult or adolescent** | | | | |
| Male-to-male sexual contact | 181,771 | 193,245 | 205,423 | 218,676 |
| Injection drug use | 57,651 | 58,149 | 58,369 | 59,077 |
| Male-to-male sexual contact and injection drug use | 23,965 | 24,434 | 24,725 | 25,085 |
| High-risk heterosexual contact[a] | 40,084 | 42,559 | 44,915 | 47,562 |
| Other[b] | 3,218 | 3,278 | 3,325 | 3,424 |
| Subtotal | 306,689 | 321,665 | 336,756 | 353,825 |
| | | | | |
| **Female adult or adolescent** | | | | |
| Injection drug use | 32,346 | 32,735 | 32,973 | 33,470 |
| High-risk heterosexual contact[a] | 80,324 | 85,348 | 90,185 | 95,403 |
| Other[b] | 2,036 | 2,123 | 2,212 | 2,321 |
| Subtotal | 114,705 | 120,206 | 125,370 | 131,195 |

# USA: New HIV Infections

| | Year of diagnosis | | | |
|---|---|---|---|---|
| | 2003 | 2004 | 2005 | 2006 |
| **Data for 33 states** | | | | |
| Age at diagnosis (yrs) | | | | |
| <13 | 211 | 183 | 169 | 135 |
| 13–14 | 53 | 36 | 40 | 41 |
| 15–19 | 993 | 993 | 1,126 | 1,332 |
| 20–24 | 3,163 | 3,368 | 3,592 | 3,886 |
| 25–29 | 4,023 | 4,057 | 4,236 | 4,603 |
| 30–34 | 5,189 | 4,820 | 4,676 | 4,466 |
| 35–39 | 6,369 | 5,807 | 5,535 | 5,442 |
| 40–44 | 5,786 | 5,429 | 5,529 | 5,718 |
| 45–49 | 4,028 | 3,877 | 4,028 | 4,204 |
| 50–54 | 2,451 | 2,401 | 2,547 | 2,718 |
| 55–59 | 1,279 | 1,363 | 1,455 | 1,438 |
| 60–64 | 655 | 702 | 692 | 714 |
| ≥65 | 570 | 624 | 613 | 618 |

| USA: New HIV Infections | 2003 | 2004 | 2005 | 2006 |
|---|---|---|---|---|
| **Race/ethnicity** | | | | |
| White, not Hispanic | 10,033 | 10,181 | 10,528 | 10,758 |
| Black, not Hispanic | 17,668 | 16,718 | 16,629 | 17,356 |
| Hispanic | 6,355 | 6,010 | 6,217 | 6,481 |
| Asian/Pacific Islander | 338 | 339 | 373 | 397 |
| American Indian/Alaska Native | 179 | 171 | 182 | 166 |
| **Transmission category** | | | | |
| **Male adult or adolescent** | | | | |
| Male-to-male sexual contact | 15,409 | 15,880 | 16,833 | 17,465 |
| Injection drug use | 3,514 | 3,083 | 2,978 | 3,016 |
| Male-to-male sexual contact and injection drug use | 1,349 | 1,299 | 1,247 | 1,180 |
| High-risk heterosexual contact[a] | 4,269 | 3,959 | 3,871 | 4,152 |
| Other[b] | 125 | 110 | 107 | 114 |
| Subtotal | 24,666 | 24,331 | 25,036 | 25,928 |
| **Female adult or adolescent** | | | | |
| Injection drug use | 2,027 | 1,856 | 1,720 | 1,712 |
| High-risk heterosexual contact[a] | 7,731 | 7,182 | 7,216 | 7,432 |
| Other[b] | 134 | 107 | 97 | 109 |
| Subtotal | 9,892 | 9,145 | 9,033 | 9,252 |

# Maternal Mortality

Source: http://www.abdn.ac.uk/immpact/resources/slides/burden.pdf

**Maternal Mortality Rate (MMR)**

$$MMR = \frac{\text{Number of women's deaths related to pregnancy}}{\text{Total number of births during a year}} \times 100{,}000$$

The highest MMRs of 1,000 or greater, are, in order of magnitude,

Sierra Leone (2,000),
Afghanistan (1,900),
Malawi (1,800),
Angola (1,700),
Niger (1,600),
United Republic of Tanzania (1,500),
Rwanda (1,400),
Mali (1,200),
Central African Republic, Chad, Guinea-Bissau, Somalia and Zimbabwe (1,100 each),
and Burkina Faso, Burundi, Kenya, Mauritania and Mozambique (1,000

| Region | Maternal mortality ratio (maternal deaths per 100,000 live births) | Number of maternal deaths | Lifetime risk of maternal death, 1 in: |
|---|---|---|---|
| WORLD TOTAL | 400 | 529,000 | 74 |
| DEVELOPED REGIONS* | 20 | 2,500 | 2,800 |
|     Europe | 24 | 1,700 | 2,400 |
| DEVELOPING REGIONS | 440 | 527,000 | 61 |
| Africa | 830 | 251,000 | 20 |
|     Northern Africa** | 130 | 4,600 | 210 |
|     Sub-Saharan Africa | 920 | 247,000 | 16 |
| Asia | 330 | 253,000 | 94 |
|     Eastern Asia | 55 | 11,000 | 840 |
|     South-central Asia | 520 | 207,000 | 46 |
|     South-eastern Asia | 210 | 25,000 | 140 |
|     Western Asia | 190 | 9,800 | 120 |
| Latin America and the Caribbean | 190 | 22,000 | 160 |
| Oceania | 240 | 530 | 83 |

\* Includes, in addition to Europe, Canada, the United States of America, Japan, Australia and New Zealand, which are excluded from the regional totals.
\*\* Excludes Sudan, which is included in sub-Saharan Africa.

# Video:

## Maternal Mortality

# Afghanistan

http://www.irinnews.org/audiofiles/lh_high.html