The population perspective (part 1)

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Population perspective - outline

1. Epidemiology emphasizes the population perspective

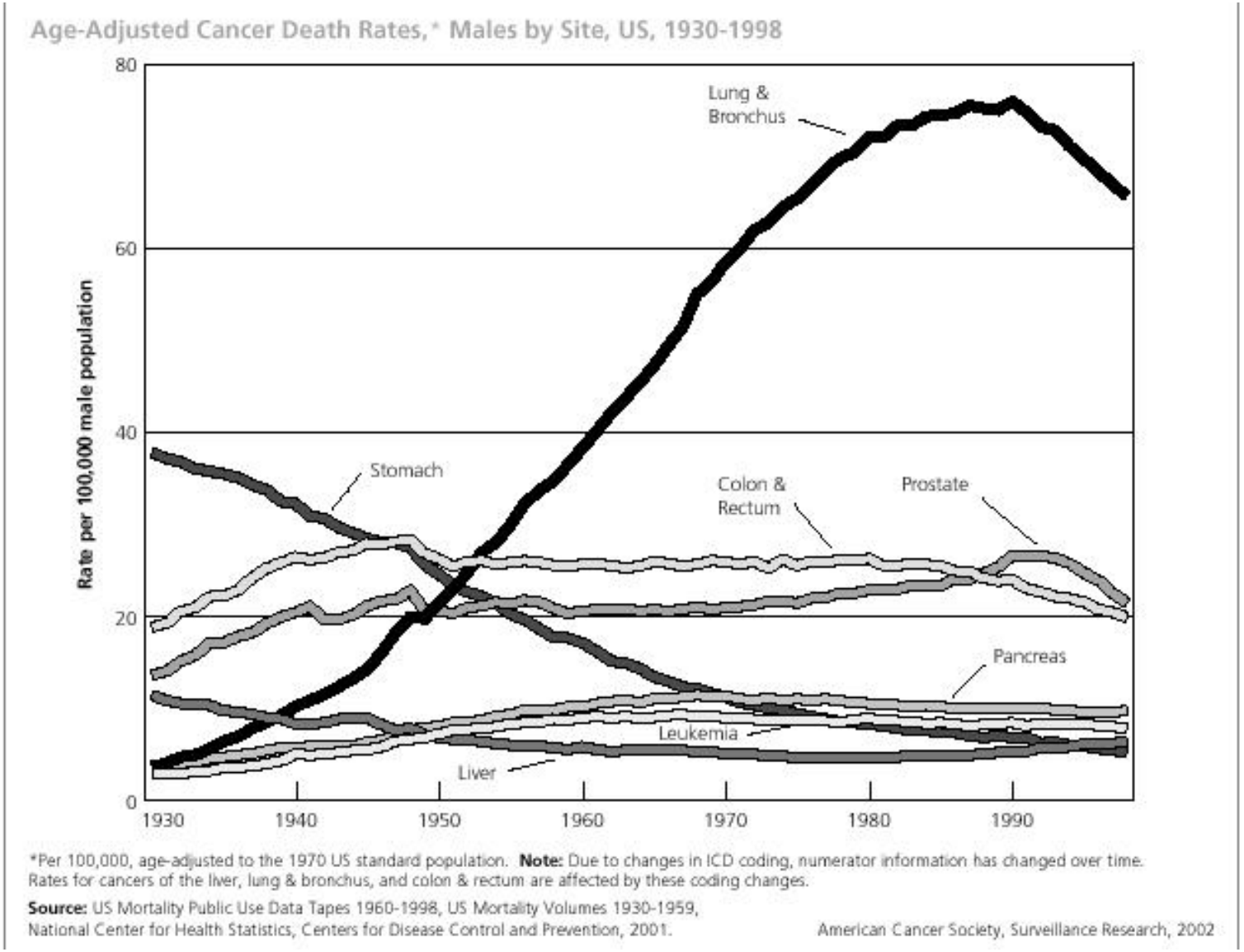
2. Populations are dynamic, diverse, heterogenous - demographic characteristics have major impact on health

3. Stratification and standardization are tools for comparing populations

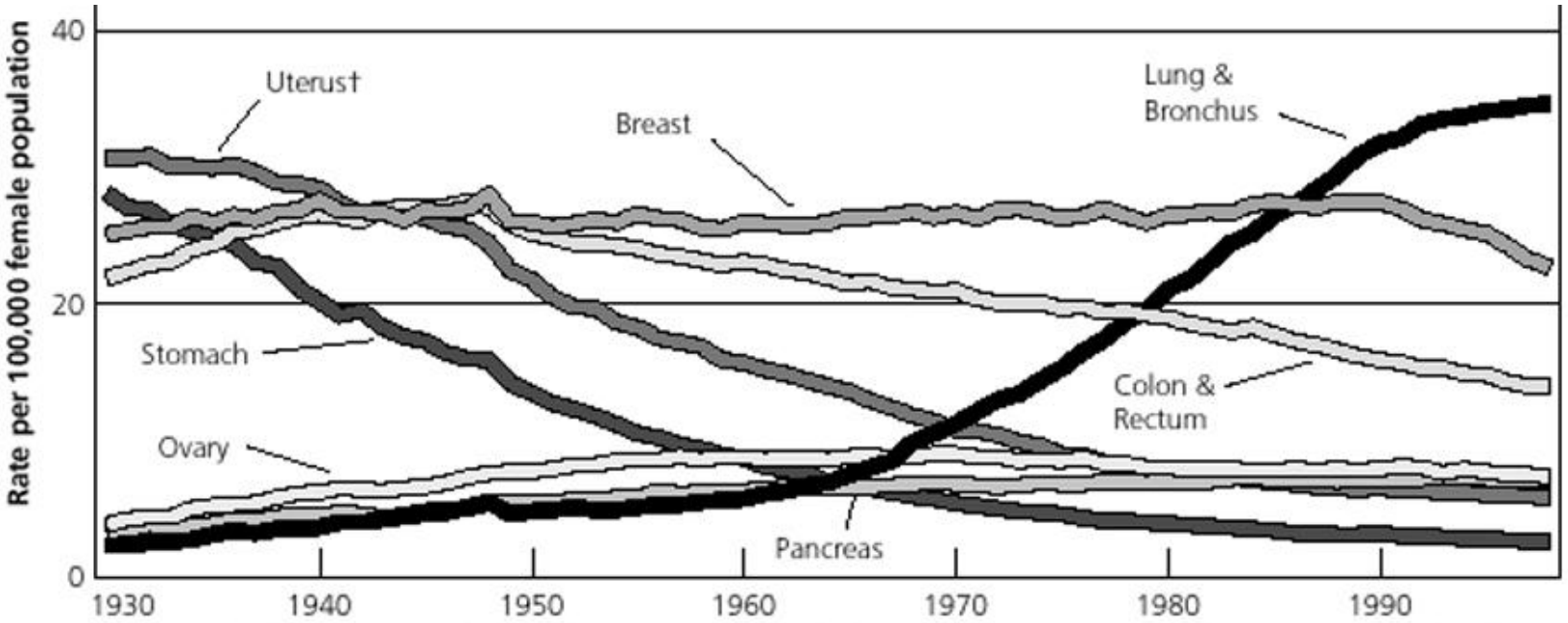
1. Epidemiology emphasizes the population perspective

- We see the world through our perspectives.
- Individual perspective - focus on health, risk factors, exposures, causal mechanisms in a people as individuals
- Population perspective - focus on disorders ("mass disease"), exposures, causal mechanisms in people as a group

Age-adjusted cancer death rates - US males, 1930-1998



Age-adjusted cancer death rates - US males, 1930-1998



*Per 100,000, age-adjusted to the 1970 US standard population. †Uterus cancer death rates are for uterine cervix and uterine co rpus combined.
Note: Due to changes in ICD coding, numerator information has changed over time. Rates for cancers of the liver, lung & bronchus, and colon & rectum are affected by these coding changes.
Source: US Mortality Public Use Data Tapes 1960-1998, US Mortality Volumes 1930-1959, National Center for Health Statistics, Centers for Disease Control and Prevention, 2001.

Cancer Facts & Figures 2002
American Cancer Society, Surveillance Research, 2002

Source: American Cancer Society: www.cancer.org

Population perspective versus the individual perspective - the lung cancer epidemic

- Individual perspective concerned with factors what individual exposures cause lung cancer, lead people to smoke, help people quit, smoking cessation clinics
- Population perspective concerned with environmental (including social, economic, technological, political) that promote smoking

HIV pandemic

- Individual perspective - counseling and testing, know about HIV, know serostatus, attitudes, safe sex, clean syringes with bleach
- Migrant labor patterns, treatment of women, long distance truck driving, globalization, societal response to sex, homosexuality, and drug use

Population perspective versus an individual perspective

- Individual perspective - diagnosis (presenting complaint, history, physical exam, lab tests), treatment derived from biomedical understanding of etiology
- Population perspective - “community diagnosis” (surveillance, descriptive data, surveys and analytic studies), intervention via health care system, policy, …

Population perspective and individual perspective complement each other

- Really a continuum - every health condition results from a combination of individual-level factors and population-level factors
- Thus, both perspectives are important for public health and clinical medicine, but emphases are different
- Political and institutional factors often favor the individual-level perspective

2. Populations are dynamic, diverse, heterogenous - demographic factors

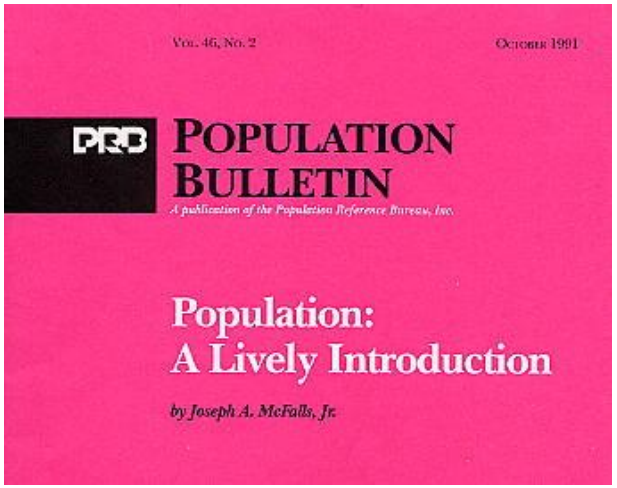
Key **characteristics**:

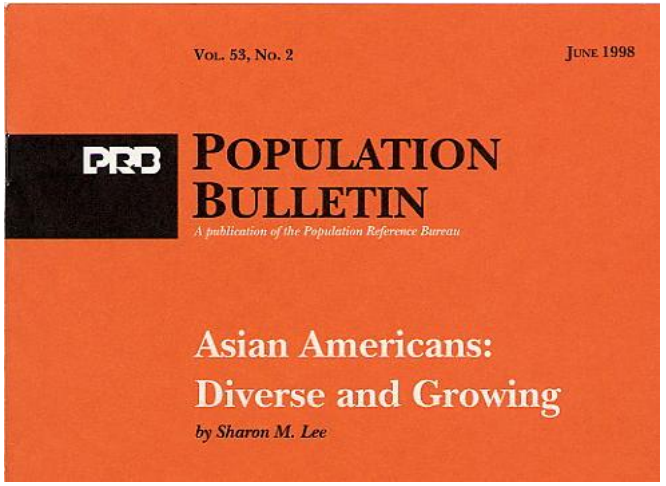
•Size/density, age, sex, place, ethnicity, education, economic resources

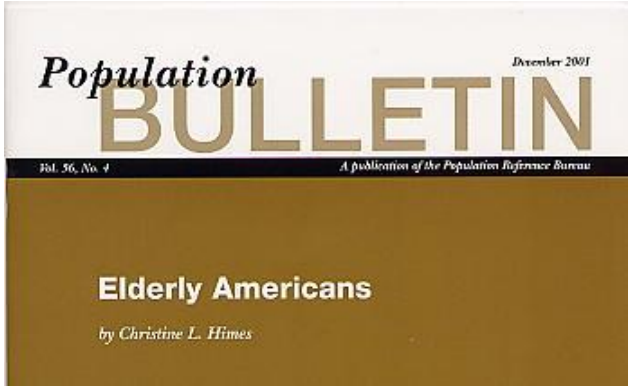
Key **events and processes**:

•Birth, marriage, migration, aging, death

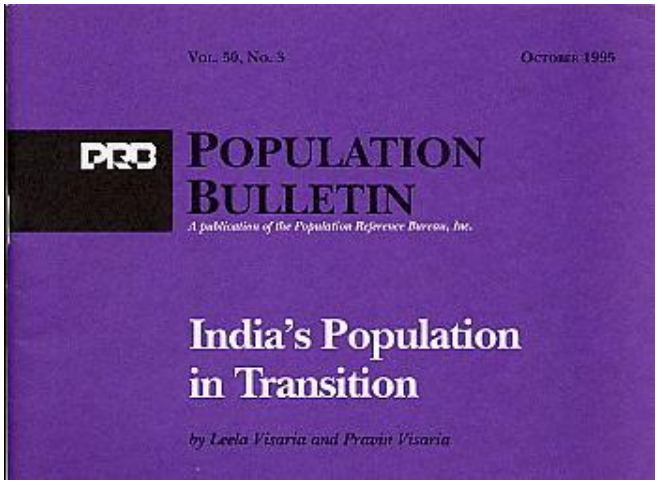
Population Reference Bureau







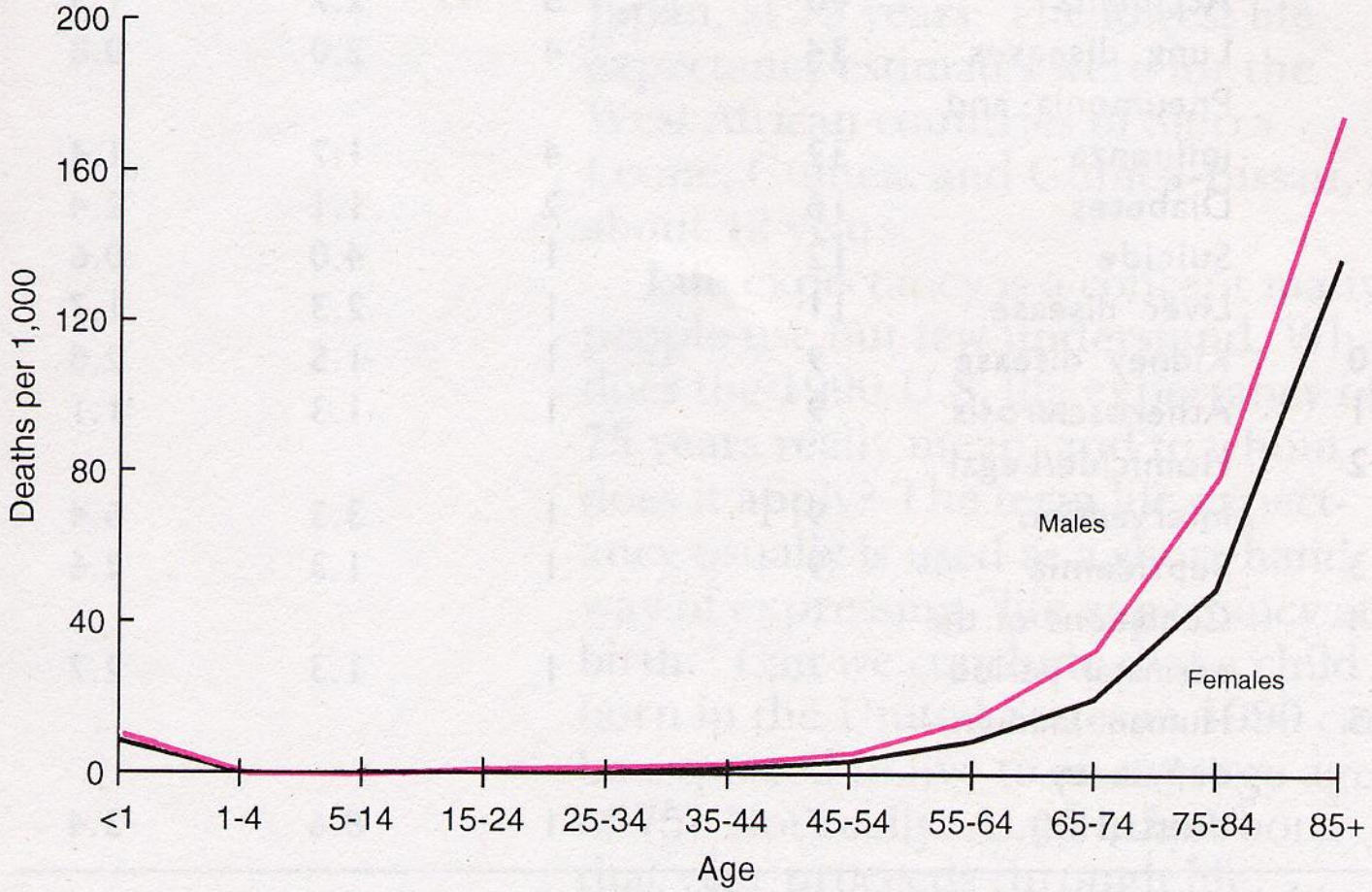
www.prb.org



- Mortality
- Life expectancy
- Health status
- Fertility

Figure 3

U.S. Death Rates by Age, 1990



Source: National Center for Health Statistics.

Table 3

Life Expectancy at Birth and at Age 65 in Years, by Sex, 1900, 1950, and 2000

	At birth			At age 65		
	Total	Male	Female	Total	Male	Female
1900	47.3	46.3	48.3	11.9	11.5	12.2
1950	68.2	65.6	71.1	13.9	12.8	15.0
2000	76.9	74.1	79.5	17.9	16.3	19.2

Sources: National Center for Health Statistics, *Health, United States, 2000* (2001): table 28; and A.M. Minino and B.L. Smith, *National Vital Statistics Reports* 49, no. 12 (2001): table 6.

Figure 4

Chronic Health Conditions Among Americans Age 70 or Older, by Race and Selected Age Group, 1995

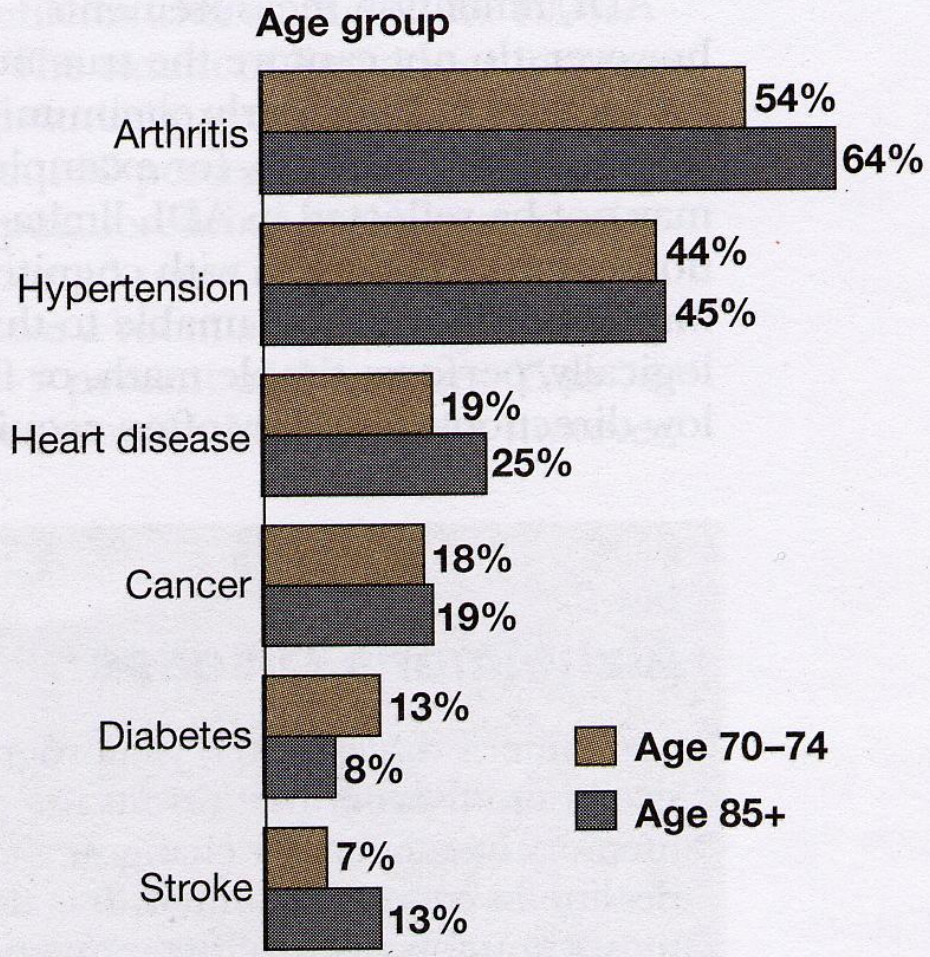
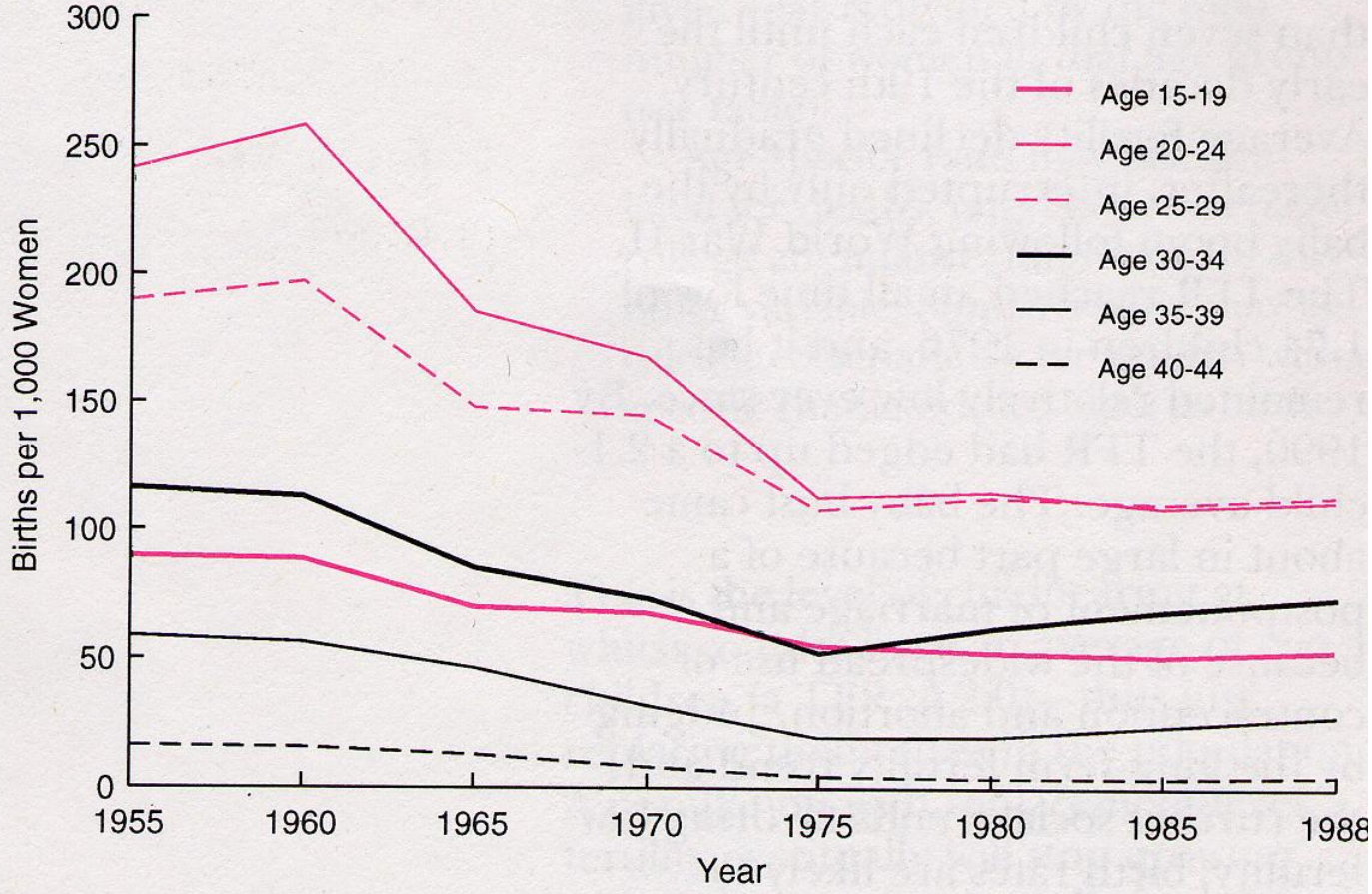


Figure 1

U.S. Birth Rates by Age of Mother, 1955-1988



Source: National Center for Health Statistics.

Birth rate calculation

$$\text{Birth rate for 2002} = \frac{\text{Births in 2002}}{\text{Mid-year population}}$$

Notes:

1. Denominator is total population (men and women, all ages, unless numerator is for a subgroup).

2. Often expressed per 1,000 people

Fertility rate calculation

$$\text{Fertility rate for 2002} = \frac{\text{Births in 2002}}{\text{Mid-year population}}$$

Notes:

1. Denominator is <u>women of reproductive age</u>.

2. Often expressed per 1,000

Death rate calculation

$$\text{Death rate for 2002} = \frac{\text{Deaths in 2002}}{\text{Mid-year population}}$$

Notes:

1. Denominator is total population (men and women, all ages) (or can have subgroup death rates)

2. Often expressed per 1,000 people

Average annual death rate calculation

$$\text{Avg annual death rate} = \frac{\text{Deaths during period}}{\text{Mid-period population}}$$

Notes:

1. Denominator is total population (men and women, all ages)

2. Often expressed per 1,000 people

- Age structure
- Population growth
- Fertility, momentum
- Demographic transition
- Population aging

Population pyramids

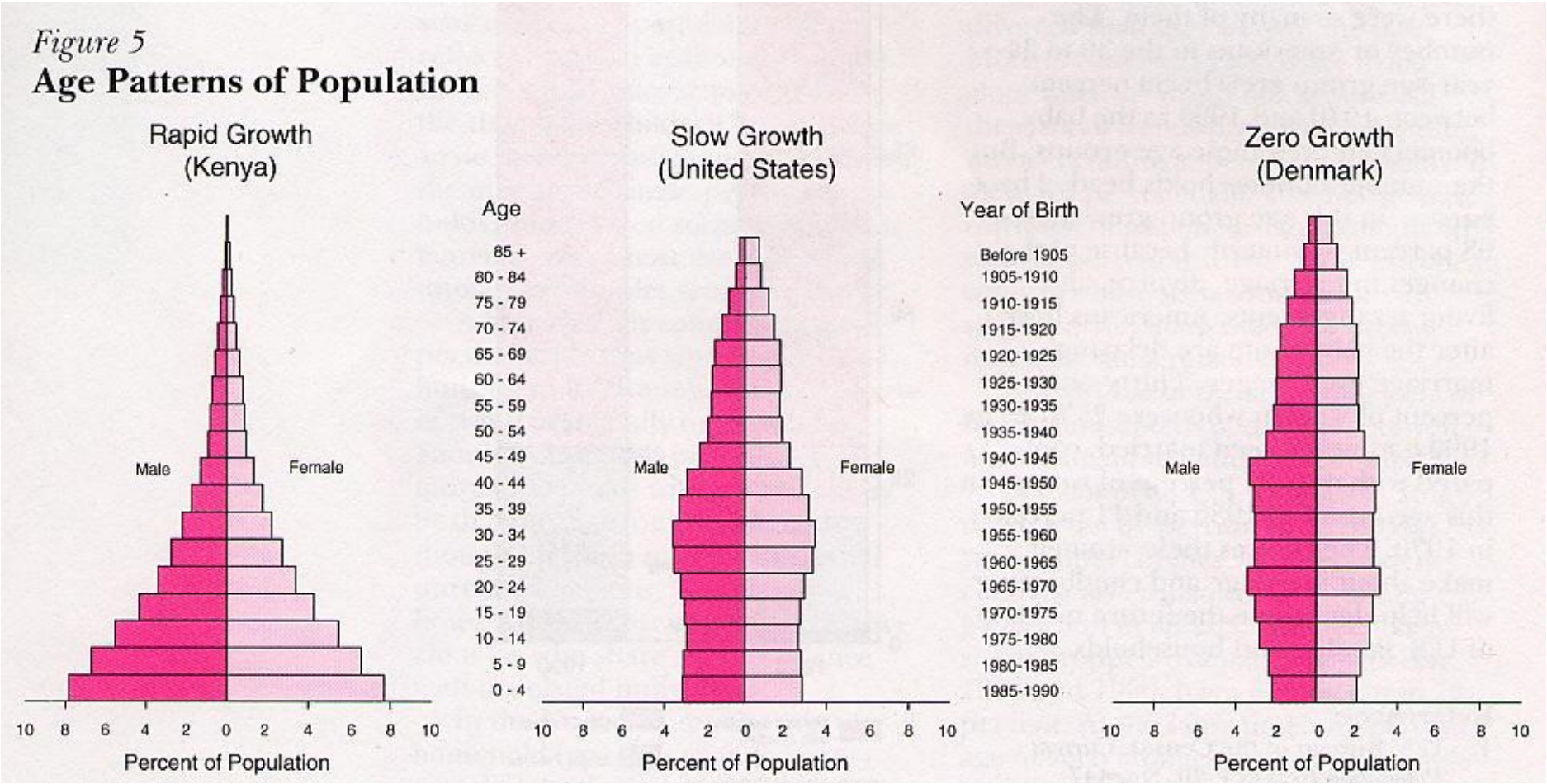
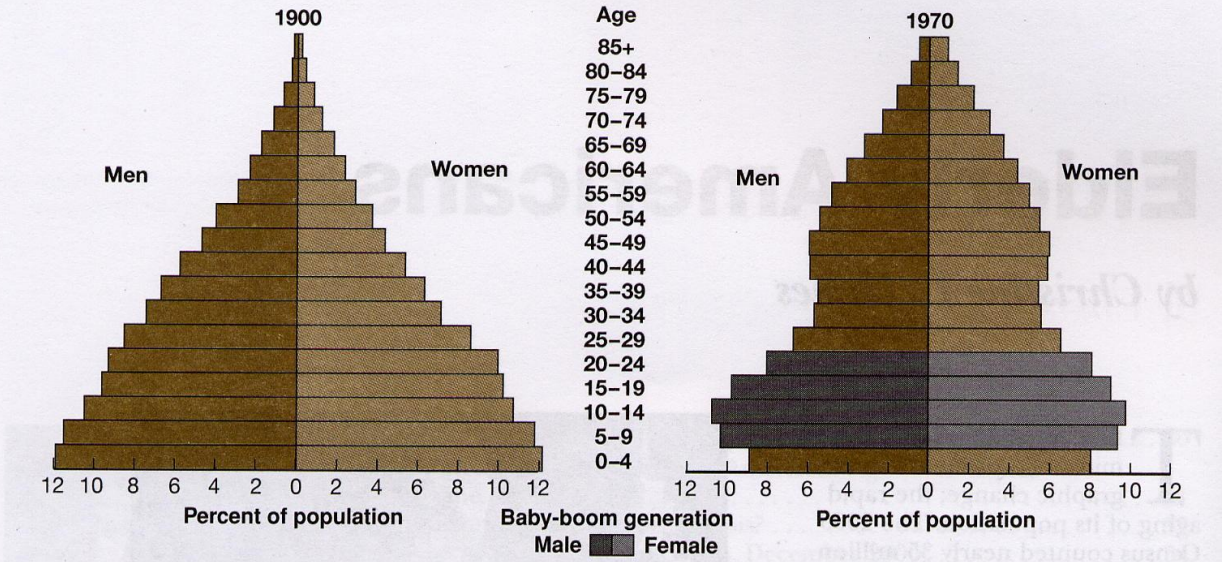


Figure 1

U.S. Population by Age and Sex, 1900, 1970, 2000, and 2030



Note: U.S. population in 1900 does not include Alaska or Hawaii. The baby-boom generation includes persons born between 1946 and 1964.

Sources: U.S. Census Bureau publications: *Historical Statistics of the United States: Colonial Times to 1970* (1975); *Census 2000 Summary File* (SF1) (http://factfinder.census.gov, accessed Sept. 5, 2001); and "Population Projections of the United States by Age, Sex, Race, Hispanic Origin, and Nativity: 1999 to 2100" (www.census.gov/population/projections/nation/summary/np-t4-a.txt, accessed Sept. 25, 2001).

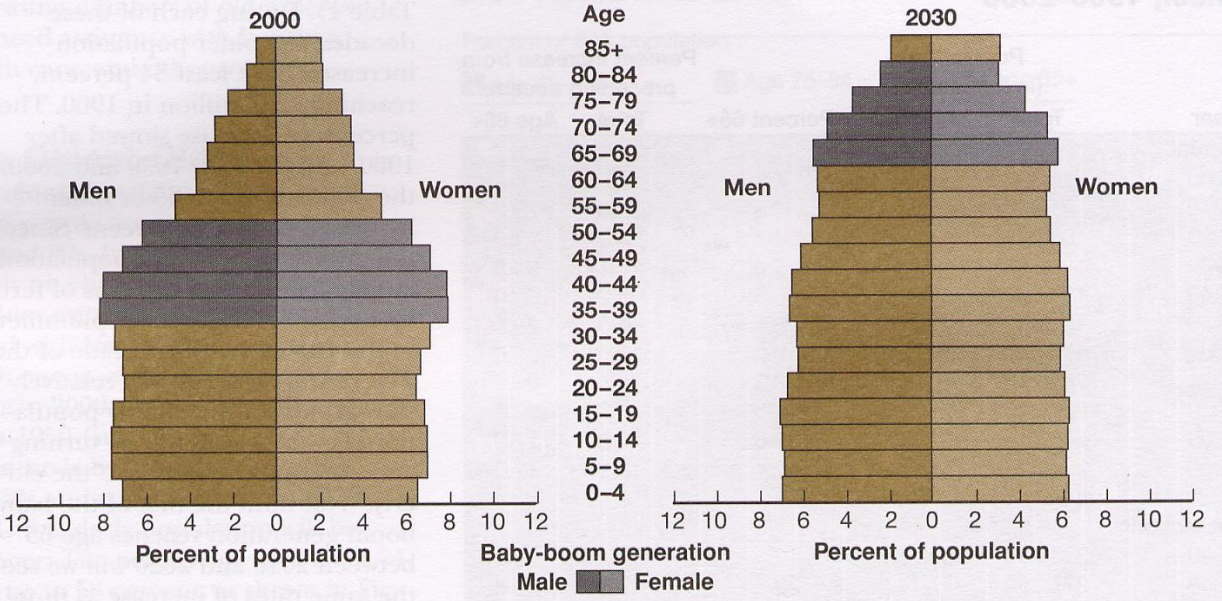
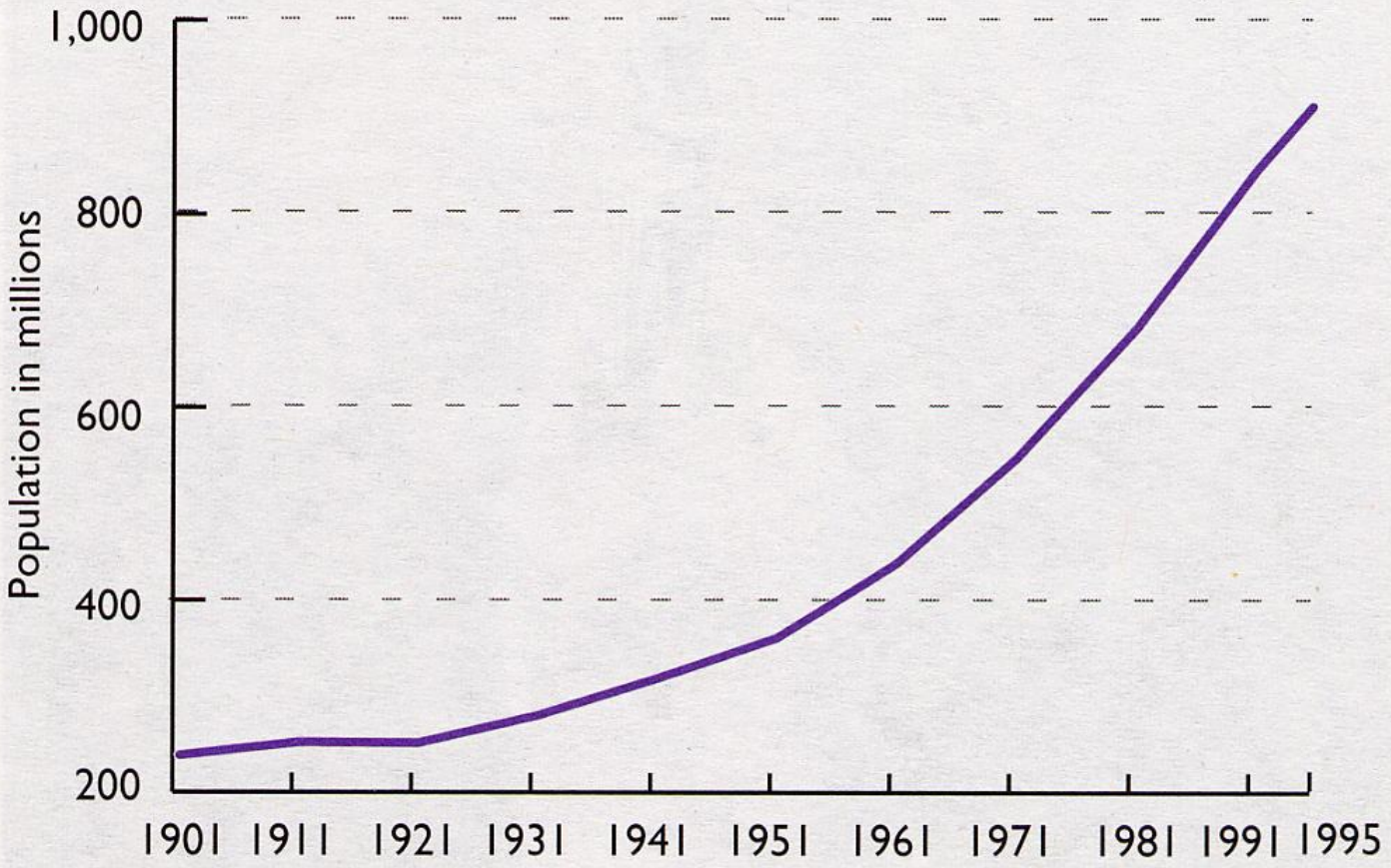


Figure 2

Population Growth in India, 1901–1995



Source: 1901-1991: India, Population Censuses; 1995 estimate: Carl Haub and Machiko Yanagishita, *1995 World Population Data Sheet* (Washington, DC: Population Reference Bureau, 1995).

Figure 5

Trends in Fertility, Mortality, and Natural Increase in India, 1911–1993

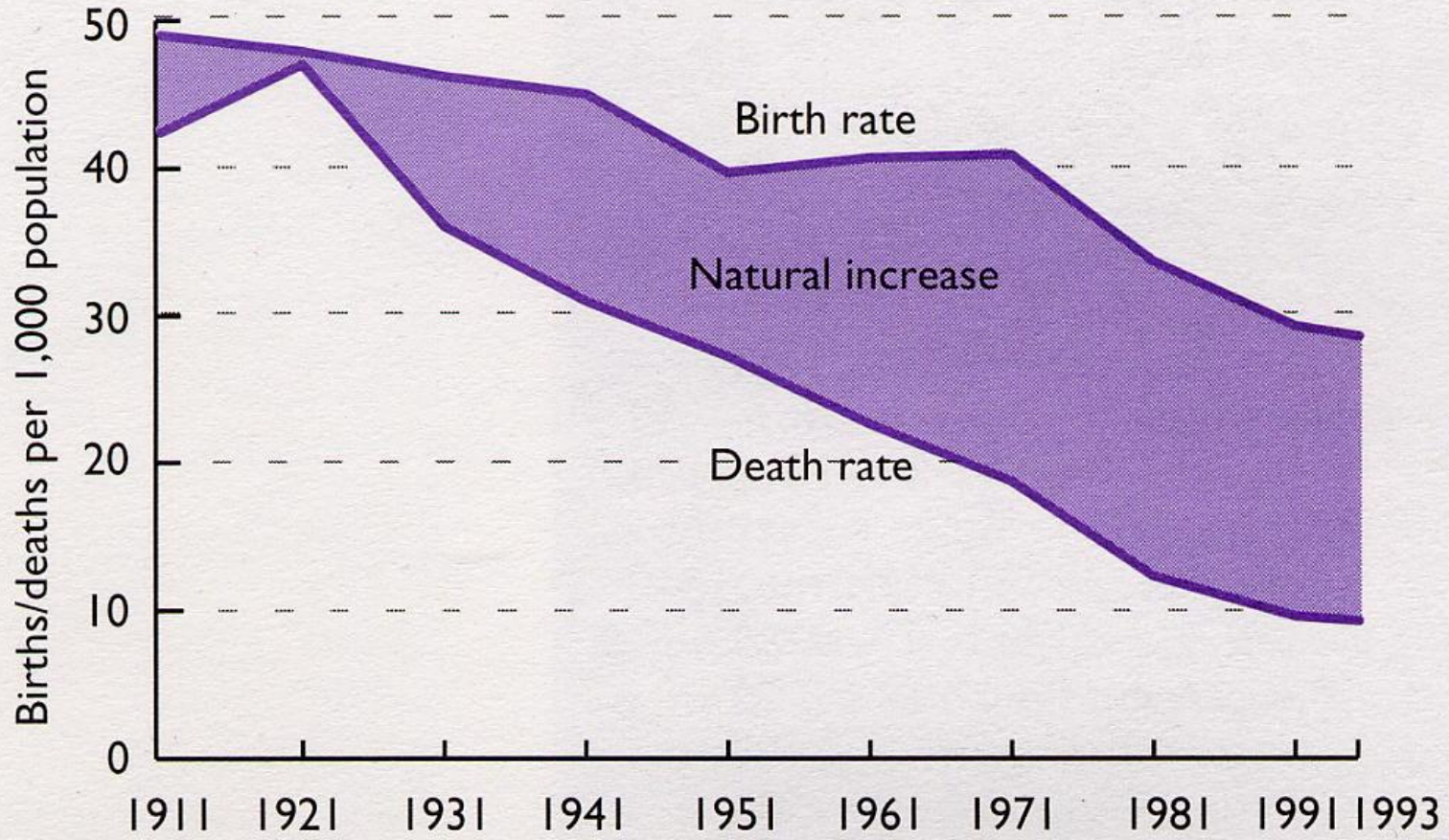
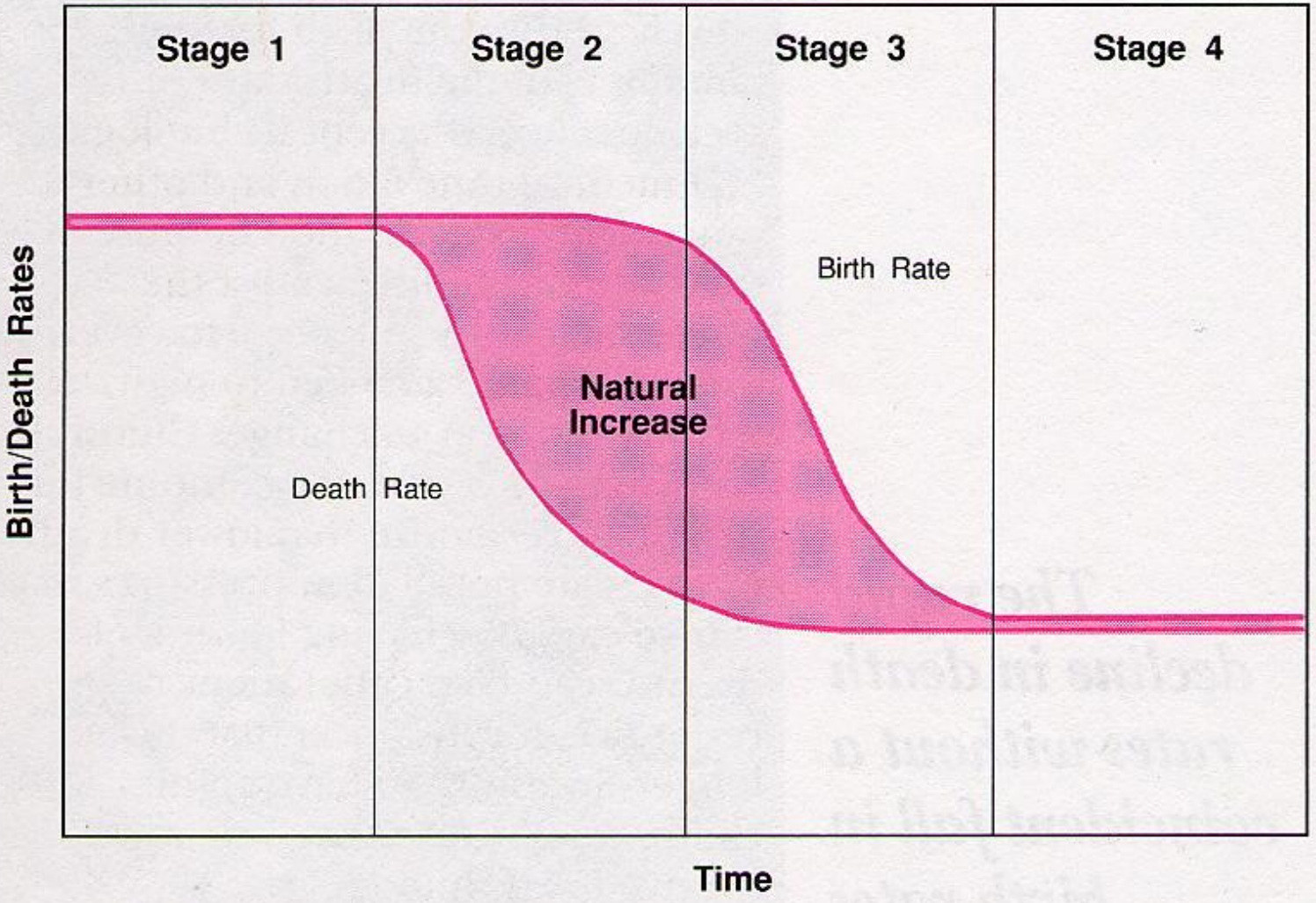
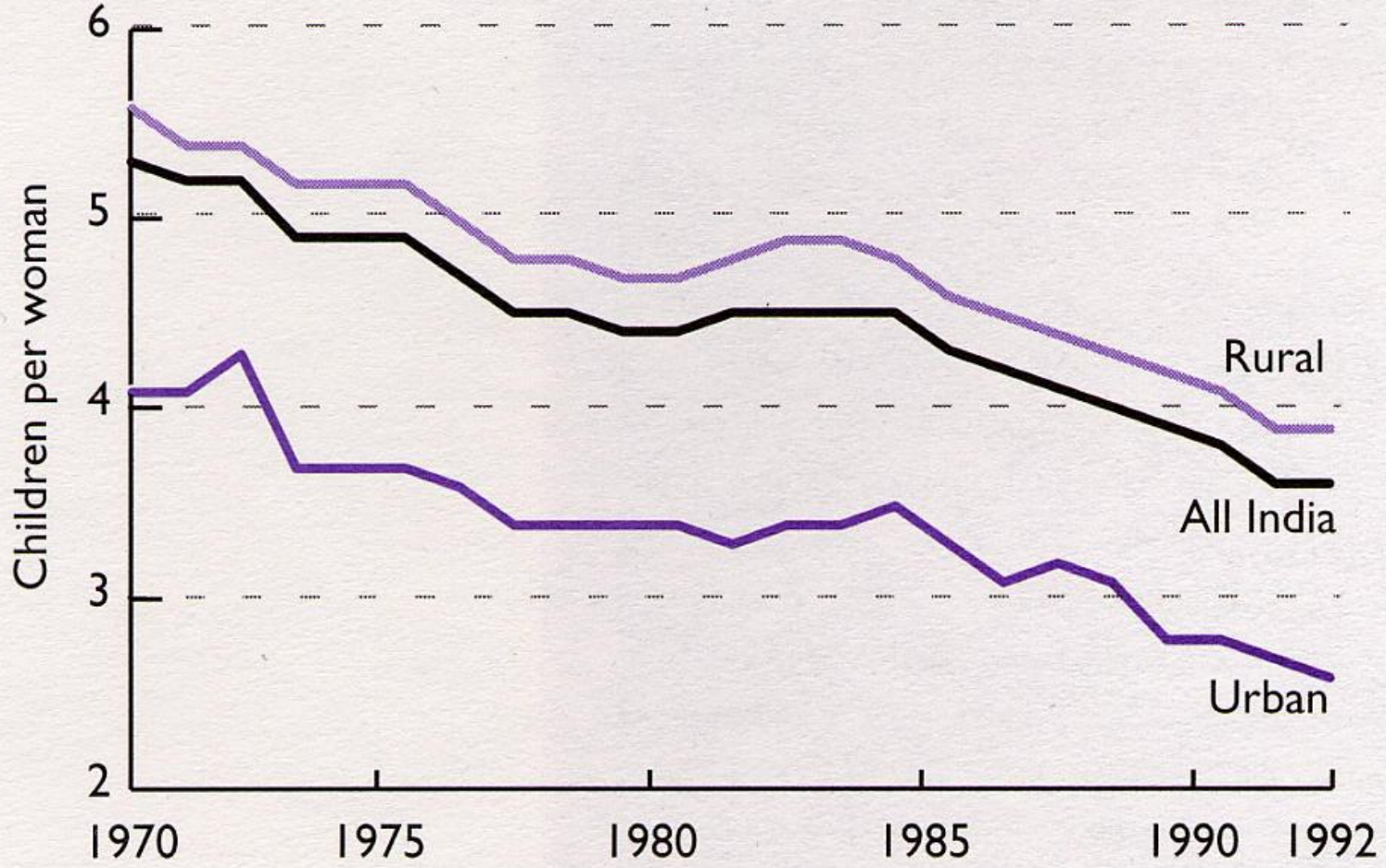


Figure 10

The Stages of Demographic Transition



Total fertility rate

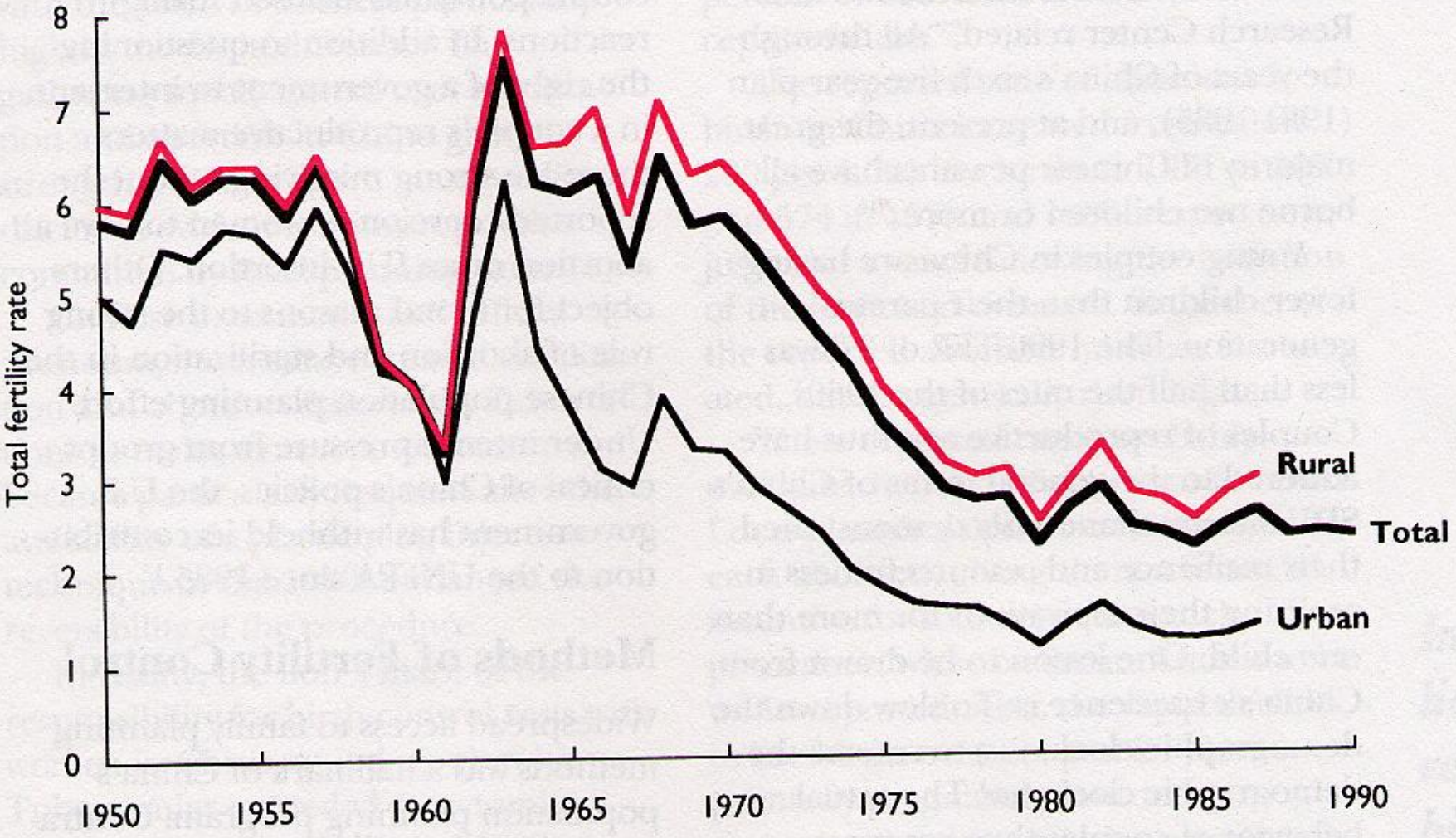


Note: The total fertility rate estimates the average number of births a woman will have given current birth rates.

Source: Birth and death rates, 1911-1991: estimates based on population censuses of India; 1993: India, Sample Registration System. All total fertility rates are from the Sample Registration System.

Figure 4

Decline in Chinese Fertility, 1950-1990



Source: Compiled by the U.S. Bureau of the Census, Center for International Research.

Total fertility rate

Summarizes current fertility rates by imagining a cohort of women moving through their reproductive age years

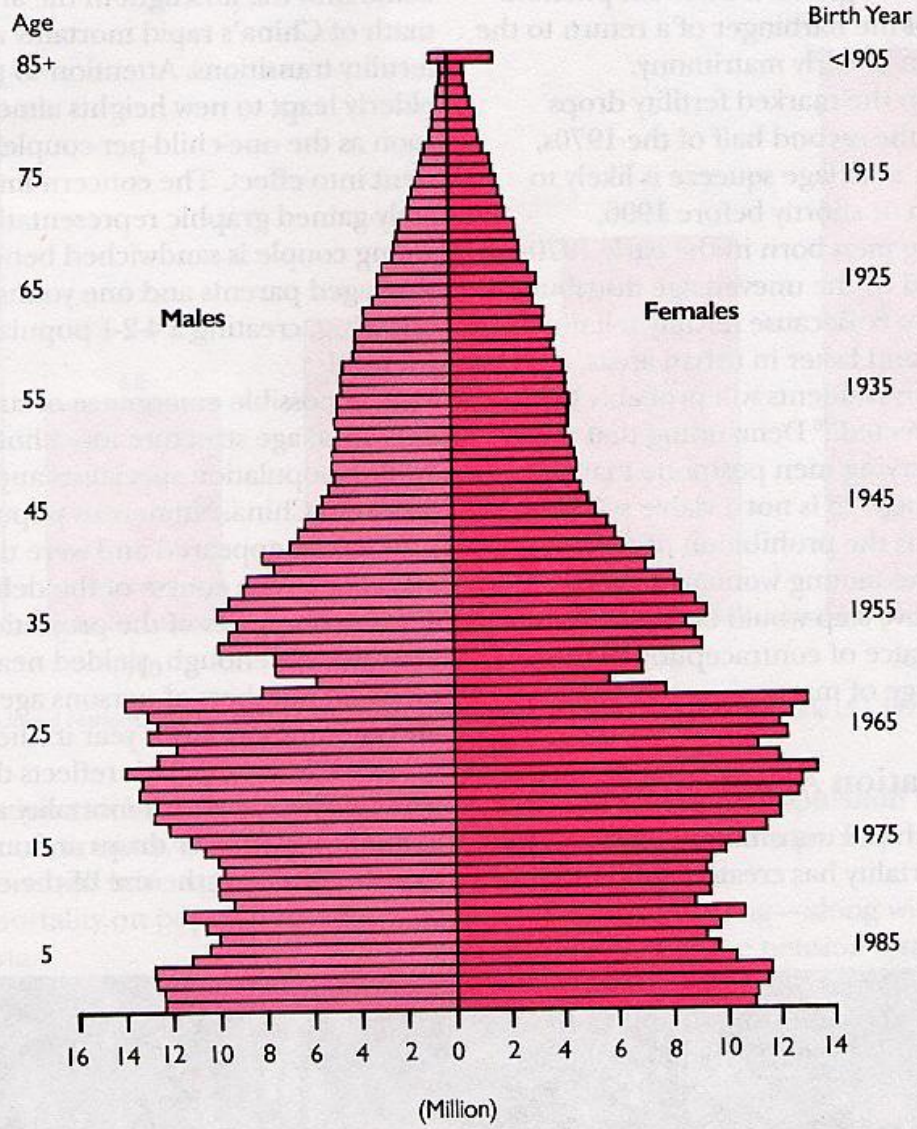
15 20 25 30 35 40 45

Total fertility rate calculation

Age band	Births	Women (1,000's)	Fertility rate
15-19	5,000	48,000	0.104
20-24	6,000	44,000	0.136
25-29	5,000	39,000	0.128
30-34	4,000	35,000	0.114
35-39	1,000	30,000	0.033
40-44	500	26,000	0.019
			2.68

Figure 6

China's Population by Age and Sex, 1990



Source: *Ten-Percent Sampling Tabulation of the 1990 Population Census of China* (Beijing: China Statistical Publishing House, 1991), Table 4-1.