POPULATION REFERENCE BUREAU'S

POPULATION HANDBOOK

5th Edition

A QUICK GUIDE TO
POPULATION DYNAMICS
FOR JOURNALISTS,
POLICYMAKERS,
TEACHERS, STUDENTS
AND OTHER PEOPLE
INTERESTED IN
DEMOGRAPHICS

PRB

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POPULATION HANDBOOK

5th Edition

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Population Reference Bureau
Washington, DC

Other Handbook Editions

The Population Handbook is also published in French, Spanish, and Chinese.

Contents

The Population Handbook

Since its publication in 1978, PRB's *Population Handbook* has appeared in eight languages and has been circulated around the world. It has been used by thousands of teachers and students in fields such as sociology, geography, and urban studies. Journalists refer to the handbook as an authoritative guide in preparing population-related stories, while policymakers and planners have found it to be a ready reference to the rates, ratios, and concepts of demography. Understanding the broad implications of population change is important to those who make decisions and inform others about demographic change around the world.

About Population   chapter 1

Just as effective development depends on reliable knowledge of natural and other resources, so does effective development planning depend upon natural knowledge of the composition, growth, and movement of population. (21 May 1975)

Rafael Salas
Executive Director (1969–1987)
United Nations Population Fund

Everyone is a member of a population, and population factors have an impact on many facets of life—from where we live to the prices we pay for goods and services. The need for health care preoccupies the political leaders of the industrialized countries whose populations are "aging," while the need for classrooms, employment opportunities, and housing preoccupies the leaders of countries that are still growing rapidly.

Population conditions influence history. Likewise, historical events can significantly affect populations. Wars can decimate a generation of men, as happened in the 20th century in the Soviet Union, France, Iraq, and several other countries. The discovery of new medicines often leads to increases in life expectancy, and different causes of death become more prominent. Alternatively, population change may sound a warning of other important changes. Environmental contamination may be detected first by increased reports of illness and rising mortality rates in certain geographic areas. In all these ways and more, population is news.

Population information is best communicated in terms of numbers and rates. It is not enough to know that life expectancy is increasing. How many years are being added? Over what time period has the change occurred? Which people are affected? What proportion of the population do they represent? Such information is more meaningful when it provides an indication of the magni-

The Tools of Demography

Count
The absolute number of a population or any demographic event occurring in a specified area in a specified time period. (For example, 1,200,500 live births occurred in Japan in 1997.) The raw quantities of demographic events are the basis of all other statistical refinements and analyses.

Rate
The frequency of demographic events in a population during a specified time period (usually a year) divided by the population "at risk" of the event occurring during that time period. Rates tell how common it is for a given event to occur. (For example, in 1997 in Papua New Guinea there were 34 live births per 1,000 population.) Most rates are expressed per 1,000 population. *Crude rates* are rates computed for an entire population. *Specific rates* are computed for a subgroup, usually the population more nearly approximating the population "at risk" of the event. (For example, the general fertility rate is the number of births per 1,000 women ages 15-49.) Thus, rates can be age-specific, sex-specific, race-specific, occupation-specific, and so on. In practice, some measures that are referred to as rates would be more accurately termed ratios.

Ratio
The relation of one population subgroup to the total population or to another subgroup; that is, one subgroup divided by another. (For example, the sex ratio in Iran in 1996 was 103 males per 100 females).

The relation of a population subgroup to the entire population; that is,

tude and distribution of the phenomenon, as well as the trend. To be useful, data must be expressed clearly as well as accurately. Birth rates are often confused with growth rates; declining growth rates are sometimes mistakenly equated with declining population size.

Demography is the scientific study of population. Demographers seek to know the levels and trends in population size and its components. They search for explanations of demographic change and their implications for societies. They use censuses, birth and death records, surveys, visa records, even motor vehicle and school registrations. They shape these data into manageable forms such as simple counts, rates, or ratios.

a population subgroup divided by the entire population. (For example, the proportion of Malaysia's population classified as urban was 0.57 or 57 percent.)	**Proportion**
An unchanging, arbitrary number (for example, 100 or 1,000 or 100,000) by which rates, ratios, or proportions can be multiplied to express these measures in a more understandable fashion. For example, 0.0134 live births per person occurred in Cuba in 1996. Multiplying this rate by a constant (1,000) gives the same statistic in terms of 1,000 people. This is a clearer way of expressing the same thing: There were 13.4 births per 1,000 population. In the formulas on the following pages, "K" means constant.	**Constant**
A statistic that measures events occurring to a cohort (a group of people sharing a common demographic experience) who are observed through time. The most commonly used cohort is the birth cohort—people born in the same year or period. Other kinds of cohorts include marriage cohorts and school class cohorts.	**Cohort Measure**
A statistic that measures events occurring to all or part of a population during one period of time; this measure "takes a snapshot" of a population, in effect. (For example, the death rate of the entire Canadian population in 1997 was 7 per 1,000.)	**Period Measure**

Most of the principal measures used in demography are defined on the following pages, together with recent examples of their use.

The purpose of this *Population Handbook* is to clarify and explain demographic terms to journalists, policymakers, teachers, students, and others who need to understand and communicate about population.

Age and Sex Composition   chapter 2

Age and sex are the most basic characteristics of a population. Every population has a different age and sex composition—the number and proportion of males and females in each age group—and this structure can have considerable impact on the population's social and economic situation, both present and future.

"Young" and "Old" Populations

Some populations are relatively young, that is, they have a large proportion of people in the younger age groups. The high-fertility countries of Africa with large proportions of young adults and children are examples. Other populations are relatively old, such as many countries in Europe. These two types of populations have markedly different age compositions; as a consequence, they also have different proportions of the population in the labor force or in school, as well as different medical needs, consumer preferences, and even crime patterns. A population's age structure has a great deal to do with how that population lives.

Developing countries have relatively young populations while most developed countries have old or "aging" populations. In many developing countries, 40 percent or more of the population is under age 15, while 4 percent is 65 or older. On the other hand, in all but a few developed countries, less than 25 percent of the population is under age 15 and more than 10 percent is 65 or older.

Median Age The median age is the age at which exactly half the population is older and half is younger.

The median age of the Costa Rican population in
1995 was 23 years.

▪ ▪ ▪

In 1995, the median age in Jordan, with a young population, was 18,
while that in Sweden was 38, signifying an older population.

Sex Ratio The sex ratio is the ratio of males to females in a given population, usually expressed as the number of males for every 100 females.

The sex ratio at birth in most countries is about 105 or 106 males per 100 females. After birth, sex ratios vary because of different patterns of mortality and migration for males and females within the population.

$$\frac{\text{Number of males}}{\text{Number of females}} \quad \text{x} \quad \text{K} \quad = \quad \frac{61,574,398}{63,995,848} \quad \text{x} \quad 100 \quad = \quad 96.2$$

In 1995, there were 96 males per 100
females in Japan.

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In Chile in 1995, the sex ratio for ages 60-64 was 85;
for ages 80 and older it was 54.

Age-Dependency Ratio The age-dependency ratio is the ratio of persons in the "dependent" ages (generally under age 15 and over age 64) to those in the "economically productive" ages (15-64 years) in a population.*

Where more detailed data are lacking, the age-dependency ratio is often used as an indicator of the economic burden the productive portion of a population must carry—even though some persons defined as "dependent" are producers and some persons in the "productive" ages are economically dependent.

Countries with very high birth rates usually have the highest age-dependency ratios because of the large proportion of children in the population.

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* The age-dependency ratio is sometimes divided into old-age dependency (the ratio of people ages 65 and older to those ages 15-64) and child dependency (the ratio of people under age 15 to those ages 15-64).

$$\frac{\text{Population under age 15}}{\text{Population ages 15-64}} \times K = \frac{11{,}245{,}500}{38{,}232{,}800} \times 100 = 53.0$$

The age-dependency ratio in France in 1996 was 53.
This means that there were 53 persons in the dependent
ages for every 100 persons in the working ages.

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By contrast, Libya had an age-dependency ratio of 92
in 1995, with 45 percent of its population under age 15 and
3 percent ages 65 and older. In Japan, the age-dependency ratio
was only 45 in 1997, with 15 percent of its population under
age 15 and 16 percent ages 65 and older.

Population Pyramid

   A population pyramid graphically displays a population's age and sex composition. Horizontal bars present the numbers or proportions of males and females in each age group. The sum of all the age-sex groups in the population pyramid equals 100 percent of the population. Pyramids may show single years of age, as does the one for Japan on page 8, or show data in age groups, as do those on page 10.
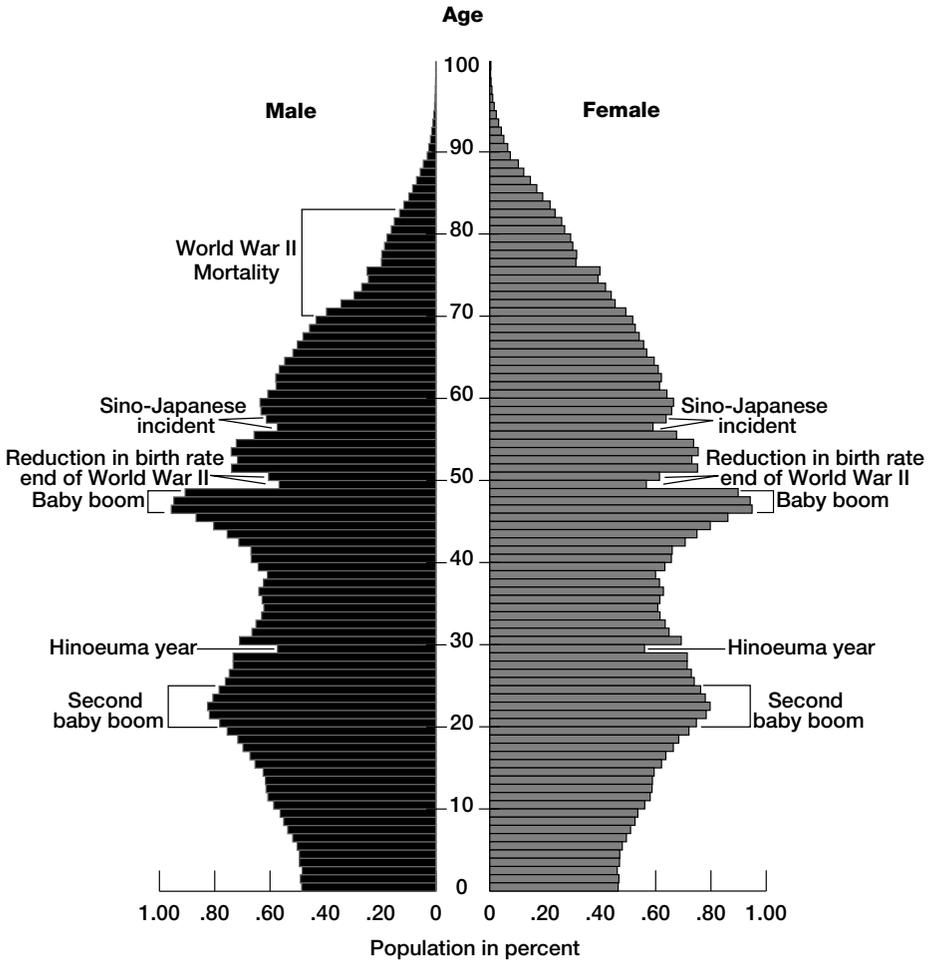   The bottom bars in Japan's pyramid show the percentage of the population that was under age 1 in 1995. Each year a new cohort is born and appears at the bottom of the pyramid, while the cohorts above it move up. As the cohorts age, they inevitably lose members because of death and may gain or lose members because of migration. After age 45 the attrition process accelerates, causing the narrowing peak of all population pyramids. Such pyramids can tell a great deal about a population at a glance. Notice, for example, that females form the substantial majority in the oldest age groups. In most countries, females outlive males.

Three General Profiles

   Populations of countries can differ markedly as a result of past and current patterns of fertility, mortality, and migration. However, they all tend to fall into three general profiles of age-sex composition.

   1. **Rapid growth** is indicated by a pyramid with a large percentage of people in the younger ages.
   2. **Slow growth** is reflected by a pyramid with a smaller proportion of the population in the younger ages.
   3. **Zero growth** or **decreasing populations** are shown by roughly equal numbers of people in all age ranges, tapering off gradually at the older ages.

Population Pyramid of Japan, 1995

Age

Male

Female

100

90

World War II
Mortality

80

70

60

Sino-Japanese
incident

Sino-Japanese
incident

Reduction in birth rate
end of World War II

Reduction in birth rate
end of World War II

Baby boom

Baby boom

50

40

Hinoeuma year

Hinoeuma year

30

Second
baby boom

Second
baby boom

20

10

0

1.00 .80 .60 .40 .20 0 0 .20 .40 .60 .80 1.00

Population in percent

Source: Japan's 1995 Census.

8

As shown in the figure on page 10, the age structure of Nigeria's population is characteristic of countries experiencing rapid growth; each cohort is larger than the previous cohort, producing a pyramid shape. This expansive age structure is the result of high birth rates. Spain's population, with roughly equal numbers in all age ranges, is typical of populations experiencing population decline or zero growth. The shape of the United States' age structure indicates a population that is growing, but at a slower rate than Nigeria's.

The pyramid on page 8, that of Japan in 1995, is a striking example of a population whose age-sex composition has been altered by past events. The low proportion of males ages 70-83 represents the loss of young men during World War II. The relatively small size of the population ages 56-57 (both males and females) is a demographic response to the Sino-Japanese Incident in 1938 and 1939. The population ages 49 and 50 reflects the reduction in the birth rate around the end of World War II. The large group ages 46-48 was born during the first "baby boom" period (1947-1949). The very small percentage of 29-year-olds corresponds to the birth year of 1966—"the year of Hinoeuma" or the "year of the Firehorse." Superstition maintains that being born during the year of Hinoeuma, which comes every 60 years, is bad luck for girls. The large percentages in the ages 21-24 show Japan's second "baby boom" period (1971-1974). Population pyramids that are constructed by single years of age can illuminate reasons for a population's age structure that larger age categories might mask.

Comparing Populations

The likelihood of getting married or dying varies at different ages. Populations that have comparatively large numbers of elderly are likely to have more deaths and fewer births each year than will a population of equal size that is largely composed of young families (other factors being equal). As a result, Finland, with a large proportion of older persons compared with Albania, will have more deaths per 1,000 population than Albania.

When comparing populations (for example, which country has higher fertility), care should be taken that the age structure of the populations does not seriously affect the comparison. Birth and death rates (see pages 13 and 25) are affected by the proportions of persons in the different ages and can give misleading comparisons (although the death rate is much more likely to do so than the birth rate). See the graph on page 27 for one example of how death rates vary by age.

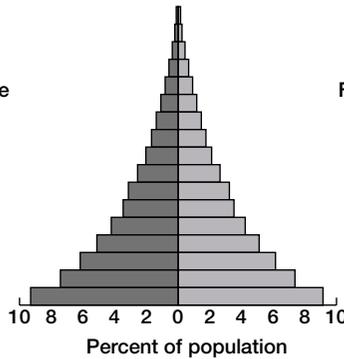# Age Patterns of Population: Nigeria, United States, and Spain, 1995

Rapid Growth—Nigeria

Year of birth		Age
Before 1915		80+
1915-1919		75-79
1920-1924		70-74
1925-1929		65-69
1930-1934	Male Female	60-64
1935-1939		55-59
1940-1944		50-54
1945-1949		45-49
1950-1954		40-44
1955-1959		35-39
1960-1964		30-34
1965-1969		25-29
1970-1974		20-24
1975-1979		15-19
1980-1984		10-14
1985-1989		5-9
1990-1994		0-4

10 8 6 4 2 0 2 4 6 8 10
Percent of population

Slow Growth—United States

Year of birth		Age
Before 1915		80+
1915-1919		75-79
1920-1924		70-74
1925-1929		65-69
1930-1934		60-64
1935-1939	Male Female	55-59
1940-1944		50-54
1945-1949		45-49
1950-1954		40-44
1955-1959		35-39
1960-1964		30-34
1965-1969		25-29
1970-1974		20-24
1975-1979		15-19
1980-1984		10-14
1985-1989		5-9
1990-1994		0-4

10 8 6 4 2 0 2 4 6 8 10
Percent of population
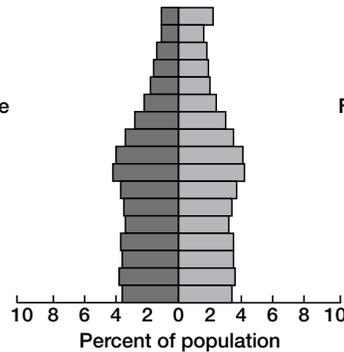
Zero or Declining Growth—Spain

Year of birth		Age
Before 1915		80+
1915-1919		75-79
1920-1924		70-74
1925-1929		65-69
1930-1934		60-64
1935-1939		55-59
1940-1944	Male Female	50-54
1945-1949		45-49
1950-1954		40-44
1955-1959		35-39
1960-1964		30-34
1965-1969		25-29
1970-1974		20-24
1975-1979		15-19
1980-1984		10-14
1985-1989		5-9
1990-1994		0-4

10 8 6 4 2 0 2 4 6 8 10
Percent of population
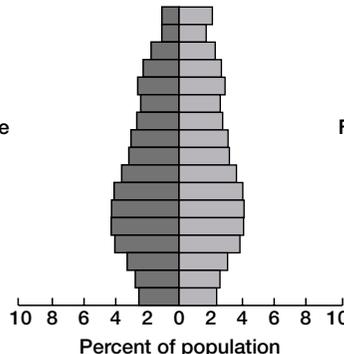
Sources: U.S. Census Bureau and the United Nations Population Division.

To make consistent comparisons, one can use *age-specific rates*. Comparing the annual death rate for persons ages 60-64 in Mexico and the United States simply shows the probability of someone in the age group in both countries dying in a given year and the comparison is clearly unaffected by the *number* of persons ages 60-64.

Another way to compare populations is to *standardize* their overall rates. This procedure applies one country's age-specific rate to the age structure of a second country and shows how many deaths one country would have in a year if it had a second country's age structure.

> The U.S. crude death rate was 8.6 deaths per 1,000 population in 1990. Mexico's crude death rate that year was 5.2. However, if Mexico's age structure had been the same as that of the United States in that year, Mexico's standardized (age-adjusted) death rate would have been 9.8, higher than in the United States.
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> In this example, we use the 1990 U.S. age structure as the standard; thus the standardized U.S. death rate would remain 8.6. We could just as well use Mexico's age structure as the standard, or even a third country's.

Age Structure and Population Growth

Along with the birth rate, age structure is the demographic "engine" that drives (or retards) population growth. In many developing countries, large proportions of young people virtually guarantee that population will continue to grow during periods of declining fertility and even after fertility drops to "replacement level" (see **population momentum**, page 19). The effect of a high birth rate upon age structure can be seen in Burkina Faso, where women average nearly seven children each. In 1995 there were about 458,000 persons in the 35-39 age group, but 2 million in the under-5 age group and 1.6 million people ages 5-9.

Fertility

Fertility refers to the number of live births women have. It differs from fecundity, which refers to the physiological capability of women to reproduce. Fertility is directly determined by a number of factors that, in turn, are affected by a great many social, cultural, economic, health, and other environmental factors. The factors directly affecting fertility are discussed in the next chapter.

Birth Rate

The birth rate (also called the crude birth rate) indicates the number of live births per 1,000 population in a given year.*

$$\frac{\text{Number of births}}{\text{Total population}} \quad x \quad K \quad = \quad \frac{38,868}{1,620,086} \quad x \quad 1,000 \quad = \quad 24.0$$

There were 24 births per 1,000 population in Kuwait in 1994.

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Around the world, birth rates vary widely. Western Sahara's 47 per 1,000 in 1996 is a very high birth rate, while Italy's 9 per 1,000, also in 1996, is very low.

Births are only one component of population change, and the birth rate should not be confused with the growth rate, which includes all components of change (see page 44).

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* Most annual rates, such as the birth rate, relate demographic events to the population at mid-year (July 1), which is considered to be the average population at risk of the event occurring during the year.

General Fertility Rate

The general fertility rate (also called the fertility rate) is the number of live births per 1,000 women ages 15-49 in a given year.*

The general fertility rate is a somewhat more refined measure than the birth rate because it relates births to the age-sex group at risk of giving birth (usually defined as women ages 15-49). This refinement helps eliminate distortions that might arise because of different age and sex distributions among populations. Thus, the general fertility rate is a better basis to compare fertility levels among populations than are changes in the crude birth rate.

$$\frac{\text{Number of births}}{\substack{\text{Number of women} \\ \text{ages 15-49}}} \times K = \frac{181{,}268}{2{,}923{,}344} \times 1{,}000 = 62.0$$

There were 62 births per 1,000 women ages 15-49 in Ecuador in 1995.

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Yemen's general fertility rate in the early 1990s was 238 live births per 1,000 women ages 15-49—one of the highest in the world. The Czech Republic's rate of 34 per 1,000 women ages 15-49 in 1996 was very low.

Age-Specific Fertility Rate

Fertility rates can also be calculated for specific age groups to see differences in fertility behavior at different ages or for comparison over time.

$$\frac{\substack{\text{Number of births to} \\ \text{women ages 20-24}}}{\substack{\text{Number of women} \\ \text{ages 20-24}}} \times K = \frac{23{,}694}{290{,}998} \times 1{,}000 = 81.4$$

In Austria in 1994, there were about 81 live births for every 1,000 women ages 20-24.

■ ■ ■

In Kenya in 1993, there were 266 live births per 1,000 women ages 20-24. In 1996, the rate was 153 in Brazil and 62 in Portugal.

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* The childbearing ages for women are assumed for statistical purposes to be ages 15-44 or 15-49.

Compare the fertility rates for women in Puerto Rico in the different age groups below.

Live births per 1,000 women ages 20-34 by age group, 1965–1994			
		Ages	
Year	20-24	25-29	30-34
1965	257.4	189.6	114.1
1975	154.9	146.1	91.2
1985	146.3	132.0	70.6
1994	133.8	113.5	69.0

In Puerto Rico in 1994, there were 134 live births to women ages 20-24 per 1,000 women in that age group.

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In 1994, the fertility rate for women ages 20-24 was about one-half as high as it was in 1965. In 1985 and 1994, the rates for women ages 30-34 were nearly equal.

Children Ever Born

The number of "children ever born" at various ages of the mother provides one measure of a population's fertility. This measure is useful only if the age group of women considered is specified. When this measure is calculated for women over age 49, it is called the completed fertility rate; it shows how many children a certain cohort of women who have completed childbearing actually produced during their childbearing years.

In 1995, the number of children ever born on average to women ages 45-49 was 4.9 in Guatemala and 3.4 in Kazakhstan.

Often, though, we need to summarize what fertility is now, without waiting for the end of the childbearing years. For this purpose the *total fertility rate* is used.

Total Fertility Rate

The total fertility rate (TFR) is the average number of children that would be born to a woman by the time she ended childbearing if she were to pass through all her childbearing years conforming to the age-specific fertility rates of a given year.

The TFR sums up, in a single number, the fertility of all women at a given point in time. In effect, it says: This is the total number

of children a woman would have if the fertility rates for a given year applied to her throughout her reproductive life. (See box below showing how the TFR is calculated.)

The TFR is a *synthetic* measure; no individual woman is very likely to pass through three decades conforming to the age-specific fertility rates of any single year. In reality, age-specific rates change and fluctuate from year to year, even if only gradually. For example, women who were ages 15-19 in 2003 may delay childbearing longer than women ages 15-19 in, say, 1990. They would lower the TFR a bit in 2003 but then raise it several years later when they begin their childbearing. Thus, year-to-year fluctuations in the TFR may reflect changes in the *timing* of births rather than changes in the average number of children women bear. The TFR is one of the most useful indicators of fertility because it gives the best picture of how many children women are currently having.

Calculating the Total Fertility Rate
Israel's TFR, 1994

Age of women	(1) Number of women	(2) Number of births to that age group	(3) Birth rate (2)÷(1)	(4) Age-specific birth rate(3)x5
15-19	244,000	4,474	.018	.090
20-24	225,800	28,013	.124	.620
25-29	194,200	36,440	.188	.940
30-34	182,300	27,402	.150	.750
35-39	181,400	14,044	.077	.385
40-44	177,600	3,176	.018	.090
45-49	151,100	182	.001	.005
			Sum =	2.88

The rates in column (3) simulate the likelihood of a woman giving birth during each year of her childbearing years—that is, they approximate the "risk" of having a birth. Multiplying each of these rates by five provides the number of children she would have for each five-year period. Each woman is subject to the annual "risk" of a birth five times in each age group; for example, 0.124 when she is 20, 0.124 when she is 21, and so on. Summing the rates for all age categories results in the number of children she would have by age 49—the total fertility rate.

> The total fertility rate in 2002 in Israel was 2.9 births per woman (or 2,900 births per 1,000 women). That is, if 2002 age-specific rates continued unchanged, women in Israel would average 2.9 children each during their childbearing years.
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> In some developing countries, the TFR is more than five children per woman. In most developed countries, it is below two.

Gross Reproduction Rate

The gross reproduction rate (GRR) is the average number of daughters that would be born to a woman (or group of women) during her lifetime if she passed through her childbearing years conforming to the age-specific fertility rates of a given year. This rate is like the TFR except that it counts only daughters and literally measures "reproduction"—a woman reproducing herself by having a daughter.

Net Reproduction Rate

The net reproduction rate (NRR) is the average number of daughters that would be born to a woman (or group of women) if she passed through her lifetime from birth conforming to the age-specific fertility and mortality rates of a given year. This rate is like the GRR, but it is always lower because it takes into account the fact that some women will die before completing their childbearing years.

Country	1993 GRR	1993 NRR
Burkina Faso	3.50	2.41
United Kingdom	0.86	0.85

> In 1993, Burkina Faso had a GRR of 3.50, while that of the United Kingdom was only 0.86. That means that, if 1993 fertility levels were to continue, a woman in Burkina Faso would produce 3.5 daughters, on average, during her lifetime. In the United Kingdom, by contrast, a woman would produce less than one daughter on average during her lifetime.
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> In Burkina Faso, one daughter would die, on average, before completing her childbearing years.

Total Fertility Rate, France, 1901–1995
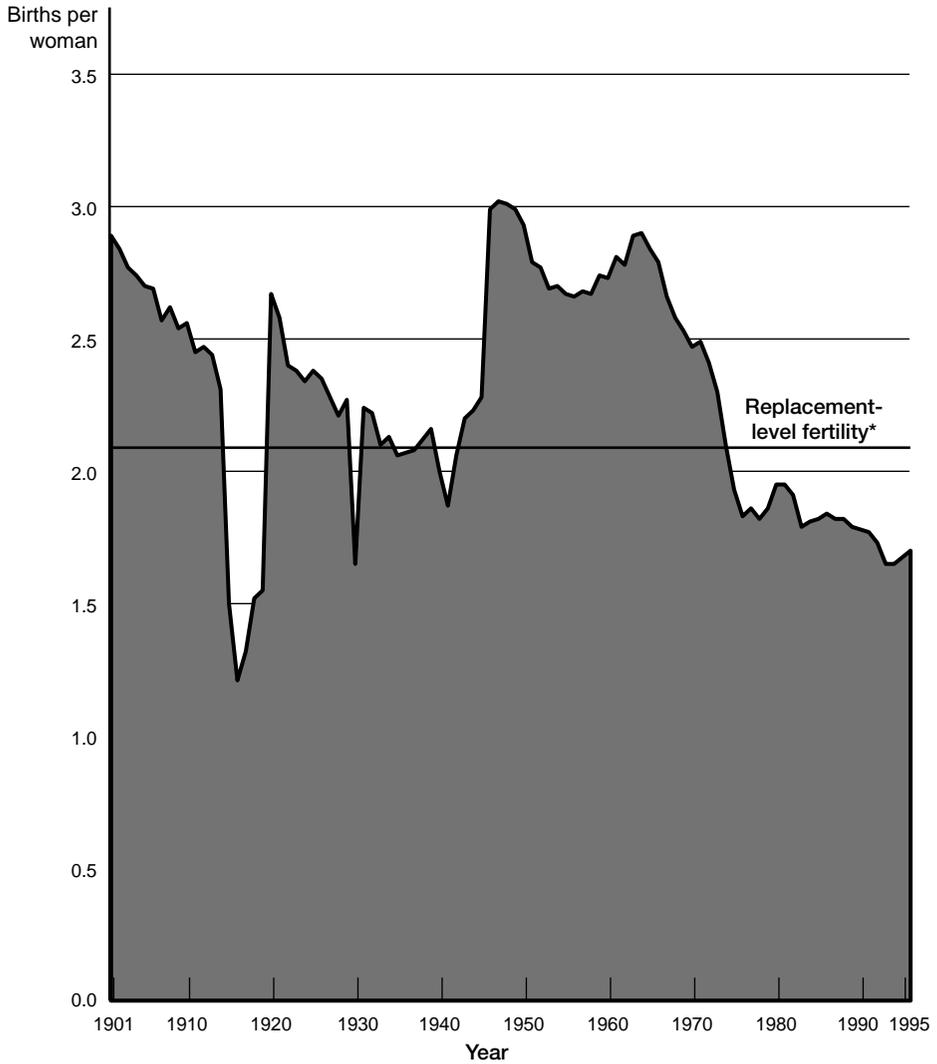
* At current mortality levels.
Source: Institut National d'Etudes Démographiques (INED), *Population* 52:5 (Paris: INED, 1997): p. 1169.

The child-woman ratio is the number of children under age 5 per 1,000 women of childbearing age in a given year. This measure can be calculated from national censuses or survey data, thereby providing fertility data where birth statistics may not otherwise be available.

$$\frac{\text{Number of children under age 5}}{\text{Number of women ages 15-49}} \quad x \quad K \quad = \quad \frac{1,304,000}{4,674,000} \quad x \quad 1,000 \quad = \quad 279$$

There were 279 children under age 5 per 1,000 women of childbearing age in Australia in 1995.

■ ■ ■

In 1995, the child-woman ratio for Slovenia was 191; in Uganda it was 905.

Replacement-level fertility is the level of fertility at which women in the same cohort have exactly enough daughters (on average) to "replace" themselves in the population. An NRR of 1.00 is equal to replacement level.

Once replacement-level fertility has been reached, births will gradually reach equilibrium with deaths, and in the absence of immigration and emigration, a population ultimately will stop growing and become stationary. The time this process takes varies greatly depending upon the age structure of the population.

Today, virtually all developed countries are at or below replacement-level fertility. In 2000, Finland, with an NRR of 0.84, was below replacement level; still *the Finnish population is growing*.

The TFR can also be used to indicate replacement-level fertility by showing the average number of children sufficient to replace both parents in the population. In the developed countries today, a TFR of about 2.1 is considered to be replacement-level. Replacement level TFRs higher than exactly 2.0 (one child for each parent) are needed because there are slightly more males than females born and not all females survive to their childbearing years. In developing countries with much higher mortality rates, TFRs higher than 2.1 are necessary to achieve replacement level.

Population momentum refers to the tendency of a population to continue to grow after replacement-level fertility has been achieved. A population that has achieved replacement or below-replacement fertility may still continue to grow for some decades because past high fertility leads to a high concentration of people in the youngest ages. Total births continue to exceed total deaths

as these youth become parents. Eventually, however, this large group becomes elderly and deaths increase to equal or outnumber births. Thus it may take two or three generations (50-70 years) before each new birth is offset by a death in the population. Although replacement-level fertility was reached in Finland by the late 1960's there are still about 10,000 more births than deaths each year.

Birth Rate for Unmarried Women

The birth rate of unmarried women is the number of live births by unmarried women per 1,000 unmarried women ages 15-49 years in a given year. This rate indicates the number of infants born to unmarried women and should not be confused with the percentage of births to unmarried women described below.

$$\frac{\text{Number of births to unmarried women}}{\text{Number of unmarried women ages 15-49}} \times \text{K} = \frac{32,400}{1,810,055} \times 1,000 = 17.9$$

There were 18 births per 1,000 unmarried women ages 15-49 in the Netherlands in 1996.

Percentage of Births Outside Marriage

The percentage of births outside marriage is the number of live births to unmarried women (never married, widowed, or divorced) per 100 total live births in a given year. This measure relates births to unmarried women to total births.

$$\frac{\text{Number of births to unmarried women}}{\text{Total live births}} \times \text{K} = \frac{35,288}{190,747} \times 100 = 18.5$$

In 1997, 18.5 percent of births in the Netherlands were outside marriage.

■   ■   ■

In 1999, the percentage of births outside marriage was 55.3 in Sweden and 4.0 in Greece.

The percentage of births outside marriage can grow while the rate of births to unmarried women declines or remains stable. This can occur when the proportion of women who are not married increases.

Factors Affecting Fertility   chapter 4

Fertility is affected by cultural, social, economic, and health factors. Most of these factors operate through four other factors: (1) the proportion of women in sexual unions; (2) the percentage of women using contraception; (3) the proportion of women who are not currently fecund (primarily because of breastfeeding); and (4) the level of induced abortion. Knowledge about these four factors provides clues to potential changes in fertility and aids our understanding of past change.

The proportion of women who are in union is affected by other demographic factors including the age at first marriage or union, the pervasiveness of marriage and other unions; rates of divorce, separation, and remarriage; and male mortality levels.

The percentage of women in sexual unions is sometimes approximated by the percentage of women in the reproductive ages who are legally married.

Percentage of Women in Union

$$\frac{\text{Number of married women ages 15-49}}{\text{Number of women ages 15-49}} \times 100 = \frac{39,002,000}{56,670,000} \times 100 = 68.9$$

In Indonesia in 1996, 69 percent of women of reproductive age (15-49) were married.

In countries where consensual unions outnumber legal marriages, the former may be used to approximate the percentage of women in union.

Percentage of Women Breastfeeding

The percentage of women who are breastfeeding is helpful in determining the number of women who are at risk of pregnancy, because exclusive breastfeeding of an infant can lengthen the period of time before menstruation resumes.

$$\frac{\text{Number of women with infants under age 1 who are breastfeeding}}{\text{Number of women with infants under age 1}} \times 100 = \frac{1,356}{1,361} \times 100 = 99.6$$

Virtually 100 percent of Nepali women surveyed in 1996 who had an infant under age 1 were breastfeeding.

Contraceptive Prevalence Rate

The contraceptive prevalence rate is the number of women of reproductive age who are using contraception per 100 women of reproductive age. This measure provides an indication of the number of women who have a lower risk of conception at a given time. This measure may be calculated for all women or subpopulations such as married women, unmarried women, or women who are sexually active.

$$\frac{\text{Number of women (ages 15-49) using contraception}}{\text{Number of women surveyed (ages 15-49)}} \times 100 = \frac{5,268}{10,707} \times 100 = 49.2$$

In Bangladesh in 1996-97, the contraceptive prevalence rate for women ages 15-49 was 49.

■   ■   ■

Women's use of contraception ranges from less than 20 percent in many African countries to 75 percent or more in many European countries, Australia, Brazil, and a few countries in East and Southeast Asia.

A parallel measure is also used that considers only modern contraceptive methods.

The abortion rate is the number of abortions per 1,000 women of reproductive age in a given year.

$$\frac{\text{Number of abortions}}{\text{Number of women ages 15-49}} \quad x \quad K \quad = \quad \frac{76,600}{2,200,300} \quad x \quad 1,000 \quad = \quad 34.8$$

In 1996, there were 35 abortions in Hungary per 1,000 women of child-bearing ages, 15-49.

■   ■   ■

In 1996, the abortion rate in Bulgaria was 54.

In Japan in 1994, it was 14.

This rate should not be confused with the abortion ratio, which is described below.

The abortion ratio is the number of abortions per 1,000 live births in a given year. This ratio should not be confused with the abortion rate, which is described above.

$$\frac{\text{Number of abortions}}{\text{Number of live births}} \quad x \quad K \quad = \quad \frac{76,600}{105,272} \quad x \quad 1,000 \quad = \quad 727.6$$

In 1996, there were 728 abortions per 1,000 live births in Hungary.

■   ■   ■

In 1996, the abortion ratio in Romania was 1,972 per 1,000 live births. In Singapore in 1994, it was 311.

Mortality   chapter 5

*Mortality refers to deaths that occur within a popula-
tion. While we all eventually die, the probability of
dying during a given time period is linked to many
factors, such as age, sex, race, occupation, and social
class. The incidence of death can reveal much about a
population's standard of living and health care.*

The death rate (also called the crude death rate) is the number   **Death Rate**
of deaths per 1,000 population in a given year.

$$\frac{\text{Number of deaths}}{\text{Total population}} \quad \text{x} \quad \text{K} \quad = \quad \frac{405,000}{61,644,000} \quad \text{x} \quad 1,000 \quad = \quad 6.6$$

In the early 1990s, the death rate in Turkey was 7 per
1,000 population.

■   ■   ■

In the early 1990s, Guinea's death rate was 20 per 1,000 population,
while Singapore's was 5 per 1,000.

Crude death rates are affected by many population characteris-
tics, particularly age structure. It is therefore prudent, when com-
paring death rates between countries, to adjust for differences in
age composition (see **comparing populations**, page 9) before mak-
ing inferences about a country's health, economic, or environ-
mental conditions.

For example, in 2002 Sweden's crude death rate was higher than
Panama's—11 per 1,000 population compared with 5 per 1,000—
despite the fact that life expectancy in Sweden was 80 years, com-
pared with only 74 for Panama. The higher Swedish rate is

attributable to the differences in age composition between the two countries. "Old" Sweden has 18 percent of its population in the 65-and-older age group, where deaths are more likely to occur, while "young" Panama's proportion of elderly persons is only 6 percent of the total population. Thus, Sweden has a higher proportion of deaths in the total population each year than Panama, even though Sweden has better health conditions.

Age-Specific Death Rate

Death rates can be calculated for specific age groups in order to compare mortality at different ages or at the same age over time. Comparisons also can be made between countries or areas.

Because mortality varies greatly by sex and race, age-specific death rates are often given separately for males and females and for different racial groups in a population.
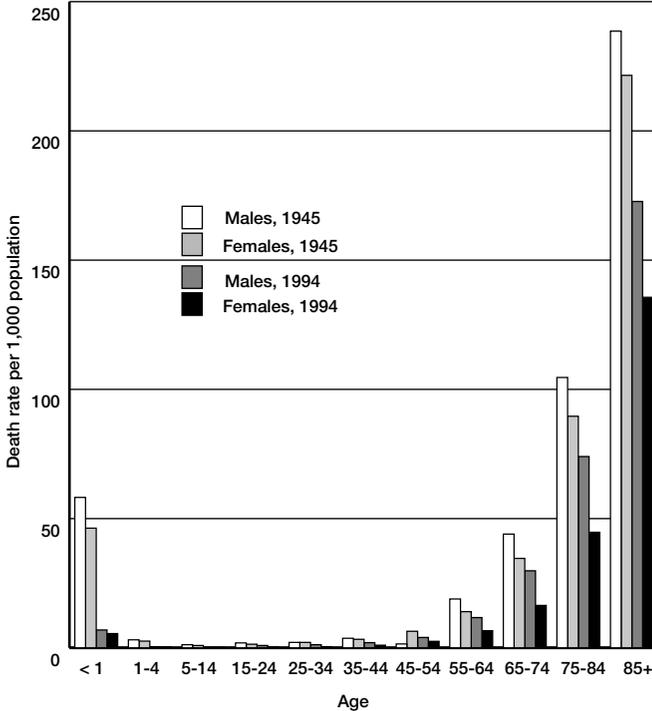
$$\frac{\text{Deaths of people ages 40-44}}{\text{Total population ages 40-44}} \quad \times \quad K \quad = \quad \frac{1,050}{236,472} \quad \times \quad 1,000 \quad = \quad 4.4$$

In Puerto Rico in 1994, the age-specific death rate for persons ages 40-44 was 4.4 per 1,000 population of that age.

■   ■   ■

By comparison, the 1994 age-specific death rate for persons ages 70-74 in Puerto Rico was 33.0 per 1,000 population of that age.

Cause-Specific Death Rate

Cause-specific death rates are usually expressed in deaths per 100,000 because, for most causes of death, the rates of occurrence are very low.

$$\frac{\text{Deaths from cancer}}{\text{Total population}} \quad \times \quad K \quad = \quad \frac{544,278}{265,283,783} \quad \times \quad 100,000 \quad = \quad 205.2$$

In 1996, 205 persons per 100,000 population died of cancer in the United States.

Death Rates by Age and Sex, Canada, 1945 and 1994

Death rate per 1,000 population

Legend:
- ☐ Males, 1945
- ☐ Females, 1945
- ☐ Males, 1994
- ■ Females, 1994

Age: < 1, 1-4, 5-14, 15-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, 85+

Source: *UN Demographic Yearbooks*, 1948, 1995, and 1996.

Deaths from a specific cause can be expressed as a percentage of all deaths.

Proportion Dying of a Specific Cause

$$\frac{\text{Number of deaths from cancer}}{\text{Total deaths}} \quad x \quad K \quad = \quad \frac{544,278}{2,322,421} \quad x \quad 100 \quad = \quad 23.4$$

In 1996, 23 percent of all deaths in the United States were from cancer.

The causes of death vary greatly from population to population and from period to period and are influenced by many factors, including health and environmental conditions. In 1900 in the United States, the pneumonia-bronchitis-influenza class of diseases was the leading cause of death, accounting for 17.2 percent of all deaths, while heart disease accounted for 7.1 percent of all deaths.

By 1996, however, heart disease was the leading cause of death (31.6 percent of all deaths), while pneumonia-bronchitis-influenza accounted for only 3.6 percent of deaths. The proportion dying of a specific cause should not be confused with the cause-specific death rate.

Infant Mortality Rate

The infant mortality rate is the number of deaths of infants under age 1 per 1,000 live births in a given year.

$$\frac{\text{Number of deaths of infants under age 1 in a given year}}{\text{Total live births in that year}} \times K = \frac{10,016}{595,816} \times 1,000 = 16.8$$

There were 17 deaths of infants under age 1 per 1,000 live births in Venezuela in 1996.

∎ ∎ ∎

In 1996, Sweden reported the world's lowest infant mortality rate, 3.5 per 1,000. A high national rate would be Malawi's, which was estimated at 140 per 1,000 in 1997.

The infant mortality rate is considered a good indicator of the health status of a population.

Maternal Mortality Ratio

The maternal mortality ratio is the number of women who die as a result of complications of pregnancy or childbearing in a given year per 100,000 live births in that year. Deaths due to complications of spontaneous or induced abortions are included.

$$\frac{\text{Number of maternal deaths}}{\text{Total live births}} \times K = \frac{185}{1,408,159} \times 100,000 = 13.1$$

There were 13 maternal deaths per 100,000 live births in Russia in 1994.

This measure is sometimes referred to as the maternal mortality rate; it is best to specify the denominator when using either measure. A true maternal mortality rate would divide the number of maternal deaths by the number of women of childbearing age in the population.

In practice, a maternal death is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.

Life expectancy is an estimate of the *average* number of additional years a person could expect to live if the age-specific death rates for a given year prevailed for the rest of his or her life. Life expectancy is a hypothetical measure because it is based on current death rates and actual death rates change over the course of a person's lifetime. Each person's life expectancy changes as he or she grows older and as mortality trends change.

> If the age-specific death rates for 2000 remain unchanged, males in brazil born in 2000 can expect to live 65 years on average. females can expect to live 73 years.

Because life expectancy differs significantly depending on sex, present age, and race, these categories are usually given separately. Life expectancy at birth is the most commonly cited life expectancy measure. It is a good indicator of current health conditions.

Life expectancies differ widely among countries. In 1996, life expectancy was 46 in Malawi compared with 80 in Japan. Women in Japan enjoy the world's highest life expectancy, 83 years in 1996.

It should be noted that low life expectancies in developing countries are in large part the result of high infant mortality rates. In 1994, for example, life expectancy at birth for females in Bangladesh was 58 years, but if a Bangladeshi female survived to age 1, she could expect to live to age 62.

The life table, one of the most powerful tools in demography, is used to simulate the lifetime mortality experience of a population. It does so by taking that population's age-specific death rates and applying them to a *hypothetical* population of 100,000 people born at the same time. For each year on the life table, death inevitably thins the hypothetical population's ranks until, in the bottom row of statistics, even the oldest people die.

The box on page 30 contains selected portions of an abridged life table for men in Malaysia in 1995. This table is based on death rates and is abridged to display data at five-year age intervals rather than single years.

Column 1 shows the proportion of each age group dying in each age interval. These data are based on the observed mortality experience of a population. Column 2 shows the number of people alive at the beginning of each age interval, starting with 100,000 at

	How Life Tables Work					
	Abridged Life Table for Males in Malaysia, 1995					
	1	**2**	**3**	**4**	**5**	**6**
Age	Proportion dying in the age interval	Number living at beginning of age interval	Number dying during the age interval	Persons living		Years of life remaining (life expectancy)
				in the age interval	in this and all subsequent intervals	
< 1	.01190	100,000	1,190	98,901	6,938,406	69.38
1-5	.00341	98,810	337	394,437	6,839,505	69.22
5-10	.00237	98,473	233	491,782	6,445,067	65.45
10-15	.00270	98,240	265	490,536	5,953,285	60.60
- - - - -	- - - - -	- - - - - -	- - - - -	- - - - - -	- - - - - - -	- - - - -
65-70	.16050	70,833	11,368	325,743	928,004	13.10
70-75	.25762	59,464	15,319	259,024	602,260	10.13
75-80	.34357	44,145	15,167	182,808	343,237	7.78
80+	1.00000	28,978	28,978	160,428	160,428	5.54
Source: Department of Statistics, Malaysia, 1997.						

birth. Each age group contains the population that survived from the immediately preceding group. Column 3 shows the number who would die within each age interval (Column 1 x Column 2 = Column 3).

Column 4 shows the total number of person-years that would be lived within each age interval. Column 5 shows the total number of years of life to be shared by the population in the age interval and in all subsequent intervals. This measure takes into account the frequency of deaths that will occur in this and all subsequent intervals. As age increases and the population shrinks, the total person-years that the survivors have to live necessarily diminish.

Life expectancy is shown in Column 6. The total person-years lived in a given interval plus subsequent intervals, when divided by the number of persons living at the start of that interval, equals life expectancy—the average number of years remaining for a person at a given age interval (Column 5 ÷ Column 2 = Column 6). For example, dividing the number of person-years associated with Malaysian men who survive to age 70 (602,260) by the number of these men (59,464) shows they have an additional life expectancy of 10.1 years.

With age, life expectancy actually rises—a kind of "bonus" for surviving. The 59,464 Malaysian men who survive to age 70, for example, can expect to live more than 10 additional years, well past their life expectancy at birth of 69 years.

Morbidity   chapter 6

Morbidity refers to disease and illness, injuries, and disabilities in a population. Data about the frequency and distribution of a disease can aid in controlling its spread and, in some cases, may lead to the identification of its cause.

Incidence Rate

The incidence rate is the number of persons contracting a disease during a given time period per 1,000 population at risk. The incidence rate and other morbidity rates vary so widely that any constant may be used that expresses the rate in a clear manner (from "per 100" or "percent" to "per 100,000").

$$\frac{\text{Number of persons developing tuberculosis during a given time period}}{\text{Population at risk}} \times K = \frac{28{,}142}{29{,}137{,}000} \times 100{,}000 = 96.6$$

The incidence of tuberculosis in Kenya in 1996 was 97 per 100,000 population.

Prevalence Rate

The prevalence rate is the number of persons who have a particular disease at a given point in time per 1,000 population. This rate includes all known cases that have not resulted in death, cure, or remission, as well as new cases developing during the specified period. The prevalence rate is a "snapshot" of an existing health situation; it describes the health status of a population at a point in time.

$$\frac{\text{Number of persons ages 15-49 with HIV/AIDS}}{\text{Total population ages 15-49}} \times K = \frac{1,400,000}{5,417,956} \times 100 = 25.8$$

The prevalence of HIV/AIDS in Zimbabwe among adults (ages 15-49) at the end of 1997 was 25.8 persons per 100 population.

■ ■ ■

At the end of 1997, the prevalence rate of HIV/AIDS for adults ages 15-49 in Botswana was 25.1. The corresponding rate in Argentina was 0.69; in Austria, 0.18; and in New Zealand, 0.07.

Case Rate   The case rate is the number of reported cases of a specific disease or illness per 100,000 population during a given year. The case rate is a special type of incidence rate but differs because it is based on the number of reported cases, which is not necessarily the number of persons contracting the disease (that is, some people may get the disease more than once).

$$\frac{\text{Number of reported cases of tuberculosis during a given year}}{\text{Total population}} \times K = \frac{28,142}{27,150,000} \times 100,000 = 103.7$$

In 1996, there were 28,142 cases of tuberculosis in Kenya, or 104 per 100,000 population.

Case Fatality Rate   The case fatality rate is the proportion of persons contracting a disease who die of that disease during a specified time period.

$$\frac{\text{Number of persons dying from the disease}}{\text{Number of persons contracting the disease during a period}} \times K = \frac{461,421}{785,422} \times 100 = 59$$

Between 1986 and March 1997, 785,422 cases of AIDS were reported to the World Health Organization by the Pan American Health Organization; 59 percent of the people infected with the HIV virus died during the period.

Nuptiality refers to marriage as a population phe-nomenon, including the rate at which it occurs, the characteristics of persons united in marriage, and the dissolution of such unions (through divorce, separa-tion, widowhood, and annulment).

Marriage Rate

The marriage rate (also called the crude marriage rate) is the number of marriages per 1,000 total population in a given year. This rate is calculated using the number of marriages—not the number of people getting married—and includes both first mar-riages and remarriages.

$$\frac{\text{Number of marriages}}{\text{Total population}} \times K = \frac{530,746}{57,851,000} \times 1,000 = 9.2$$

In 1994, the crude marriage rate in Egypt was 9.2 per 1,000 population.

Median Age at First Marriage

Half the people marrying for the first time in a given year got married before the median age, half after. The median age at first marriage is usually computed separately for males and females, because females typically marry at younger ages. The median age at first marriage has an effect on a population's fertility. The importance of this factor depends on the extent to which child-bearing is limited to marriage.

In 1994, the median age at first marriage in the United States was 26.7
years for males and 24.5 for females.

■ ■ ■

Median age at first marriage varies widely. In Nepal in 1996,
median age at first marriage was 17 for females; in Bangladesh a survey
conducted in 1996 and 1997 found that it was 14.

Divorce Rate   The divorce rate (or crude divorce rate) indicates the number of
divorces per 1,000 population in a given year. This rate is calculated
using the number of divorces—*not* the number of people being
divorced.

$$\frac{\text{Number of divorces}}{\text{Total population}} \times K = \frac{48,256}{17,843,268} \times 1,000 = 2.7$$

In Australia in 1994, there were 2.7 divorces per 1,000 population.

■ ■ ■

By contrast, Turkey's divorce rate in 1995 was 0.5 per 1,000 population,
while in the United States it was 4.4.

Migration chapter 8

Migration is the geographic movement of people across a specified boundary for the purpose of establishing a new permanent or semipermanent residence. Along with fertility and mortality, migration is a component of population change. The terms "immigration" and "emigration" are used to refer to moves between countries (international migration). The parallel terms "in-migration" and "out-migration" are used for movement between areas within a country (internal migration).

The immigration rate is the number of immigrants arriving at a destination per 1,000 population at that destination in a given year.

Immigration Rate

$$\frac{\text{Number of immigrants}}{\text{Total population at destination}} \quad x \quad K \quad = \quad \frac{39,895}{8,844,499} \quad x \quad 1,000 \quad = \quad 4.5$$

In 1996, the Swedish immigration rate was
4.5 per 1,000 residents.

■ ■ ■

In some countries, immigration plays a significant role
in population growth. In Sweden in 1996, 83 percent of all
population growth was a result of immigration.

35

Emigration Rate   The emigration rate is the number of emigrants departing an area of origin per 1,000 population at that area of origin in a given year.

$$\frac{\text{Number of emigrants}}{\substack{\text{Total population} \\ \text{at origin}}} \times \text{K} = \frac{33,884}{8,844,499} \times 1,000 = 3.8$$

In 1996, the Swedish emigration rate was 3.8 emigrants per 1,000 residents.

Net Migration   The net effect of immigration and emigration on an area's population (increase or decrease) is referred to as net migration.

Net Migration Rate   The net migration rate shows the net effect of immigration and emigration on an area's population, expressed as increase or decrease per 1,000 population of the area in a given year.

$$\frac{\substack{\text{Number of immigrants} \\ \text{– Number of emigrants}}}{\text{Total population}} \times \text{K} = \frac{39,895–33,884}{8,844,499} \times 1,000 = +0.7$$

In 1996, Sweden experienced a net increase of 0.7 persons per 1,000 population through migration.

■ ■ ■

Romania had a net migration rate of -0.9 per 1,000 in 1996 (that is, the net result was a loss of 0.9 persons per 1,000 population).

Race and Ethnicity   chapter 9

Race, ethnicity, language group, and national heritage are often used for analyses of population groups. These data may reveal much about a population's origins and are often used in the administration of government programs.

In many countries, demographic data are reported for race, ethnic group, national origin, and religious affiliation. Definitions of race and ethnicity vary from country to country and over time. Even within academic disciplines, not everyone agrees on how to define these concepts. The definitions and criteria applied by each country investigating racial or ethnic characteristics of the population should be determined by the groups that it wants to identify.

Race

Race is not a scientific term. There is no consensus about how many races there are or about what exactly distinguishes a race from an ethnic group. Many social scientists agree that, while race may have a biological or a genetic component, race is defined primarily by society, not by genetics. There are no universally accepted categories.

Ethnicity   Ethnicity usually is defined by cultural practices, language, cuisine, and traditions—not by biological or physical differences.

$$\frac{\text{Population of Chinese origin}}{\text{Total population}} \quad x \quad K \quad = \quad \frac{5{,}495{,}000}{19{,}047{,}000} \quad x \quad 100 \quad = \quad 28.8$$

In 1996, 29 percent of the population of Malaysia was of
Chinese origin.

■   ■   ■

In 1996, 19 percent of the Canadian
population—5.6 million people—was of French origin.

Foreign-Born   The foreign-born population represents persons born outside
Population   the borders or territories of a country.

$$\frac{\text{Number of foreign-born persons}}{\text{Total population}} \quad x \quad K \quad = \quad \frac{233{,}375}{4{,}348{,}410} \quad x \quad 100 \quad = \quad 5.4$$

As of January 1, 1996, 5 percent of the Norwegian
population was born abroad.

■   ■   ■

In 1996, 9 percent of the population of the
United States was foreign-born.

Households and Families

Households and families are the basic units in which most people live. Trends in the number, type, and composition of households are important to sociologists, planners, and policymakers. For example, municipal services are provided to households, not to each individual. Other living situations include homelessness; group arrangements such as college dormitories, nursing homes, and military quarters; and institutions such as psychiatric units and prisons.

Household

A household is often defined as one or more persons who occupy a single housing unit. Households consist of unrelated persons or persons related by birth, marriage, or adoption.

Average Household Size

By knowing the number of people who live in households and the number of households, we can calculate the average size of households.

$$\frac{\text{Number of persons living in households}}{\text{Total households}} = \frac{10,412,548}{2,165,744} = 4.8$$

In 1992, the average size of a household in Zimbabwe was 4.8 persons.

■   ■   ■

In rural areas of India, the average household contained 5.6 persons in 1991. Average household size varies from as low as 2.1 in Sweden in 1990 to more than 6 in some developing countries.

Family   The definition of family varies by country. In Norway, a single person is regarded as a family. For the country as a whole, nearly half of the families consisted of single persons in 1997. It is important to be aware of such differences in definitions when making comparisons across countries.

Family is usually defined as a group of two or more persons residing together and related by birth, marriage, or adoption. Family households are households maintained by a family, although the household may also contain other unrelated persons.

$$\frac{\text{Number of married-couple families}}{\text{Total family households}} \times K = \frac{53,567,000}{69,594,000} \times 100 = 77.0$$

In 1996, 77 percent of family households in the United States were headed by a married couple.

■ ■ ■

In 1970, 87 percent of U.S. family households consisted of married couples. In 1996, 18 percent of family households were female-headed, up from 11 percent in 1970.

Single-Parent Family   A single-parent family is one in which children are maintained by one parent as a result of a birth outside marriage, divorce, separation, or death of a spouse.

$$\frac{\text{Number of single-parent families}}{\text{Total family households}} \times K = \frac{124,201}{2,052,354} \times 100 = 6.1$$

About 6 percent of family households were maintained by a single parent in 1997 in Norway.

Urbanization and Distribution chapter 11

Urbanization is the increase in the proportion of the population living in urban areas—the process of people moving to cities or other densely settled areas. Population distribution refers to the patterns of settlement and dispersal of population within a country or other area.

Urban

Countries differ in their definitions of urban, although it is fairly common for the urban population to consist of those living in towns and cities of 2,000 or more, especially if the population is largely nonagricultural. In densely populated Japan, the term "urban" refers to areas with populations of 5,000 or more and with a population density of 1,544 or more per square kilometer. In the United States, places with populations of 2,500 or more are considered urban.

Percent Urban

The population living in urban areas can be expressed as a percentage of the area's total population and is a measure of urbanization. Usually the remainder of the population is considered rural, although some countries also have a middle category designated "semiurban."

Urban growth refers to an increase in the physical size of an urban area.

$$\frac{\text{Number living in urban areas}}{\text{Total population}} \times K = \frac{382,447,000}{1,232,084,000} \times 100 = 31.0$$

In 2002, the population of China was 39 percent urban.

■ ■ ■

Singapore was 100 percent urban, while Cuba was 75 percent urban and Rwanda was only 5 percent urban.

Metropolitan Area   A metropolitan area is defined as a large concentration of population, usually an area of 100,000 or more people with an important city at its core plus suburban and "exurban" areas that surround the city and are socially and economically integrated with it.

In 1995, the Seoul metropolitan area had a population of 11,609,000; 10,776,201 in Seoul itself and 832,799 in surrounding, contiguous localities outside the city proper.

Population Density   Population density is usually expressed as the number of people per unit of land area.

$$\frac{\text{Total population}}{\text{Total land area}} = \frac{20,140,000}{329,750} = 61.1$$

In 1995, Malaysia had a population density of 61 persons per square kilometer of land area.

■ ■ ■

By contrast, Singapore had a density of 5,366 persons per square kilometer in 1995, the Netherlands had a population density of 379, and Australia had a population density of 2.

Density figures are often more meaningful if given as population per unit of arable land. For example, in 1995, Egypt had an estimated 62 persons per square kilometer of its total area, but about 2,204 persons per square kilometer of arable land. Other useful density measures are the average number of persons per household or per room—measures that are sometimes used to show crowding.

Population Change   chapter 12

Population change has three components: births, deaths, and migration. As people are born, die, or move, their total numbers in an area change. During most of history, world population increased very slowly, but during the 20th century, this growth accelerated.

The most basic method of calculating numerical population change over time is the "balancing equation," shown below.

The Balancing Equation

$$P_1 + (B - D) + (I - E) = P_2$$

Where P_2 is the population at the later date, P_1 is the population at the earlier date; B is births and D is deaths between the two dates; and I is immigration (or in-migration) and E is emigration (or out-migration) between the two dates.

Jan. 1996 population of Poland	+	(1996 births − 1996 deaths)	+	(1996 immigration − 1996 emigration)	=	Jan. 1997 population of Poland
38,609,400	+	(428,200 − 385,500)	+	(8,200 − 21,000)	=	38,639,300

During 1996, the population of Poland increased by 29,900.

Natural Increase

Natural increase is the surplus (or deficit) of births over deaths in a population in a given time period.

$$NI = B - D$$

Where NI is the natural increase during a period and B is the number of births and D is the number of deaths during that period.

Rate of Natural Increase

The rate of natural increase is the rate at which a population is increasing (or decreasing) in a given year due to a surplus (or deficit) of births over deaths, expressed as a percentage of the base population. This rate does not include the effects of immigration or emigration.

$$\frac{\text{Births in 1996} - \text{Deaths in 1996}}{\text{Total population 1996}} \times K = \frac{429{,}000 - 386{,}000}{38{,}609{,}400} \times 100 = 0.11$$

In 1996, the rate of natural increase in Poland was 0.11 percent.

The rate of natural increase can also be calculated from birth and death rates:

$$\frac{\text{Birth rate} - \text{Death rate}}{10} = \frac{11.1 - 10.0}{10} = 0.11$$

Growth Rate

The growth rate is the rate at which a population is increasing (or decreasing) in a given year due to natural increase and net migration, expressed as a percentage of the base population.

The growth rate takes into account all components of population growth: births, deaths, and migration. It should never be confused with the birth rate (see page 13), but it sometimes is.

$$\frac{\text{Births 1996} - \text{Deaths 1996} \pm \text{Net migration 1996}}{\text{Total population 1996}} \times K = \frac{\begin{array}{r}429{,}000 \\ -386{,}000 \\ -13{,}111\end{array}}{38{,}609{,}400} \times 100 = 0.07$$

In 1996, the annual growth rate in Poland was 0.07 percent.

The growth rate can also be calculated from natural increase and net migration rates:

Rate of natural increase	+	Net migration rate	=	0.11	+	(–0.034)	=	0.08

Birth rates and population growth characteristically fluctuate. A growth rate that is declining does not necessarily mean that an area's population is declining. Rather, it may indicate only that the population is growing at a slower rate. A negative growth rate means that an area is losing population. Today, about a dozen countries, all in Europe, are experiencing a decline in total population, but many countries are experiencing a decline in their rates of population growth.

In 1997, the world's population was growing at an annual rate of 1.4 percent. (To put it another way, each year it was increasing by 14 people per 1,000 population.) At this growth rate, the world increased by nearly 80 million people in 1998.

■   ■   ■

Niger, with a growth rate of 3.5 percent in 2002, had one of the world's highest growth rates. Ukraine's population, on the other hand, was shrinking at an annual rate of -0.8 percent.

Doubling Time

Growth expressed as a percentage is not very descriptive for many purposes. Is a 3 percent growth rate fast or slow? A more vivid way of showing population growth is to calculate how long, at its current growth rate, a population would take to double in size. A country with a constant growth rate of 1 percent would double its population in about 70 years; at 2 percent, in 35 years; at 3 percent, in 23 years.

A quick way to approximate doubling time is to divide 70 by the growth rate expressed as a percent.

$$\frac{70}{\text{Growth rate (\%)}} = \frac{70}{0.08} = 875$$

If its 1996 growth rate of 0.08 percent continued unchanged, Poland would double its population in about 875 years.

With an annual growth rate of 1.4 percent in 2003, the United Arab Emirates would require about 50 years to double its population. Uganda would take 23 years, at 3.0 percent. Belgium, at its present low annual growth rate of 0.1 percent, would take 700 years to double its population.

Doubling time cannot be used to project future population size, because it assumes a constant growth over decades, whereas growth rates change. Nonetheless, calculating doubling time helps provide a picture of just how fast a population is growing at the present time.

The world's population took 130 years to double from 1 billion to 2 billion. It then took only 45 years to double from 2 billion to 4 billion, and with no change in present rates it could foreseeably double from 6 billion in 2003 to almost 13 billion by 2050.

The Demographic Transition

The demographic transition refers to the change that populations undergo from high rates of births and deaths to low rates of births and deaths. High levels of births and deaths kept most populations from growing rapidly throughout most of time. In fact, many populations not only failed to grow but also completely died out when birth rates did not compensate for high death rates. Death rates eventually fell as living conditions and nutrition improved. The decline in mortality usually precedes the decline in fertility, resulting in population growth during the transition period. In Europe and other industrialized countries, death rates fell slowly. With the added benefit of medical advances, death rates fell more rapidly in the countries that began the transition in the 20th century. Fertility rates fell neither as quickly nor as dramatically as death rates, and thus population grew rapidly.

The Demographic Transition

Finland is a good example of a country that has passed through the four stages of the demographic transition.

Stage I

High birth rate, high death rate = little or no growth
(Finland in 1785-1790)
Birth rate: 38 per 1,000
Death rate: 32 per 1,000
Rate of natural increase: 0.6 percent

Stage II

High birth rate, falling death rate = high growth
(Finland in 1825-1830)
Birth rate: 38 per 1,000
Death rate: 24 per 1,000
Rate of natural increase: 1.4 percent

Stage III

Declining birth rate, relatively low death rate = slowed growth
(Finland in 1910-1915)
Birth rate: 29 per 1,000
Death rate: 17 per 1,000
Rate of natural increase: 1.2 percent

Stage IV

Low birth rate, low death rate = very low population growth
(Finland in 1996)
Birth rate: 12 per 1,000
Death rate: 10 per 1,000
Rate of natural increase: 0.2 percent

World Population: Three Alternative Scenarios

This chart shows three possible paths of future population growth.
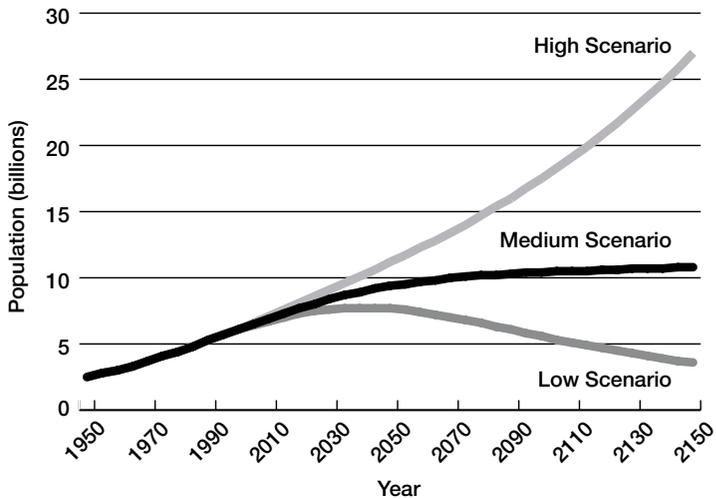
Source: United Nations.

Beyond the Transition

There is a fifth stage to the demographic transition. When fertility falls to very low levels and stays there for a protracted period, a slow rate of population growth can turn into a negative one. Many countries in Europe now have TFRs below the replacement level of about two children per woman. In the late 1990s, the TFRs of Bulgaria, Italy, Spain, the Czech Republic, Latvia, and Russia—all 1.2—were among the world's lowest, and those of several other countries were not far behind.

The limited experience to date shows that declining fertility tends to drop below replacement and (at least so far) to stay there. This fact has become an issue in a number of developed countries and is likely to become an issue in quite a few others. The present population of Ukraine could be cut by one-third by the middle of the next century if current rates continue.

Countries such as France have instituted pro-growth policies with little success, although fertility could have fallen even further without these policies. Many of the factors that lowered fertility in the first place—greater involvement of women in the workplace, a rising cost of living, and preferences in how people want to spend their time—appear to be keeping fertility rates low.

The *high fertility scenario* assumes that total fertility rates (children per woman) will decline to between 2.5 and 2.6 children by 2050. Under this assumption, the world's population would grow to 11.2 billion by 2050, 17.5 billion by 2100, and 27 billion by 2150.

The *medium fertility scenario* assumes that replacement-level fertility (about 2.1 children per woman) will be reached by 2055, and the world's population would stabilize at about 9.4 billion by 2050, 10.4 billion by 2100, and 10.8 billion by 2150. Under this scenario, world population will ultimately stabilize at just under 11 billion around 2200.

The *low fertility scenario* assumes that total fertility rates (children per woman) will eventually stabilize between 1.35 and 1.60. Under this assumption, the world's population would increase to 7.7 billion by 2050 and then begin to decline, dropping to 5.6 billion by 2100 and eventually falling to 3.6 billion by 2150.

None of the three scenarios assumes that fertility rates will remain as high as they are at present. These scenarios are based on United Nations projections released in February 1998.

The needs of an aging population and the limited ability of relatively fewer workers to provide for those needs are important concerns for such populations.

Zero Population Growth

Zero population growth (ZPG) occurs when births plus immigration equals deaths plus emigration. A population at replacement-level fertility is not necessarily at ZPG because of population momentum. A young population will continue to grow for a few generations as the large proportion of youth move into and through their childbearing years.

Historical Perspective

During most of human history, population increased very slowly. It took hundreds of thousands of years for world population to reach 1 billion, in about 1800. At that point, growth began to accelerate as death rates fell. World population reached 2 billion 130 years later, around 1930. It passed the 3 billion mark in 1960 and reached 4 billion only 15 years later, in 1975. World population reached 5 billion in 1987, it reached 6 billion in 1999, and it is expected to reach 9 billion by 2050.

In 2002, the world birth rate was 21 births per 1,000 population, with women averaging about 3.0 children each. The death rate was 9 per 1,000 population; this combination results in a growth rate of 1.2 percent annually. This growth rate was down from a peak of about 2.1 percent in the late 1960s but was still high enough to result in a historically rapid rate of growth. If this rate were to remain constant, the world would reach nearly 37 billion by the year 2150. No one expects this to happen. Long before that point is reached, the growth curve will level off—a result of the birth rate going down, the death rate going up, or some combination of the two (see the figure on page 48).

The characteristics of population growth during the 20th century were unique in world history. At the beginning of this century, the world had fewer than 2 billion people, and at the end it had more than 6 billion people—over 80 percent of them living in developing countries.

What are the effects of such population growth on economic development? Some people argue that population growth and high population density are intrinsically beneficial to modernization and increased productivity. Others believe that the rapid population growth in most developing countries is at the root of their development problems.

What will happen during the 21st century? Will eco-nomic and social development progress more rapidly than population growth? Will the world find that it can support much larger numbers than it does at present? What is known for certain is that an elementary knowl-edge of population will continue to be key to under-standing human behavior and anticipating changes.

There were five international conferences on population in the 20th century. In 1954, population experts met in Rome to ex-change their work. They produced new insights into the conse-quences of population growth and issued a mild warning that population change was imminent. No formal resolutions or rec-ommendations were made, however. In 1965, population experts convened in Belgrade, Yugoslavia, to discuss fertility as a policy issue for development planning. Unprecedented world population growth had spurred closer investigation of the demographic as-pects of development. Yet the advancement of scientific knowl-edge, rather than the development of policy, remained the goal.

In 1974, the first United Nations intergovernmental conference on population was held in Bucharest, Romania. Representatives from 136 nations met and, for the first time, acknowledged the scope and complexity of the world's population issues. Here, the focus shifted from exchanging knowledge to developing policy. Population began to be widely perceived as a major international challenge. At the same time, economic progress was slow and pover-ty rampant in the developing world. Industrialized countries advo-cated programs to control population growth. Developing coun-tries countered that "development is the best contraceptive" and resisted interference from industrialized countries. Despite the con-troversy, delegates drew up the first international document on

population policies and programs. They approved a World Population Plan of Action stating that all couples and individuals have the basic right to decide freely and responsibly the number and spacing of their children and to have the information, education, and means to do so.

In 1984, 149 nations participated in the International Conference on Population, held in Mexico City. Based on research results, the conference revised and extended the 1974 plan.

Representatives from over 180 countries and 1,200 nongovernmental agencies convened in Cairo, Egypt, for the United Nations International Conference on Population and Development (ICPD) in 1994. The consensus was that no single solution would slow population growth. The broader policies to be pursued include responsible economic development; the education and empowerment of women; and high-quality health care, including family planning services. Individual health and well-being and meeting family needs were recognized as crucial to meeting development goals. Delegates adopted a 20-year Programme of Action that provides a broad population policy framework for the 21st century.

Demographic Change

Since the 1974 Bucharest conference, many developing countries have made efforts to improve their economies, provide for the health of their citizens, and increase their support for family planning services. As a result of these and other efforts, TFRs have fallen significantly among developing countries. TFRs in developing countries as a whole (excluding China*) have come down from around 6 children per woman in the 1960s to 3.8 in 1998.

Birth rates in the developing world (again excluding China) fell 31 percent (from 42 births per 1,000 population in the late 1960s to 29 in the late 1990s). However, death rates fell 41 percent during the same period (from 17 to 10). Therefore, the rate of natural increase for these countries declined less dramatically, by 24 percent (from 2.5 percent to 1.9 percent), than did birth rates for the period. In short, the birth rate in developing countries has come down significantly over the past 25 years, while the growth rate has fallen at a slower rate.

Many countries, especially in Europe, are "aging," as sustained declines in fertility coupled with constant or improving life expectancy in the older ages eventually lead to a larger proportion of older persons and a lower proportion of children and adolescents. This results in a rise in the median age of the population.

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* Fertility statistics for the developing countries excluding China provide a more representative picture of the population situation in these countries as a whole. China's fertility (a very low estimated TFR of 1.8) and family planning programs have been quite different from those in other developing countries.

Appendix

- *Sources and Availability of Data*

- *Glossary*

- *Trilingual Thesaurus*

"They must have data on that." How often do we assume that some mysterious "they" have data on whatever subject it is we happen to be researching? Very often, the desired data do exist. But sometimes finding them can be a frustrating and time-consuming project. Defining terms is important. If we want the population sizes of cities, we must stop to think about what we mean by "city." City "proper"? Or metropolitan area? When we ask for the population of Tokyo, we must first decide what we mean by "Tokyo." No matter what data one needs, there may be a statistical table out there with the necessary information. Finding it is another matter.

Demographic data and estimates are drawn primarily from national censuses, demographic surveys, and vital statistics systems. A census is a count of the age and sex of all people in a specified territory at a given time. A census may also collect other demographic, social, and economic information. A survey attempts to describe, as accurately as possible, the demographic aspects of a population by collecting information on a sample of the total population. Vital statistics systems refer to the registration of births, deaths, fetal deaths, marriages, and divorces in a population.

Often, however—especially in developing countries—only one or even none of these sources is available. If data are available, their reliability is often questionable. Because of internal obstacles such as a lack of trained staff, poor transportation in some areas,

and cultural and linguistic barriers, censuses are often incomplete or uneven in their coverage. The results of some censuses have even been rejected outright. And in many developing countries, the reporting of age, an important data item for many purposes, is inaccurate.

Recent decades have seen marked improvement in data quality and availability in developing countries. The worldwide efforts of agencies such as the United Nations Statistics Division in publishing statistical standards and providing technical assistance to national census organizations have resulted in much-improved data or in data for areas where none previously existed. Major programs, including the Demographic and Health Surveys, funded by the U.S. Agency for International Development, have quantified many unknowns in our knowledge of fertility levels and patterns. Still, there are gaps in the world demographic picture.

International demographic data are collected and published by a number of groups or agencies. The *Demographic Yearbook* of the United Nations Statistics Division, produced annually since 1948, provides a wealth of information on population, birth and death rates, life expectancy, city populations, and a variety of census tabulations. The *Demographic Yearbook* also contains valuable technical notes that give definitions and indicators of data quality.

In its biennial *World Population Prospects*, the United Nations Population Division issues a series of demographic estimates and projections from 1950 to 2050. This publication is particularly valuable for its consistent time series of demographic data, which are continuously reassessed as new information is received. More frequent updates are available in the United Nations Statistics Division's *Population and Vital Statistics Report*, a quarterly update of total population, birth, death, and infant mortality rates.

The U.S. Census Bureau also works with international data and issues periodic reports such as its World Population Profile series.

The annual *World Population Data Sheet*, published by the Population Reference Bureau, contains latest population estimates, projections, and other key indicators for 200 countries.

Abortion Rate	The number of abortions per 1,000 women ages 15-44 or 15-49 in a given year.
Abortion Ratio	The number of abortions per 1,000 live births in a given year.
Age-Dependency Ratio	The ratio of persons in the ages defined as dependent (under 15 years and over 64 years) to persons in the ages defined as economically productive (15-64 years) in a population.
Age-Sex Structure	The composition of a population as determined by the number or proportion of males and females in each age category. The age-sex structure of a population is the cumulative result of past trends in fertility, mortality, and migration. Information on age-sex composition is essential for the description and analysis of many other types of demographic data. See also **population pyramid**.
Age-Specific Rate	Rate obtained for specific age groups (for example, age-specific fertility rate, death rate, marriage rate, illiteracy rate, or school enrollment rate).
Aging of Population	A process in which the proportions of adults and elderly increase in a population, while the proportions of children and adolescents decrease. This process results in a rise in the median age of the population. Aging occurs when fertility rates decline while life expectancy remains constant or improves at the older ages.
Antinatalist Policy	The policy of a government, society, or social group to slow population growth by attempting to limit the number of births.
Baby Boom	A dramatic increase in fertility rates and in the absolute number of births in the United States, Canada, Australia, and New Zealand during the period following World War II (1947-1961).
Baby Bust	A rapid decline in U.S. fertility rates to record-low levels during the period immediately after the baby boom.
Balancing Equation	A basic demographic formula used to estimate total population change between two points in time—or to estimate any unknown component of population change, provided that the other components are known. The balancing equation includes all components of population change: births, deaths, immigration, emigration, in-migration, and out-migration.
Birth Control	Practices employed by couples that permit sexual intercourse with reduced likelihood of conception and birth. The term birth control is often used synonymously with such terms as contraception, fertility control, and family planning. But birth control includes abortion to

	prevent a birth, whereas family planning methods explicitly do not include abortion.
Birth Rate (or crude birth rate)	The number of live births per 1,000 population in a given year. Not to be confused with the growth rate.
Birth Rate for Unmarried Women	The number of live births per 1,000 unmarried women (never married, widowed, or divorced) ages 15-49 in a given year.
Brain Drain	The emigration of a significant proportion of a country's highly skilled, highly educated professional population, usually to other countries offering better economic and social opportunity (for example, physicians leaving a developing country to practice medicine in a developed country).
Carrying Capacity	The maximum sustainable size of a resident population in a given ecosystem.
Case Fatality Rate	The proportion of persons contracting a disease who die from it during a specified time period.
Case Rate	The number of reported cases of a specific disease per 100,000 population in a given year.
Cause-Specific Death Rate	The number of deaths attributable to a specific cause per 100,000 population in a given year.
Census	A canvass of a given area, resulting in an enumeration of the entire population and often the compilation of other demographic, social, and economic information pertaining to that population at a specific time. See also **survey**.
Childbearing Years	The reproductive age span of women, assumed for statistical purposes to be 15-44 or 15-49 years of age.
Child-Woman Ratio	The number of children under age 5 per 1,000 women ages 15-44 or 15-49 in a population in a given year. This crude fertility measure, based on basic census data, is sometimes used when more specific fertility information is not available.
Closed Population	A population with no migratory flow either in or out, so that changes in population size occur only through births and deaths.
Cohort	A group of people sharing a common temporal demographic experience who are observed through time. For example, the birth cohort of 1900 is the people born in that year. There are also marriage cohorts, school class cohorts, and so forth.
Cohort Analysis	Observation of a cohort's demographic behavior through life or through many periods; for example, examining the fertility behavior

of the cohort of people born between 1940 and 1945 through their entire childbearing years. Rates derived from such cohort analyses are cohort measures. Compare with **period analysis.**

Completed Fertility Rate	The number of children born per woman to a cohort of women by the end of their childbearing years.
Consensual Union	Cohabitation by an unmarried couple for an extended period of time. Although such unions may be quite stable, they are not regarded as legal marriages in official statistics.
Crude Rate	Rate of any demographic event computed for an entire population.
Death Rate (or crude death rate)	The number of deaths per 1,000 population in a given year.
Demographic Transition	The historical shift of birth and death rates from high to low levels in a population. The decline of mortality usually precedes the decline in fertility, thus resulting in rapid population growth during the transition period.
Demography	The scientific study of human populations, including their sizes, compositions, distributions, densities, growth, and other characteristics, as well as the causes and consequences of changes in these factors.
Dependency Ratio	The ratio of the economically dependent part of the population to the productive part; arbitrarily defined as the ratio of the elderly (ages 65 and older) plus the young (under age 15) to the population in the "working ages" (ages 15-64).
Depopulation	The state of population decline.
Divorce Rate (or crude divorce rate)	The number of divorces per 1,000 population in a given year.
Doubling Time	The number of years required for the population of an area to double its present size, given the current rate of population growth.
Emigration	The process of leaving one country to take up permanent or semipermanent residence in another.
Emigration Rate	The number of emigrants departing an area of origin per 1,000 population in that area of origin in a given year.
Ethnicity	The cultural practices, language, cuisine, and traditions—not biological or physical differences—used to distinguish groups of people.
Family	Usually two or more persons living together and related by birth, marriage, or adoption. Families may consist of siblings or other relatives as well as married couples and any children they have.

Family Planning	The conscious effort of couples to regulate the number and spacing of births through artificial and natural methods of contraception. Family planning connotes conception control to avoid pregnancy and abortion, but it also includes efforts of couples to induce pregnancy.
Fecundity	The physiological capacity of a woman to produce a child.
Fertility	The actual reproductive performance of an individual, a couple, a group, or a population. See **general fertility rate**.
General Fertility Rate	The number of live births per 1,000 women ages 15-44 or 15-49 years in a given year.
Gross Reproduction Rate (GRR)	The average number of daughters that would be born alive to a woman (or group of women) during her lifetime if she passed through her childbearing years conforming to the age-specific fertility rates of a given year. See also **net reproduction rate** and **total fertility rate**.
Growth Rate	The number of persons added to (or subtracted from) a population in a year due to natural increase and net migration expressed as a percentage of the population at the beginning of the time period.
Household	One or more persons occupying a housing unit.
Illegal Alien (sometimes called undocumented alien)	A foreigner who has entered a country without inspection or without proper documents, or who has violated the terms of legal admission to the country, for example, by overstaying the duration of a tourist or student visa.
Immigration	The process of entering one country from another to take up permanent or semipermanent residence.
Immigration Rate	The number of immigrants arriving at a destination per 1,000 population at that destination in a given year.
Incidence Rate	The number of persons contracting a disease per 1,000 population at risk, for a given period of time.
Infant Mortality Rate	The number of deaths of infants under age 1 per 1,000 live births in a given year.
In-migration	The process of entering one administrative subdivision of a country (such as a province or state) from another subdivision to take up residence.
Life Expectancy	The average number of additional years a person could expect to live if current mortality trends were to continue for the rest of that person's life. Most commonly cited as life expectancy at birth.

Life Span	The maximum age that human beings could reach under optimum conditions.
Life Table	A tabular display of life expectancy and the probability of dying at each age (or age group) for a given population, according to the age-specific death rates prevailing at that time. The life table gives an organized, complete picture of a population's mortality.
Malthus, Thomas R. (1766-1834)	English clergyman and economist famous for his theory (expounded in the "Essay on the Principle of Population") that the world's population tends to increase faster than the food supply and that unless fertility is controlled (by late marriage or celibacy), famine, disease, and war must serve as natural population restrictions. See **neo-Malthusian**.
Marital Fertility Rate	Number of live births to married women per 1,000 married women ages 15-44 or 15-49 in a given year.
Marriage Rate (or crude marriage rate)	The number of marriages per 1,000 population in a given year.
Maternal Mortality Ratio	The number of women who die as a result of pregnancy and childbirth complications per 100,000 live births in a given year.
Mean Age	The mathematical average age of all the members of a population.
Median Age	The age that divides a population into two numerically equal groups; that is, half the people are younger than this age and half are older.
Megalopolis	A term denoting an interconnected group of cities and connecting urbanized bands.
Metropolitan Area	A large concentration of population, usually an area with 100,000 or more people. The area typically includes an important city with 50,000 or more inhabitants and the administrative areas bordering the city that are socially and economically integrated with it.
Migration	The movement of people across a specified boundary for the purpose of establishing a new or semipermanent residence. Divided into international migration (migration between countries) and internal migration (migration within a country).
Mobility	The geographic movement of people.
Morbidity	The frequency of disease, illness, injuries, and disabilities in a population.
Mortality	Deaths as a component of population change.
Natality	Births as a component of population change.

Natural Increase (or Decrease)	The surplus (or deficit) of births over deaths in a population in a given time period.
Neo-Malthusian	An advocate of restricting population growth through the use of birth control. (Thomas Malthus himself did not advocate birth control as a remedy for rapid population growth.)
Neonatal Mortality Rate	The number of deaths to infants under 28 days of age in a given year per 1,000 live births in that year.
Net Migration	The net effect of immigration and emigration on an area's population in a given time period, expressed as an increase or decrease.
Net Migration Rate	The net effect of immigration and emigration on an area's population, expressed as an increase or decrease per 1,000 population of the area in a given year.
Net Reproduction Rate (NRR)	The average number of daughters that would be born to a woman (or a group of women) if she passed through her lifetime conforming to the age-specific fertility and mortality rates of a given year. This rate is similar to the gross reproduction rate but takes into account that some women will die before completing their childbearing years. An NRR of one means that each generation of mothers is having exactly enough daughters to replace itself in the population. See also **total fertility rate** and **replacement-level fertility**.
Nuptiality	The frequency, characteristics, and dissolution of marriages in a population.
"Old" Population	A population with a relatively high proportion of middle-age and elderly persons, a high median age, and thus a lower growth potential.
Out-migration	The process of leaving one subdivision of a country to take up residence in another.
Parity	The number of children previously born alive to a woman; for example, "two-parity women" are women who have had two children and "zero-parity women" have had no live births.
Perinatal Mortality Rate	The number of fetal deaths after 28 weeks of pregnancy (late fetal deaths) plus the number of deaths to infants under 7 days of age per 1,000 live births.
Period Analysis	Observation of a population at a specific period of time. Such an analysis in effect takes a "snapshot" of a population in a relatively short time period—for example, one year. Most rates are derived from period data and therefore are period rates. Compare to **cohort analysis**.
Population	A group of objects or organisms of the same kind.

Population Control	A broad concept that addresses the relationship between fertility, mortality, and migration, but is most commonly used to refer to efforts to slow population growth through action to lower fertility. It should not be confused with family planning. See also **family planning**.
Population Density	Population per unit of land area; for example, persons per square mile or persons per square kilometer of arable land.
Population Distribution	The patterns of settlement and dispersal of a population.
"Population Explosion" (or "Population Bomb")	Expressions used to describe the 20th century worldwide trend of rapid population growth, resulting from a world birth rate much higher than the world death rate.
Population Increase	The total population increase resulting from the interaction of births, deaths, and migration in a population in a given period of time.
Population Momentum	The tendency for population growth to continue beyond the time that replacement-level fertility has been achieved because of the relatively high concentration of people in the childbearing years.
Population Policy	Explicit or implicit measures instituted by a government to influence population size, growth, distribution, or composition.
Population Projection	Computation of future changes in population numbers, given certain assumptions about future trends in the rates of fertility, mortality, and migration. Demographers often issue low, medium, and high projections of the same population, based on different assumptions of how these rates will change in the future.
Population Pyramid	A bar chart, arranged vertically, that shows the distribution of a population by age and sex. By convention, the younger ages are at the bottom, with males on the left and females on the right.
Population Register	A government data collection system in which the demographic and socioeconomic characteristics of all or part of the population are continuously recorded. Denmark, Sweden, and Israel are among the countries that maintain universal registers for demographic purposes—recording the major events (birth, marriage, moves, death) that happen to each individual so that up-to-date information on the whole population is readily available. Other countries, like the United States, keep partial registers, such as social security and voter registration, for administrative purposes.
Postneonatal Mortality Rate	The annual number of deaths of infants ages 28 days to 1 year per 1,000 live births in a given year.

Prevalence Rate	The number of persons having a particular disease at a given point in time per 1,000 population at risk.
Pronatalist Policy	The policy of a government, society, or social group to increase population growth by attempting to raise the number of births.
"Push-Pull" Hypothesis	A migration theory that suggests that circumstances at the place of origin (such as poverty and unemployment) repel or push people out of that place to other places that exert a positive attraction or pull (such as a high standard of living or job opportunities).
Race	Race is defined primarily by society, not by genetics, and there are no universally accepted categories.
Rate of Natural Increase (or Decrease)	The rate at which a population is increasing (or decreasing) in a given year due to a surplus (or deficit) of births over deaths, expressed as a percentage of the base population.
Remarriage Rate	The number of remarriages per 1,000 formerly married (that is, widowed or divorced) men or women in a given year.
Replacement-Level Fertility	The level of fertility at which a couple has only enough children to replace themselves, or about two children per couple.
Reproductive Age	See **childbearing years**.
Reproductive Health	Reproductive health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and to its functions and processes.
Sex Ratio	The number of males per 100 females in a population.
Social Mobility	A change in status (for example, an occupational change).
Stable Population	A population with an unchanging rate of growth and an unchanging age composition as a result of age-specific birth and death rates that have remained constant over a sufficient period of time.
Survey	A canvass of selected persons or households in a population usually used to infer demographic characteristics or trends for a larger segment or all of the population. See also **census**.
Survival Rate	The proportion of persons in a specified group (age, sex, or health status) alive at the beginning of an interval (such as a five-year period) who survive to the end of the interval.

Total Fertility Rate (TFR)	The average number of children that would be born alive to a woman (or group of women) during her lifetime if she were to pass through her childbearing years conforming to the age-specific fertility rates of a given year. This rate is sometimes stated as the number of children women are having today. See also **gross reproduction rate** and **net reproduction rate**.
Urban	Countries differ in the way they classify population as "urban" or "rural." Typically, a community or settlement with a population of 2,000 or more is considered urban. A listing of country definitions is published annually in the United Nations *Demographic Yearbook.*
Urbanization	Growth in the proportion of a population living in urban areas.
Vital Statistics	Demographic data on births, deaths, fetal deaths, marriages, and divorces.
"Young" Population	A population with a relatively high proportion of children, adolescents, and young adults; a low median age; and thus a high growth potential.
Zero Population Growth (ZPG)	A population in equilibrium, with a growth rate of zero, achieved when births plus immigration equal deaths plus emigration.

Trilingual Thesaurus of Selected Demographic Terms

Spanish	English	French
Tasa de abortos	Abortion rate	Taux d'avortement
Razón de abortos	Abortion ratio	Rapport d'avortement
Razón (relación) de dependencia por edad	Age-dependency ratio	Rapport de dépendance en fonction de l'âge
Tasa por edad	Age-specific rate	Taux par âge
Ecuación compensadora	Balancing equation	Equation d'équilibre
Tasa de natalidad	Birth rate	Taux de natalité
Tasa de natalidad ilegítima	Births Outside Marriage	Taux d'illégitimité
Tasa de letalidad	Case fatality rate	Taux de létalité
Tasa de casos	Case rate	Taux de cas
Tasa de mortalidad por causas	Cause-specific death rate	Taux de mortalité par cause
Censo	Census	Recensement
Razón (relación) niños-mujeres	Child-woman ratio	Rapport enfants-femmes
Edad reproductiva	Childbearing age	Age de procréation
Análisis de cohorte	Cohort analysis	Analyse de cohorte
Tasa final de fecundidad	Completed fertility rate	Taux de descendance finale
Tasa bruta	Crude rate	Taux brut
Tasa de mortalidad	Death rate	Taux de mortalité
Demografía	Demography	Démographie

Spanish	English	French
Tasa de divorcio	Divorce rate	Taux de divorce
Tiempo de duplicación	Doubling time	Temps de doublement
Emigración	Emigration	Emigration
Tasa de emigración	Emigration rate	Taux d'émigration
Crecimiento exponencial	Exponential growth	Croissance exponentielle
Planificación familiar	Family planning	Planification de la famille
Fertilidad	Fecundity	Fertilité
Fecundidad	Fertility	Fécondité
Tasa general de fecundidad (tasa de fecundidad)	General fertility rate	Taux général de fécondité (taux de fécondité)
Tasa bruta de reproducción	Gross reproduction rate	Taux brut de reproduction
Tasa de crecimiento	Growth rate	Taux de croissance
Extranjero ilegal	Illegal alien	Etranger en situation illégale
Inmigración	Immigration	Immigration
Tasa de inmigración	Immigration rate	Taux d'immigration
Inmigración interna	In-migration	Immigration interne
Tasa de incidencia	Incidence rate	Taux d'incidence
Tasa de mortalidad infantil	Infant mortality rate	Taux de mortalité infantile
Esperanza de vida	Life Expectancy	Espérance de vie
Longevidad	Life span	Longévité

Spanish	English	French
Tabla de mortalidad	Life table	Table de mortalité
Tasa de fecundidad conyugal	Marital fertility rate	Taux de fécondité maritale
Tasa de nupcialidad	Marriage rate	Taux de mariage
Tasa de mortalidad materna	Maternal mortality rate	Taux de mortalité maternelle
Edad media	Mean age	Age moyen
Edad mediana	Median age	Age médian
Migración	Migration	Migration
Movilidad	Mobility	Mobilité
Morbilidad	Morbidity	Morbidité
Mortalidad	Mortality	Mortalité
Natalidad	Natality	Natalité
Crecimiento natural	Natural increase	Accroissement naturel
Crecimiento negativo de la población	Negative population growth	Croissance de population négative
Tasa de mortalidad neonatal	Neonatal mortality rate	Taux de mortalité néonatale
Migración neta	Net migration	Migration nette
Tasa neta de migración	Net migration rate	Taux net de migration
Tasa neta de reproducción	Net reproduction rate	Taux net de reproduction
Nupcialidad	Nuptiality	Nuptialité
Población vieja	Old population	Population vieille

Spanish	English	French
Población óptima	Optimum population	Population optimum
Emigración interna	Out-migration	Emigration interne
Paridad	Parity	Parité
Tasa de mortalidad perinatal	Perinatal mortality rate	Taux de mortalité périnatale
Análisis en un período	Period analysis	Analyse transversale
Población	Population	Population
Densidad de población	Population density	Dénsité de population
Distribución de la población	Population distribution	Répartition de la population
Aumento de la población	Population increase	Accroissement de la population
Ímpetu demográfico	Population momentum	Elan démographique
Política de población	Population policy	Politique en matière de population
Proyección de la población	Population projection	Projection de la population
Pirámide (histograma) de la población	Population pyramid	Pyramide des âges
Registro de la población	Population register	Registre de population
Tasa de mortalidad post-neonatal	Postneonatal mortality rate	Taux de mortalité post-néonatale
Tasa de prevalencia	Prevalence rate	Proportion de malades
Política pronatalista	Pronatalist policy	Politique pro-nataliste
Tasa de aumento natural	Rate of natural increase	Taux d'accroissement naturel
Fecundidad a nivel de reemplazo	Replacement level fertility	Fécondité de remplacement (ou renouvellement)

Spanish	English	French
Razón por sexo	Sex ratio	Rapport de masculinité
Población estable	Stable population	Population stable
Normalización	Standardization	Normalisation
Población estacionaria	Stationary population	Population stationnaire
Encuesta	Survey	Enquête
Probabilidad de supervivencia	Survival rate	Taux de survie
Tasa global de fecundidad (tasa total)	Total fertility rate	Indice synthétique de fécondité
Zona urbana	Urban area	Zone urbaine
Urbanización	Urbanization	Urbanisation
Estadísticas vitales	Vital statistics	Statistiques d'état civil
Población joven	Young population	Population jeune
Crecimiento nulo de la población	Zero population growth	Croissance zéro de population

World Population Data Sheet

PRB's *World Population Data Sheet*, published annually, contains the latest population estimates, projections and other key indicators for 200 countries, including births, deaths, natural increase, infant mortality, total fertility, life expectancy, urban population, HIV/AIDS prevalence, contraceptive use, GNI PPP per capita, land area, and population per square mile. ($4.50)

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