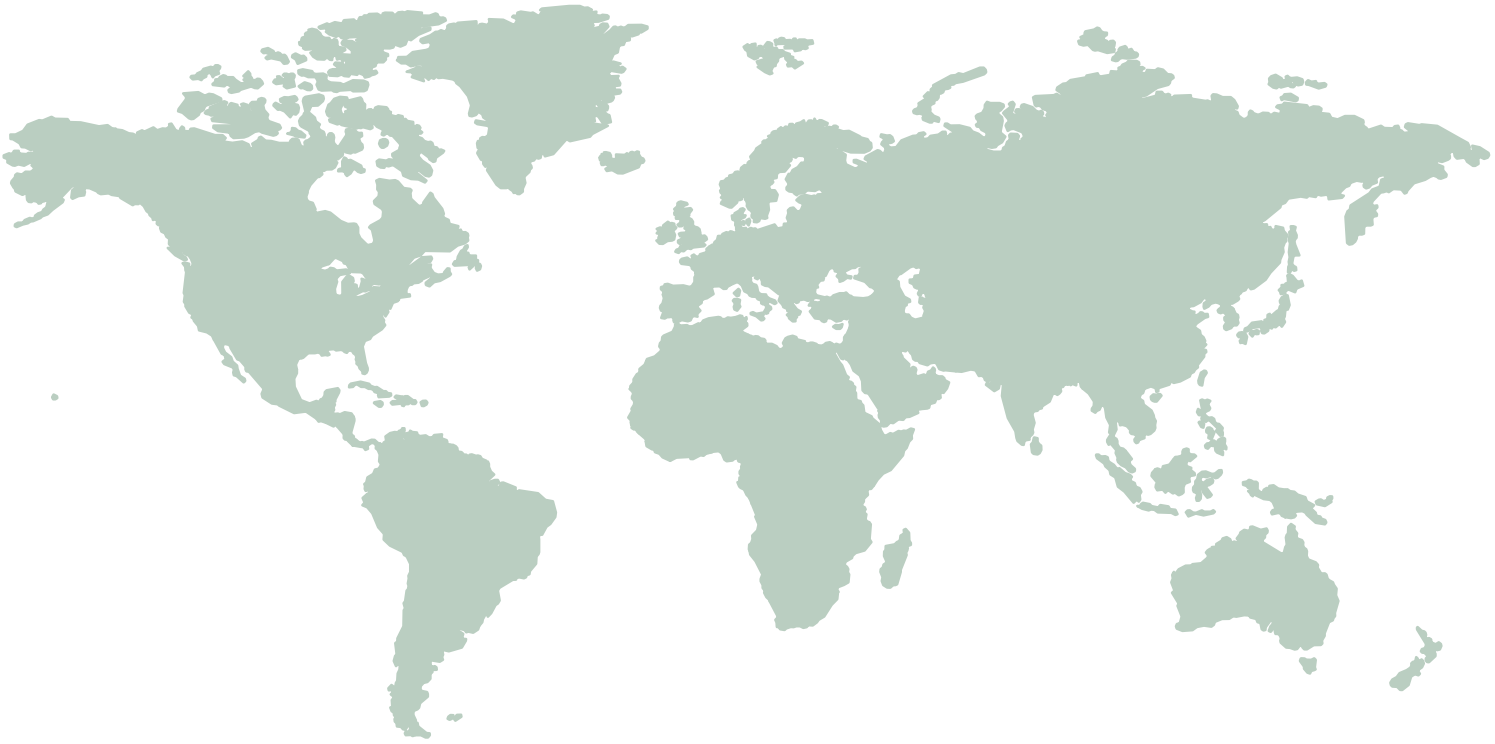
Appendix B

Population Projections and Availability of Data



Appendix B
Population Projections and Availability of Data

Making Population Projections

While actually making a population projection is a routine application of a computer program, the complexity of the undertaking lies in the derivation of the input data. Gathering the base data, ensuring that they are of adequate quality, adjusting them as necessary using demographic techniques, and assessing their comparability among countries are all activities that ensure the success of the projection process. Once the base estimates are derived, the researcher also must make reasonable and consistent assumptions about the future course of fertility, mortality, and international migration. Regional and world populations are obtained by first projecting each country population separately and then combining the results to derive aggregated totals. This section (adapted from Arriaga and Associates 1995) briefly summarizes the process of preparing population projections by the cohort component method.

The Cohort Component Method

The cohort component population projection method follows each cohort of people of the same age throughout its lifetime according to its exposure to mortality, fertility, and migration. Starting with a base population by sex and age, the population at each specific age is exposed to the chances of dying as determined by projected mortality levels and patterns by sex and age. Once deaths are estimated, they are subtracted from the population, and those surviving become older. Fertility rates are projected and applied to the female population in childbearing ages to estimate the number of births every year. Each cohort of children born is also followed through time by exposing it to mortality. Finally, the component method takes into account any in-migrants who are incorporated into the population and out-migrants who leave the population. Migrants are added to or subtracted from the population at each specific age. The whole procedure is repeated for each year of the projection period, resulting in the projected population by age and sex, as well as birth and death rates, rates of natural increase, rates of population growth, and other summary measures of fertility, mortality, and migration for each year.

Base Data on Population

For many developed countries, base data on population are taken from population registers or are current official estimates prepared by national statistical offices based on a census for an earlier year. For developing countries, the base population for a projection is taken from the latest census, generally since 1980. However, census enumerations are not perfect, and reported data on a population age and sex structure may be affected by age misreporting and by underenumeration of persons in certain ages. If the projection starts with errors in the base year, such errors will be carried throughout the projection period and will have an impact on the projected number of births as well.

Consequently, before being accepted to serve as a base for the projections, a population must be evaluated to detect errors and adjusted as necessary to correct them. Various methods have been developed to detect age misreporting, including analysis of digit preference, age ratios, and sex ratios. Techniques have been developed for making any needed corrections. Depending on the country-specific data problems, slight smoothing or strong smoothing techniques may be recommended. The base population age and sex structures for most developing countries in this report are at least slightly smoothed for the population ages 10 years and over.

Special attention is given to possible underenumeration of the youngest age groups, 0 to 4 years and 5 to 9 years, because errors in these ages may have a significant impact on the total projection. Suppose, for example, that children ages 0 to 4 years were undercounted in the base population. In the projection, not only would the surviving cohorts of these children be smaller than they should be, but when the female cohorts reached reproductive ages, the number of births they had would also be underestimated. The completeness of enumeration of these youngest age groups is evaluated by checking for consistency between the number counted and the estimated levels of fertility and mortality during the 10-year period prior to the census date, as children of these ages represent the survivors of births during that period.

Base Data on Mortality

When vital registration data are available and complete (which is usually the case only in developed countries), it is easy to construct life tables using microcomputer programs, and to thereby derive both a level and an age pattern of mortality suitable for the projection process. For most developing countries, however, it is necessary to estimate mortality some other way. Various techniques have

been developed to evaluate and correct information on deaths by sex and age in relation to information on population. Data on deaths may be provided not only in vital statistics registers, but also in surveys or censuses that include questions concerning deaths during a specific period of time; for example, deaths of any household members during the past year. If registered deaths can be evaluated and adjusted for errors, they can be used to obtain valuable information about the level and pattern of mortality.

There are several techniques[7] for estimating underregistration of deaths. Some of them are based on the assumption that the population is "stable." A stable population is one in which there has been no migration, and neither fertility nor mortality has changed in the past. Other techniques, developed more recently, do not require the assumption of stability. Some methods[8] may be applied to estimate mortality during the first years of life. They are based on data on children ever born and children surviving, by age of mother.

Like mortality in infancy and childhood, mortality in adult ages can be estimated indirectly when reliable data are not available to measure it directly. Two principal techniques have been developed to estimate adult mortality based on information collected in censuses or surveys. They are the orphanhood technique, based on the number of persons whose mother or father has died, and the widowhood technique, based on the number of persons whose first spouse has died. Both provide an estimate of survivorship levels between two adult ages for a period of time prior to the year of data collection. However, these techniques are seldom used for the base mortality patterns of the projections in this report because the reference period to which the estimated mortality pertains is not well defined.

Base Data on Fertility

As in the case of mortality, procedures for estimating fertility depend on the availability of data and on the detail of the information. For cases where vital registration is complete, fertility can be measured directly using classical procedures. Most developing countries, however, do not have reliable vital statistics, and so techniques have been developed to measure fertility indirectly based on census or survey information.

Using the age structure of the population, the crude birth rate is sometimes estimated by the rejuvenation technique, in which the population at the youngest ages is "reverse survived" to determine the number of births from which they are survivors. This technique is attractive because it does not require the collection of any data related specifically to fertility. However, the reliability of the estimate depends on the quality of both the census data on age and the survival ratios used for the rejuvenation.

Under certain circumstances, census data by age can be used to obtain not only a crude birth rate but age-specific fertility rates as well. This is done by using the own-children technique based on information on children and women by single years of age. This technique requires data linking individual children to their natural mothers.

Other techniques, such as the Rele technique, use census data by age to calculate the net reproduction rate or total fertility rate based on the relationship of children of specified ages to the number of women in childbearing ages.

Finally, and most importantly for many developing countries, many censuses and surveys include questions related specifically to fertility; for example, the number of children women have had and whether they had a birth in the year preceding the inquiry. Responses to such questions can be used to estimate fertility indirectly. Some techniques to do this include the P/F (Parity/Fertility) ratio developed by Brass, based on the average number of children ever born to women in 5-year age groups and women's age pattern of fertility derived from births in the year preceding the census or survey; the P1/F1 ratio technique, also developed by Brass, based on first births only; and the Arriaga technique, which is similar to the P/F ratio technique but links data for more than one date. All of these methods can be used to estimate the age-specific fertility rates required for making component population projections.

Base Data on International Migration

Although migration is sometimes an important component of population change, it is not generally well recorded except in some European countries, such as Sweden and the Netherlands, that maintain complete and detailed population registers. Some countries collect information on arrivals and departures of passengers at the official borders of the national territory, but such data are seldom processed in such a way as to render them useful for statistical purposes. Even in countries with otherwise excellent statistical systems, information on international migration is often unreliable.

[7] For example, the Coale-Preston technique, the growth balance technique developed by Brass, and the Bennett-Horiuchi technique.

[8] For example, the Brass technique and modifications developed by Trussell, Sullivan, and Feeney; the Palloni-Heligman technique, and the Johnson technique.

The primary source of information on immigration for purposes of population projections is census data on place of birth of the foreign-born population. To detect emigration as well, in order to calculate the net movement in or out of a country, it is necessary to find data for the countries in which the emigrants have settled (since they are the foreign immigrants of that country). In addition, special migration flows, such as refugee movements, are incorporated by considering reported numbers of refugees from the United Nations High Commissioner on Refugees, country sources, and media reports. Thus, most data on international migration are educated guesses at best, especially since not only total numbers but also age and sex distributions of the migrants are required for the projection process.

Assumptions About the Future

Once levels of mortality, fertility, and migration have been determined for the base year of the projection, each component must be projected into the future. Although the procedure for doing this is mechanical, careful attention must be paid in determining projected levels, trends, and patterns by age. Not only must the assumptions be appropriate for the particular country in question, but consistent assumptions must be made when projections are being carried out for more than one country.

An expected increase in contraceptive prevalence is implicit in the assumptions about future fertility declines for most developing country projections. For many developed countries, future fertility levels are projected to experience only minor change, either slight decreases, or in some cases, slight increases.

In general, mortality is expected to continue to decline in most countries, as development and health advances continue. A particular exception relates to the impact that acquired immune deficiency syndrome (AIDS) will have on the mortality of some countries, where mortality levels in the next decades are expected to increase. (For a description of the method used to incorporate the impact of AIDS mortality on selected populations, see the next section of this appendix.) While there is no single "right" way to make assumptions about the future, the following procedures are those recommended and generally used by the Bureau of the Census for the projections presented in this report.

Projecting Mortality and Fertility

The first step is usually to assign a target level of life expectancy at birth and total fertility rate for some intermediate year in the future or the last year of the projection period. Next, a trend of these measures is determined for the period between the base year and the last year. Then, an age and sex pattern of mortality and a female age pattern of fertility are determined for each projected level of life expectancy and total fertility rate, respectively.

In setting target levels for both mortality and fertility, available data on past trends are taken into consideration. If estimates are available for more than one date in the past, a logistic function can be fitted to these data, since this function approximates expected changes in life expectancy at birth and total fertility rate. The results of the logistic function must be carefully scrutinized, however, to ensure that they yield an acceptable future target for the individual country circumstances.

Recent population and socioeconomic trends and policies of each country are taken into account to determine if the projected trends are plausible. For example, for mortality, information concerning programs of public health are considered in judging the results. For fertility, factors such as trends in age at marriage, the proportion of women using contraception, the strength of family planning programs, and any foreseen changes in women's educational attainment or in their labor force participation in the modern economic sector are considered.

In some instances, no data on past trends are available to which a logistic curve can be fitted. In such circumstances, life expectancies can be projected based on increases related to the general level of mortality. The United Nations has recommended such increases based on countries with available data. For fertility, when trend data are not available for estimating future changes using a logistic function, the past experience of other countries serves as a guideline to determine the pace of future change.

Once levels of life expectancy at birth and total fertility rate have been set for the base year and some future year or the last year of the projection, a logistic function is often used to determine the trend. For developed countries with little expected change in fertility, intermediate levels are often determined linearly rather than logistically.

The next task is to determine an age pattern of mortality and fertility for each of the projected values, since these patterns tend to vary as overall levels change. For each level of projected life expectancy at birth, a set of central death rates is estimated using an iterative interpolation process. The interpolation is logarithmic and uses a set of central death rates for the base year and a "limit" set of rates with

very low mortality. Life tables constructed with the interpolated rates correspond to the life expectancies at birth projected previously. Age-specific fertility rates for each projected level of total fertility rate are interpolated between the set for the base year and "model" sets derived from empirical data for populations at various levels of total fertility.

Once mortality and fertility have been tentatively projected for each country according to its particular circumstances, the estimates are compared with projected values for other countries in the same region and with those for other regions. Differences are evaluated to make sure they exist for valid reasons that can be explained by known peculiarities of the particular countries.

Finally, in recent years the Bureau of the Census has concluded that distinctive mortality assumptions must be made for selected countries in this report because of the death risk due to AIDS. Using methodology that takes into account the effect of AIDS, country projections have been prepared that assess its impact on future populations in countries where the infection is significant.

Projecting International Migration

Assumptions about future migration are generally much more speculative than assumptions about fertility and mortality. International migration may occur as a result of changing economic conditions, or as a result of political unrest, persecutions, famines, and other extreme conditions in the countries of origin. Thus, individuals may feel rejected by stagnated economies and attracted by industrialized societies, or refugees may flee in large numbers looking for better or more stable lives elsewhere.

Due to the unpredictability of conditions such as crop failure, emerging violence, and bellicose activities, migration forecasts are subject to large errors. If migration is known to have a negligible impact on a country's current growth rate, future migration is often assumed to be nil. If a country's migration is known to be significant, the estimated number of migrants during the past is frequently held constant in projecting to the near future. Projected migration is usually assumed to diminish, reaching zero at some year in the medium- to long-term future. The age and sex composition of international migrants depends on the situation in each country. If information is not available, model patterns by age and sex are sometimes used.

Regional and World Aggregations

As new data are obtained, population projections are updated and published biennially in the *World Population Profile* series.[9] The national projections presented in this report were updated for any country for which significant new information was received since the preparation of the previous profile. For most countries, the cutoff for receipt of new information was September 1995.

Due to the differing nature of the base data for each country, there is no standard starting date for each country's projection. The projection period for a few countries started as recently as 1990 when the base information was current to that date. In contrast, the projection period for many African countries (and a few countries in other regions as well) started as long ago as the 1970's, or even before, although information for a later date on one or more of the variables may have been taken into account for the early years of the projection. "New" information for such a country may pertain to 1980 as opposed to a 1970 figure available for the previous round. Thus, total populations in the revised projections may change for any year in the past.

When the projected population for any individual country changes, so does the aggregated total for the corresponding region and for the world. New aggregations are made for world regions and world totals, combining the latest projected data for all countries, and superseding previously projected world and regional totals given in previous reports.

The differing starting dates complicate aggregations not only of total population but of vital rates and other measures as well. For this reason, regional and global aggregations of crude birth and death rates, life expectancy at birth, infant mortality rates, and age-sex distributions of the population generally can be presented only for the latest year for which all countries have a projected estimate for each variable. In this report, such measures are usually shown for 1996.

Population Projections Incorporating AIDS

Background

Although it has been clear for a number of years that mortality estimates and projections for many countries would have to be revised due to AIDS mortality, the lack of accurate empirical data on AIDS deaths, the paucity of data on HIV infection among the general population, and the absence of tools to project the impact of AIDS epidemics into the future have all

[9] Projections are made by the cohort component method for all but 19 small countries or territories with a combined population in 1996 of 1.1 million, or 0.02 percent of the world total. For these small countries, total populations and vital rates are projected, but not age and sex distributions.

hampered these efforts. Although the accuracy of data on AIDS deaths has not substantially improved, knowledge of HIV infection has expanded and modeling tools have become available to project current epidemics into the future.

The methodology used to project AIDS mortality for this report generally follows the method adopted for *World Population Profile: 1994*, with several modifications. The method consists of the following steps:

1. Establish criteria for selecting countries for which AIDS mortality will be incorporated into the projections.

2. For each selected country, determine the empirical epidemic trend and a point estimate of national HIV prevalence.

3. Model the spread of HIV infection and the development of AIDS in the population, generating alternative epidemic scenarios, and produce the seroprevalence rates and AIDS-related age-specific mortality rates which correspond to each epidemic scenario.

4. Use the empirical levels and trends (from step 2) to establish a factor representing each country's position on a continuum between high and low epidemics (from step 3). Use the derived factor to generate a unique interpolated epidemic.

5. Use weighted country total adult seroprevalence to determine an appropriate location on the total country epidemic curve implied by the interpolation factor. This projects adult HIV seroprevalence for the total country.

6. Interpolate AIDS-related mortality rates, by age and sex, associated with the estimated speed and level of HIV from epidemic results for the period 1990 to 2010.

In the sections that follow, each of these steps is described, and the method is illustrated.

Country Selection Criteria

The International Programs Center (Population Division, Bureau of the Census) maintains an HIV/AIDS Surveillance Data Base. This data base is a compilation of aggregate data from HIV seroprevalence studies in developing countries. Currently, it contains over 25,000 data items drawn from nearly 3,200 publications and presentations. As a part of the updating of the data base, new data are reviewed for inclusion into a summary table which, for each country, lists the most recent and best study of seroprevalence levels for high- and low-risk populations in urban and rural areas.[10]

A review of the data in the summary table suggests that a reasonable cut-off point for selection would be countries that have reached 5 percent HIV prevalence among their low-risk urban populations or, based on recent trends, appear to be likely to reach this level in the near future.

A total of 21 countries now meet these criteria for the incorporation of AIDS mortality in the projections. All but two of these countries are in Africa. The countries are:

Botswana	Ethiopia	South Africa
Burkina Faso	Guyana	Tanzania
Burundi	Haiti	Uganda
Cameroon	Kenya	Zaire
Central African Republic	Lesotho	Zambia
	Malawi	Zimbabwe
Congo	Nigeria	
Côte d'Ivoire	Rwanda	

AIDS mortality was incorporated into projections for two other countries, Brazil and Thailand, because some country-specific modeling work had already been completed. The description of the simplified approach taken in these special cases follows that of the more general procedure.

Empirical Epidemic Trends

For each of the 21 countries meeting the selection criteria, we reviewed the HIV seroprevalence information available in the HIV/AIDS Surveillance Data Base to establish urban seroprevalence trends over time (table B-1, cols.1-4) and to identify available rural data points (table B-1, cols. 5-6). The two data points judged to be most representative for the urban low-risk population were identified and used to calculate the annual change between the dates of the two studies. Rural data were used in conjunction with the urban data to establish a total-country seroprevalence estimate (table B-1, col. 7).

[10]High risk includes samples of prostitutes and their clients, sexually-transmitted disease patients, or other persons with known risk factors. Low risk includes samples of pregnant women, volunteer blood donors, or others with no known risk factors. For a more complete description of the selection criteria, see U.S. Bureau of the Census (1995).

Table B-1.
Empirical Seroprevalence Data for Urban and Rural Areas of Selected Countries

Country	Urban pregnant women				Rural adults		Estimated total country (percent)
	Earlier		Later				
	Year	Percent	Year	Percent	Year	Percent	
Botswana	1990	6.0	1993	19.2	1992	7.5	9.5
Burkina Faso	1987	3.1	1991	8.8	1989	4.1	4.5
Burundi	1986	16.3	1992	20.0	1992	1.8	3.1
Cameroon	1990	1.1	1994	5.7	1992	2.6	2.8
Central African Republic	1986	4.7	1993	16.0	1992	1.7	6.4
Congo	1990	7.7	1991	9.0	1990	5.3	6.7
Côte d'Ivoire	1987	8.0	1992	14.8	1989	3.3	6.1
Ethiopia	1988	3.7	1991	6.2	1993	1.8	2.6
Guyana	1990	1.2	1992	2.0	1992	(NA)	2.0
Haiti	1989	8.0	1993	8.5	1990	4.0	5.2
Kenya	1991	13.0	1992	15.0	1993	(NA)	[a]5.7
Lesotho	1992	5.1	1993	6.1	1993	(NA)	5.8
Malawi	1989	18.6	1994	33.0	1993	12.3	14.9
Nigeria	(NA)	(NA)	(NA)	(NA)	1992	(NA)	[b]1.1
Rwanda	1989	23.2	1991	26.7	1991	8.9	9.9
South Africa	1992	3.1	1993	4.7	1993	4.4	4.2
Tanzania	1988	10.6	1992	17.7	1993	7.1	9.7
Uganda	1987	24.0	1992	29.5	1992	7.8	10.4
Zaire	1985	6.9	1991	9.2	1991	2.9	4.7
Zambia	1987	11.6	1993	24.7	1993	13.5	18.3
Zimbabwe	1990	18.0	1993	25.9	1990	(NA)	12.8

(NA) Not available.

[a]Kenya National AIDS Control Program 1994.
[b]Average of Nigerian states' HIV sentinel surveillance program estimates for pregnant women.

Source: Urban and rural data are from the HIV/AIDS Surveillance Database, International Programs Center, U.S. Bureau of the Census, December 1994.

Alternative Scenarios

To project the impact in the selected countries, three alternative epidemic scenarios were developed, corresponding to low, medium, and high-impact AIDS epidemics. These scenarios were developed using iwgAIDS, which is a complex deterministic model of the spread of HIV infection and the development of AIDS in a population. It was developed under the sponsorship of the Interagency Working Group (iwg) on AIDS Models and Methods of the U.S. Department of State (Stanley et al. 1991).

All three of these epidemic scenarios incorporate increasing levels of behavior change in the form of increased condom use. This assumption corresponds to actual changes in behavior that are now beginning to occur in some countries.

Interpolation of a Unique Epidemic

The empirical urban trend from each country was used to interpolate among the three epidemic scenarios to derive an epidemic trend line matching the observed HIV seroprevalence increase between two data points. Thus, both the level and the rate of increase of the urban epidemic were matched through this procedure, resulting in an interpolation factor used in subsequent steps.

Projected Total Seroprevalence

At this point in the estimation procedure, no direct linkage has been made to the total-country prevalence or to a particular calendar year in this country's epidemic. The next step accomplishes these tasks. The total-country adult prevalence estimate (table B-1, col. 7) was matched with the one implied using the interpolation factor. From this comparison, an "offset" figure was calculated, corresponding to the number of years of difference between the start of the epidemics in the three scenarios and the empirical epidemic at the reference date.

AIDS-Related Mortality Rates

Based on the "interpolation factor" and the "offset" described above, AIDS-related age-sex-specific mortality rates (${}_nm_x$ values) at 5-year intervals from 1990 to 2010 were interpolated and added to non-AIDS ${}_nm_x$ values for the same period. Population projections were prepared with the combined ${}_nm_x$ values as input, using the Rural-Urban Projection Program (RUP) of the Bureau of the Census.

The future course of the AIDS pandemic is uncertain, but making projections for affected countries requires that some assumptions be made about AIDS mortality as well as about non-AIDS mortality. For the projections underlying this report, it was assumed that the epidemics in each of the 23 affected countries would peak in 2010, with no further growth in HIV infection after that year. AIDS mortality was assumed to decline from the level reached in 2010 to nil by 2050, thus implying a return to "normal" mortality levels in the latter year. To implement the projection process, life tables for 2050 that assume no AIDS mortality were used.

Non-AIDS ${}_nm_x$ values were derived by making standard assumptions concerning the improvement in mortality conditions as described earlier in this appendix.

The Special Cases of Brazil and Thailand

Modeling activities were also undertaken for Brazil and Thailand with the support of the Interagency Working Group. AIDS epidemics in these two countries have substantial homosexual and intravenous drug use components, while those in Africa do not (WHO/GPA 1993). For Brazil, AIDS-related age-sex-specific mortality rates were estimated from the iwgAIDS model and added directly to the non-AIDS mortality rates previously prepared for the projection program. For Thailand, AIDS-related mortality rates from recent epidemiological and demographic projections (TNESDB 1994) were added to the non-AIDS ${}_nm_x$ values for the 1990 to 2010 period.

Caveats and Limitations

In developing the methodology for these projections, the International Programs Center has attempted to maximize the use of both the empirical data and the modeling tools available. However, there is much that is unknown about the dynamics of AIDS epidemics in countries around the world, and the methodology is necessarily imprecise. As the AIDS pandemic grows, future behavior changes and interventions being implemented in countries around the world may alter the projected course.

What if AIDS epidemics do not peak early in the next century as projected? Will entire populations become infected with HIV and eventually die from AIDS? The simulations used for this report suggest that this will not happen in any population, although population declines are possible with a sustained widespread epidemic. Variations in sexual behavior help to ensure that the majority of the population in countries around the world are not at high risk of HIV infection. With substantial proportions of the population at lower risk of infection, each of the epidemic scenarios displays a definite plateau in HIV seroprevalence after the initial rapid rise.

Recency of Base Data for the Projections

The first two sections of this appendix described methods for evaluating base data and making projections, without reference to the data situations actually encountered in the various countries. This section reviews the availability of data for the current round of projections as presented in this report.

Demographic Data Are More Recent Than in Past Years

This report presents population estimates and projections for 227 countries or areas of the world. Of these 227 countries, 179 have information on fertility pertaining to some date since 1985, 167 countries have recent data on population size and 172 on mortality (tables B-2, B-3 and B-4). In previous publications, it was reported that fertility data were obtained on a more frequent basis than mortality or population data. Currently, however, more recent data have been available on mortality and population size.

Large Discrepancies Found in Recency of Data by Region

Not surprisingly, the more developed countries have the most recent data on population size, fertility, and mortality. All developed countries have data on population size and mortality since 1985, and all except Monaco have fertility data pertaining to 1985 or later that were considered for the projections in this report. Sub-Saharan Africa has the smallest proportion of countries with data for 1985 or later on all topics.

Current Fertility Level Is Known for Over 91 Percent of World's Population

Perhaps more important than the number of countries with recent information on population size, fertility, and mortality is the proportion of the world's population covered by such information.

As seen in table B-3, 91 percent of the world's people live in countries with data on fertility that pertain to 1985 or later. The proportion is higher in North Africa (96 percent), Asia (96 percent), and the regions of North America, Europe and the New Independent States, and Latin America and the Caribbean (100 percent).

With many countries taking censuses during the 1990 round and the rapid processing of results by computer, information on population size is also available for a large portion of the world's population. Eighty-nine percent of the world's people live in countries with at least population totals available for 1985 or later.

For mortality, about 69 percent of the world's population is covered by information since 1985 (table B-4). However, the available mortality data often pertain only to infants and children and not to the adult population. Nearly one-third of the population of the Near East and 21 percent of that of Sub-Saharan Africa live in countries for which we lack reliable mortality data since 1980.

Information on Contraceptive Prevalence

In the population projections presented in this report, information on the prevalence of family planning is not used directly as input in the computer model. Nevertheless, a knowledge of the extent of contraceptive use and the strength of national family planning programs is an important consideration when setting future target levels and age patterns of fertility for the projections.

Recent data on the current use of family planning methods are gathered primarily by surveys such as the DHS program of Macro International, Inc. and the various family health and contraceptive prevalence surveys of the U.S. Centers for Disease Control. In addition, some countries conduct other national surveys, either for the specific purpose of gathering information on family planning or for other purposes, such as collecting data on maternal and child health. These surveys often include questions about contraceptive use.

In contrast to the practice of collecting information on population size, fertility, and mortality, the gathering of data on contraceptive use is a fairly recent phenomenon. Nonetheless, the practice is becoming more widespread, and many of the larger countries in developing regions now provide such data. Of the 171 countries in developing regions, 92 (54 percent) have gathered information on family planning for some date since 1985, and another 13 (8 percent) during the early 1980's (table B-5).

Differences among the regions have narrowed. The proportion of countries with information available for 1985 or later ranges from 59 percent in Sub-Saharan Africa to 66 percent in North Africa. In the developing regions of the Near East, Asia, and Latin America and the Caribbean, just around 60 percent of countries have contraceptive data available for 1985 or later.

It is primarily the larger countries in each region that gather information on contraceptive use, as shown by the larger proportions of populations than of countries covered by available data. Thus, 94 percent of the population in less developed regions is covered by such data since 1985, with the proportions in North Africa and Asia, excluding the Near East, over 95 percent. Even in Sub-Saharan Africa, information on contraceptive use for 1985 or later is available for 84 percent of the population.

Table B-2.
Distribution of Countries and of Population, by Region and Recency of Reliable Data on Population Size

Region	Year of latest data									
	Total	1990-95	1985-89	1980-84	Before 1980 or none	Total	1990-95	1985-89	1980-84	Before 1980 or none
	Number of countries					Midyear population: 1996 (millions)				
WORLD	227	110	57	40	20	5,772	2,909	2,256	480	128
Less Developed Countries	171	63	48	40	20	4,601	2,226	1,768	480	128
More Developed Countries	56	47	9	–	–	1,171	683	488	–	–
AFRICA	57	13	20	16	8	732	225	257	220	30
Sub-Saharan Africa	51	13	17	14	7	594	225	155	190	25
North Africa	6	–	3	2	1	137	–	102	30	5
NEAR EAST	16	4	4	4	4	157	66	27	23	41
ASIA	27	13	7	4	3	3,271	1,660	1,382	194	35
LATIN AMERICA AND THE CARIBBEAN	45	25	4	14	2	489	396	46	42	4
EUROPE AND THE NEW INDEPENDENT STATES	56	41	14	–	1	800	507	276	–	17
Western	28	28	–	–	–	387	387	–	–	–
Eastern	13	13	–	–	–	120	120	–	–	–
New Independent States	15	–	14	–	1	293	–	276	–	17
Baltics	3	–	3	–	–	266	–	266	–	–
Commonwealth of Independent States	12	–	11	–	1	285	–	268	–	17
NORTH AMERICA	5	3	2	–	–	295	29	267	–	–
OCEANIA	21	11	6	2	2	29	27	2	–	(Z)
	Percent distribution of:									
	Number of countries					Population				
WORLD	100	48	25	18	9	100	50	39	8	2
Less Developed Countries	100	37	28	23	12	100	48	38	10	3
More Developed Countries	100	84	16	–	–	100	58	42	–	–
AFRICA	100	23	35	28	14	100	31	35	30	4
Sub-Saharan Africa	100	25	33	27	14	100	38	26	32	4
North Africa	100	–	50	33	17	100	–	74	22	4
NEAR EAST	100	25	25	25	25	100	42	17	15	26
ASIA	100	48	26	15	11	100	51	42	6	1
LATIN AMERICA AND THE CARIBBEAN	100	56	9	31	4	100	81	9	9	1
EUROPE AND THE NEW INDEPENDENT STATES	100	73	25	–	2	100	63	34	–	2
Western	100	100	–	–	–	100	100	–	–	–
Eastern	100	100	–	–	–	100	100	–	–	–
New Independent States	100	–	93	–	7	100	–	94	–	6
Baltics	100	–	100	–	–	100	–	100	–	–
Commonwealth of Independent States	100	–	92	–	8	100	–	94	–	6
NORTH AMERICA	100	60	40	–	–	100	10	90	–	–
OCEANIA	100	52	29	10	10	100	92	6	2	(Z)

– Represents zero.
(Z) Less than 500,000 or less than 0.5 percent.

Table B-3.
Distribution of Countries and of Population, by Region and Recency of Reliable Data on Fertility

Region	Year of latest data									
	Total	1990-95	1985-89	1980-84	Before 1980 or none	Total	1990-95	1985-89	1980-84	Before 1980 or none
	Number of countries					Midyear population: 1996 (millions)				
WORLD	227	137	42	19	29	5,772	4,970	294	282	226
Less Developed Countries	171	84	40	18	29	4,601	3,799	294	282	226
More Developed Countries	56	53	2	1	–	1,171	1,171	(Z)	–	–
AFRICA	57	23	10	12	12	732	308	113	265	45
Sub-Saharan Africa	51	20	9	12	10	594	240	50	265	39
North Africa	6	3	1	–	2	137	68	64	–	6
NEAR EAST	16	11	1	1	3	157	95	2	16	45
ASIA	27	14	5	–	8	3,271	2,995	145	–	131
LATIN AMERICA AND THE CARIBBEAN	45	28	14	2	1	489	454	33	1	1
EUROPE AND THE NEW INDEPENDENT STATES	56	55	–	1	–	800	800	–	–	–
Western	28	27	–	1	–	387	387	–	–	–
Eastern	13	13	–	–	–	120	120	–	–	–
New Independent States	15	15	–	–	–	293	293	–	–	–
Baltics	3	3	–	–	–	266	266	–	–	–
Commonwealth of Independent States	12	12	–	–	–	285	285	–	–	–
NORTH AMERICA	5	3	2	–	–	295	295	(Z)	–	–
OCEANIA	21	3	10	3	5	29	23	1	(Z)	5
	Percent distribution of:									
	Number of countries					Population				
WORLD	100	60	19	8	13	100	86	5	5	4
Less Developed Countries	100	49	23	11	17	100	83	6	6	5
More Developed Countries	100	95	4	2	–	100	100	(Z)	–	–
AFRICA	100	40	18	21	21	100	42	15	36	6
Sub-Saharan Africa	100	39	18	24	20	100	40	8	45	7
North Africa	100	50	17	–	33	100	50	46	–	4
NEAR EAST	100	69	6	6	19	100	60	1	10	28
ASIA	100	52	19	–	30	100	92	4	–	4
LATIN AMERICA AND THE CARIBBEAN	100	62	31	4	2	100	93	7	–	–
EUROPE AND THE NEW INDEPENDENT STATES	100	98	–	2	–	100	100	–	–	–
Western	100	96	–	4	–	100	100	–	–	–
Eastern	100	100	–	–	–	100	100	–	–	–
New Independent States	100	100	–	–	–	100	100	–	–	–
Baltics	100	100	–	–	–	100	100	–	–	–
Commonwealth of Independent States	100	100	–	–	–	100	100	–	–	–
NORTH AMERICA	100	60	40	–	–	100	100	(Z)	–	–
OCEANIA	100	14	48	14	24	100	78	4	1	17

– Represents zero.
(Z) Less than 500,000 or less than 0.5 percent.

Table B-4.
Distribution of Countries and of Population, by Region and Recency of Reliable Data on Mortality

Region	Year of latest data									
	Total	1990-95	1985-89	1980-84	Before 1980 or none	Total	1990-95	1985-89	1980-84	Before 1980 or none
	Number of countries					Midyear population: 1996 (millions)				
WORLD	227	125	47	15	40	5,772	3,665	356	1,361	391
Less Developed Countries	171	71	45	15	40	4,601	2,494	356	1,361	391
More Developed Countries	56	54	2	–	–	1,171	1,171	(Z)	–	–
AFRICA	57	21	10	6	20	732	293	206	100	132
Sub-Saharan Africa	51	19	8	6	18	594	234	134	100	126
North Africa	6	2	2	–	2	137	59	73	–	6
NEAR EAST	16	7	3	2	4	157	85	6	20	47
ASIA	27	11	5	3	8	3,271	1,745	86	1,232	207
LATIN AMERICA AND THE CARIBBEAN	45	24	19	1	1	489	423	57	8	(Z)
EUROPE AND THE NEW INDEPENDENT STATES	56	56	–	–	–	800	800	–	–	–
Western	28	28	–	–	–	387	387	–	–	–
Eastern	13	13	–	–	–	120	120	–	–	–
New Independent States	15	15	–	–	–	293	293	–	–	–
Baltics	3	3	–	–	–	266	266	–	–	–
Commonwealth of Independent States	12	12	–	–	–	285	285	–	–	–
NORTH AMERICA	5	3	2	–	–	295	295	(Z)	–	–
OCEANIA	21	3	8	3	7	29	23	1	1	5
	Percent distribution of:									
	Number of countries					Population				
WORLD	100	55	21	7	18	100	63	6	24	7
Less Developed Countries	100	42	26	9	23	100	54	8	30	8
More Developed Countries	100	96	4	–	–	100	100	(Z)	–	–
AFRICA	100	37	18	11	35	100	40	28	14	18
Sub-Saharan Africa	100	37	16	12	35	100	39	23	17	21
North Africa	100	33	33	–	33	100	43	53	–	4
NEAR EAST	100	44	19	13	25	100	54	4	13	30
ASIA	100	41	19	11	30	100	53	3	38	6
LATIN AMERICA AND THE CARIBBEAN	100	53	42	2	2	100	87	12	2	(Z)
EUROPE AND THE NEW INDEPENDENT STATES	100	100	–	–	–	100	100	–	–	–
Western	100	100	–	–	–	100	100	–	–	–
Eastern	100	100	–	–	–	100	100	–	–	–
New Independent States	100	100	–	–	–	100	100	–	–	–
Baltics	100	100	–	–	–	100	100	–	–	–
Commonwealth of Independent States	100	100	–	–	–	100	100	–	–	–
NORTH AMERICA	100	60	40	–	–	100	100	(Z)	–	–
OCEANIA	100	14	38	14	33	100	78	3	2	17

– Represents zero.
(Z) Less than 500,000 or less than 0.5 percent.

Table B-5.
Distribution of Countries and of Population, by Region and Recency of Reliable Data on Contraceptive Prevalence

Region	Year of latest data									
	Total	1990-95	1985-89	1980-84	Before 1980 or none	Total	1990-95	1985-89	1980-84	Before 1980 or none
	Number of countries					Midyear population: 1996 (millions)				
WORLD	227	74	41	18	94	5,772	4,190	1,071	99	412
Less Developed Countries	171	59	33	13	66	4,601	3,638	668	37	259
More Developed Countries	56	15	8	5	28	1,171	552	404	63	153
AFRICA	57	23	11	3	20	732	445	187	22	77
Sub-Saharan Africa	51	21	9	3	18	594	386	115	22	71
North Africa	6	2	2	–	2	137	59	73	–	6
NEAR EAST	16	4	5	–	7	157	96	27	–	35
ASIA	27	11	6	1	9	3,271	3,029	171	3	68
LATIN AMERICA AND THE CARIBBEAN	45	14	11	4	16	489	122	283	7	77
EUROPE AND THE NEW INDEPENDENT STATES	56	22	6	4	24	800	498	119	34	149
Western	28	4	4	4	16	387	167	107	34	78
Eastern	13	3	2	–	8	120	37	12	–	71
New Independent States	15	15	–	–	–	293	293	–	–	–
Baltics	3	3	–	–	–	266	–	266	–	–
Commonwealth of Independent States	12	12	–	–	–	285	285	–	–	–
NORTH AMERICA	5	–	1	1	3	295	–	266	29	(Z)
OCEANIA	21	–	1	5	15	29	–	18	5	6
	Percent distribution of:									
	Number of countries					Population				
WORLD	100	33	18	8	41	100	73	19	2	7
Less Developed Countries	100	35	19	8	39	100	79	15	1	6
More Developed Countries	100	27	14	9	50	100	47	34	5	13
AFRICA	100	40	19	5	35	100	61	26	3	11
Sub-Saharan Africa	100	41	18	6	35	100	65	19	4	12
North Africa	100	33	33	–	33	100	43	53	–	4
NEAR EAST	100	25	31	–	44	100	61	17	–	22
ASIA	100	41	22	4	33	100	93	5	(Z)	2
LATIN AMERICA AND THE CARIBBEAN	100	31	24	9	36	100	25	58	1	16
EUROPE AND THE NEW INDEPENDENT STATES	100	39	11	7	43	100	62	15	4	19
Western	100	14	14	14	57	100	43	28	9	20
Eastern	100	23	15	–	62	100	31	10	–	59
New Independent States	100	100	–	–	–	100	100	–	–	–
Baltics	100	100	–	–	–	100	–	100	–	–
Commonwealth of Independent States	100	100	–	–	–	100	100	–	–	–
NORTH AMERICA	100	–	20	20	60	100	–	90	10	(Z)
OCEANIA	100	–	5	24	71	100	–	63	16	21

– Represents zero.
(Z) Less than 500,000 or less than 0.5 percent.