

---

# BRAZIL

## GENERAL SITUATION AND TRENDS

### Socioeconomic, Political, and Demographic Overview

**B**razil has an area of 8.5 million km<sup>2</sup> and shares borders with all the countries of South America except Ecuador and Chile. The Federative Republic of Brazil is currently governed by the Federal Constitution of 1988. Its political and administrative organization includes the three branches of government—executive, legislative, and judicial—as well as 26 states, 5,508 *municípios*, and the Federal District (the seat of government).

The country is divided into five major regions. The North, the largest region, occupies 45% of the national territory, but has only 7% of the population; the Southeast occupies 11% of the territory and has 43% of the population. The South is the smallest region, with 7% of the territory and 15% of the population. Each of the other two regions occupies approximately 18% of the territory, but the Northeast has 29% of the population, and the Central-West has only 6%.

In 1991 and 1994, based on the human development index (HDI) of the United Nations Development Program, Brazil ranked very close to the point at which countries are considered to have attained a high level of human development. However, the global HDI figure masks tremendous internal disparities. The HDI in the South, Southeast, and Central-West regions places them in the upper ranges of human development, whereas the North and Northeast regions are at an intermediate level, with the latter region bordering on lower levels of the index. The nine states in the Northeast have the lowest socioeconomic indicators in the country.

Brazil is one of the countries with the most pronounced socioeconomic inequalities in the world. In recent years growth of the economy has raised the median income in all strata of the population, but the unequal distribution has exacerbated existing differences. The median income of the wealthiest 10% of the population is almost 30 times greater than that of

the poorest 40%, whereas in other countries with comparable levels of development it is only 10 times greater. Between 1960 and 1990, the share of national income of the poorest half of the population fell from 18% to 12%, and that of the richest 20% increased from 54% to 65%.

The proportion of women in the economically active population (EAP) has increased from 31% to 35% in the past decade. Nevertheless, the median wage of women is 63% that of men. Ethnic disparities are evident in the lower wages received by blacks and *pardos* (other dark-skinned groups), who make up 44% of the country's total population and in 1990 earned, on average, 68% of the amount earned by whites. In the Northeast, an estimated 46% of the population lives in poverty. This percentage is 43% in the North, 25% in the Central-West, 23% in the Southeast, and 20% in the South. Whereas the poverty in the Northeast is typical of traditional societies that have been largely left out of urban-industrial growth, poverty in the metropolises in the Southeast, especially the peripheral areas surrounding the cities of São Paulo and Rio de Janeiro, is associated socially and economically with this region's role as the dynamic center of the national economy.

Educational levels have improved significantly in recent decades, with a reduction in illiteracy, an increase in school enrollment, and a rise in the average number of years of schooling of the population. In 1991, the average school enrollment rate among children aged 5–17 years was 73%, with rates ranging from 81% in families earning more than two times the monthly minimum wage per capita to 37% among the poor. Between 1991 and 1995, the proportion of children aged 7–14 years who did not regularly attend school decreased from 16% to 10% for the country as a whole, although the rate was higher in the states of the Northeast (15%). In 1991, among groups earning less than half the per capita minimum wage, 15% of children aged 10–14 years worked while attending school and 12% worked but did not attend school. Among adolescents aged 15–17 years, these percentages were 39% and 15%, respectively. Blacks and *pardos* have

greater difficulty enrolling and remaining in school. The rate of illiteracy in the population over 25 years old in 1991 was approximately 35% among blacks and *pardos*, whereas among whites it was 15%.

In 1995, the proportion of the EAP that was employed was 58% of the total population aged 10 years and over (5% in the group aged 10–14 years, 11% in the group aged 15–19, 59% in the group aged 20–39, 28% in the group aged 40–59, and 6% in the group aged 60 and over). Data from 1990 indicate that, among poor families, 23% of children aged 10–14 years worked. These children generally work in adverse conditions, are not protected by labor laws, and often work more than 40 hours per week, earning less than the minimum wage.

According to the Brazilian Geography and Statistics Institute, the unemployment rate remained at about 5% for the period 1990–1995. However, the quality of jobs has deteriorated, with a decline in industrial jobs and absorption of the unemployed into the service sector. In addition, the proportion of workers with a formal employment contract has fallen from 60% to 50%, and the proportion of “self-employed” workers who are excluded from the benefits and protections of labor legislation has increased.

### *Economic Growth and Stability*

During the 1980s and the early 1990s the Brazilian economy was characterized by extreme instability and inconsistent growth, with inflation rising to extremely high rates. Reflecting external imbalances (the debt crisis), as well as the internal instability (persistent public deficit and hyperinflation), the period saw the demise of the industrial development strategy initiated in Brazil during the 1950s, which was based on import substitution and extensive state intervention in productive activities. The poor economic results of the 1980s and successive frustrated attempts at stabilization can be attributed to an inability to effect the structural changes necessitated by the new development model. Although there were some isolated successes, the Brazilian economy grew scarcely 1.2% per year between 1980 and 1992; at the same time, per capita income fell by 7.5% and the living conditions of the population deteriorated sharply, as did the prospects for overcoming the inherent problems associated with poverty and social inequality.

In 1994, the “Real Plan” (named for the country’s new currency unit, the *real*) was launched, ushering in a period of growth in per capita income and the beginnings of a redistribution of the wealth. The poorest half of the population saw its share of national revenues increase by 1.2%, and that of the richest 20% decreased by 2.3%. The gross domestic product (GDP) grew 7.4% between 1994 and 1996 (at 1996 prices), rising from US\$ 662,000 million to US\$ 711,000 million, with an increase in per capita GDP from US\$ 4,305 to US\$ 4,503.

In 1995 per capita income reached its highest level since 1990, with an increase of 30% over the 1993 level if all sources of income of persons aged 10 years and over are taken into account. Wages for persons with formal employment contracts have grown at a slower rate (18.5%). In 1996 the annual inflation rate was 9.8%, compared with rates of as much as 45% per month at the time the stabilization plan was initiated.

The MERCOSUR Treaty (1991) laid the foundations for the establishment of a common market comprising Argentina, Brazil, Paraguay, and Uruguay. In addition to the immediate objective of promoting subregional economic integration, the MERCOSUR modernization process is aimed at improving living conditions for the population. The new economic programs adapted by the MERCOSUR countries favor economic liberalization, promoting competition, and increasing the efficiency and competitiveness of their economies in the global market. The ultimate objective is sustained long-term growth.

### *Population*

According to the national census of 1991, Brazil has a total of 146.8 million inhabitants, with a ratio of 97.5 males for every 100 females. There are 17.2 inhabitants per km<sup>2</sup>, and 75.6% of the total population is urban. Only the state of Maranhão continues to have a predominantly rural population. Mean population growth declined from 2.4% per year during the 1970s to slightly less than 1.9% in the 1980s, and it is expected that it will fall to 1.36% by the year 2000. Projections put the total Brazilian population in 1998 at 161.8 million.

During the 1980s urban population growth slowed significantly. Cities with more than 20,000 inhabitants grew at a rate of 2.6% annually, compared with 4.9% annually in the previous decade. The population of the nine metropolitan regions grew at an annual rate of 2%, considerably less than the 3.8% of the preceding decade. As a result of the exodus of the population from the Northeast in search of better living conditions in other regions of the country, the Northeast has the smallest proportion of nonnative inhabitants.

The fertility rate has decreased rapidly in recent decades. The rate dropped from 2.57 children per woman in 1991 to 2.52 in 1995. The crude birth rate fell from 31.2 live births per 1,000 inhabitants in 1980 to 23.6 in 1990, and it is estimated that the rate will be 18.2 per 1,000 in the year 2000. Total mortality followed the same trend, with a rate of 7.2 deaths per 1,000 inhabitants in 1990. It is estimated that the death rate will be 6.7 per 1,000 in the year 2000. Life expectancy at birth increased 3.9 years (6.3%) between 1980 and 1990. In 1999 it is expected to be 64.8 years for males and 71.2 for females.

The age structure of the Brazilian population has also changed in recent decades. The oldest generations, born be-

fore fertility began to decline rapidly, forming a broad-based pyramid, while the age structure of younger generations is much less regular and unlike the distribution of the older generations. In 1991 there were fewer children under 5 years old than between 5 and 10 years old. Between 1970 and 1991 the proportion of children under 15 years of age decreased from 42% to 35% of the total population, while the group aged 15–64 years increased from 54% to 60% and the group aged 65 and over grew from 3% to 5%.

Around 1970 the economically dependent population (persons under 15 or over 64 years of age) made up almost 50% of the total population, and of every 20 dependents, fewer than 2 were elderly. By the turn of the century, it is estimated that dependents will make up only 33% of the total population and that of every 20 dependents, 3 will be elderly. The total dependency rate has declined notably as a result of the rapid reduction in the proportion of the population under 15 years of age and the still slow growth of the elderly component. This situation creates a special opportunity for significantly improving the quality of nutrition, health, and education policies aimed at children and young people.

### Mortality Profile

Given the difference between the number of deaths estimated on the basis of population projections of the Brazilian Geography and Statistics Institute and the number of deaths registered by the mortality information system of the Ministry of Health, it is estimated that the mean number of unreported deaths for the country as a whole in the period 1990–1994 was approximately 20% of the total number. The figure exceeded 50% in some parts of the North and the Northeast. In most of the South and the Southeast, underreporting was less than 10%, and it was close to 0% in urban areas. Among the reported deaths, ill-defined causes accounted for 17.8% in the period 1990–1994. The North and the Northeast have the highest proportion of deaths due to ill-defined causes (28.6% and 42.1%, respectively, in 1990), which calls for caution in analyzing the distribution of deaths due to defined causes in these regions. A more accurate picture of the evolution of total and age-specific mortality rates for the country as a whole will probably be obtained by using population projections as indicators, reserving data from death records for the analysis of causes of death.

Demographic data indicate that mortality levels in the Brazilian population have declined significantly in recent decades. This reduction has resulted mainly from the decline in mortality in the population under 5 years of age; deaths in that age group as a proportion of total mortality between 1980 and 1994 decreased from 24.0% to 9.8% for the subgroup of children aged under 1 year and from 4.6% to 1.7% in

the group aged 1–4 years. Consequently, proportional mortality in the group aged 50 and over rose from 48.4% to 62.4% during the same period.

Part of the reduction in mortality during the last decade was canceled out by an increase in male mortality from external causes in the group aged 15–29 years. A comparison of mortality curves for both sexes reveals a clear difference between the ages of 15 and 44 years; the patterns are similar for the other age groups. The reduction in mortality from complications of childbirth and the puerperium among females and the increase in deaths due to homicide and suicide among males explain the increase in the difference between the sexes in life expectancy at birth. For every female between the ages of 15 and 19 who died in 1991, there were 2.8 deaths of males in the same age group, 3.2 in the group aged 20–29 years, and 2.6 in the group aged 30–39.

Analysis by cause of death according to the categories used by PAHO shows that in the period 1990–1994, excluding ill-defined causes, diseases of the circulatory system constitute the leading cause of death, accounting for 33.9% of the total. In the North and Northeast, where communicable diseases continue to be an important cause of death, cardiovascular disease also ranked first, although it accounts for a smaller proportion of deaths than in the South and Southeast. Within this group of illnesses, ischemic heart disease is the predominant one among males and cerebrovascular disease is the leading cardiovascular disease among females.

The second leading cause of death is composed of external causes, which includes injuries and poisoning. This group accounts for 14.8% of all deaths in the country, with higher proportions in the North (19%) and Central-West (20%). Within this group, homicide is a major cause of death, especially in large urban centers.

The third leading cause of death is malignant neoplasms, which between 1990 and 1994 accounted for 13.0% of all deaths from defined causes. The most common malignant neoplasms among males are stomach cancer and lung cancer. Prostate cancer ranked third as a cause of male mortality from malignant neoplasms in virtually all regions. Among females, breast cancer is most frequent, followed by cervical cancer, which is the leading cause of death from malignant neoplasms in the North and the Northeast.

Communicable diseases (including all those listed in Section I of the Ninth Revision of the *International Classification of Diseases*, as well as meningitis, acute respiratory infections, pneumonia, and influenza) ranked fourth as a cause of death in the Brazilian population, accounting for 11% of all deaths from defined causes with no significant annual variations during the 1990–1994 period.

The maternal mortality rate dropped during the 1982–1991 period from 156.0 to 114.2 deaths per 100,000 live births. According to data for 1989, the rate was 380 per

100,000 live births in the North, 153 per 100,000 in the Northeast, 134 in the Central-West, 97 in the Southeast, and 96 in the South. The national average was 124 per 100,000 live births.

The most frequent direct cause of maternal mortality is toxemia of pregnancy (30% of all maternal deaths). Hemorrhage during pregnancy, childbirth, or the puerperium constitutes the second leading cause, accounting for 18% of all deaths, followed by puerperal infection, which accounts for 15%. Abortions cause 12% of all maternal deaths; the remaining 25% are due to other causes.

A study conducted in 1996 showed a clear decline in mortality in all the age subgroups of children under 5. During the 10 years preceding the study, infant mortality fell from 56 to 39 per 1,000 live births, with significant variations according to region, social class, and other characteristics. In urban populations, infant mortality decreased from 51 to 32 deaths per 1,000 live births in children less than 1 year old. In rural areas, the reduction was only from 69 to 61 per 1,000. There are also marked interregional disparities. Infant mortality in the Northeast (64 per 1,000 live births) is 2.5 times higher than in the South (25 per 1,000). Infant mortality rates tend to decline as the educational level of the mother rises, with rates of 93, 42, 38, 28, and 9 deaths per 1,000 live births in groups of mothers with less than 1 year, 4 years, 5–8 years, 9–11 years, and 12 or more years of schooling, respectively. In urban areas, postneonatal mortality is declining significantly, while in rural areas it continues to account for two-thirds of infant mortality.

Among children under the age of 5 years, mortality patterns are similar to those described above for infant mortality. During the same 10-year period, the overall rate fell from 64 to 49 per 1,000 live births; however, the rate in the Northeast (89 per 1,000) is more than triple the rate in the South (29 per 1,000). With respect to maternal levels of education, the mortality rate of children under 5 decreases from 119 per 1,000 in the group whose mothers have less than 1 year of schooling, to 48 in the group whose mothers have 4 years, and 9 in the group whose mothers have 12 years or more of schooling.

### Morbidity Profile

In Brazil general morbidity data are generated by the hospital information system, which encompasses institutions within the public health system. It is estimated that these hospitals provide close to 80% of all hospital care, with a monthly total of approximately 1.2 million hospitalizations. According to data for the period 1991–1994 on principal diagnosis by groups of causes according to the Ninth Revision of the *International Classification of Diseases*, 22.8% of all hospitaliza-

tions were related to pregnancy, childbirth, and the puerperium; the vast majority were for childbirth. The leading causes of the remainder of hospitalizations were respiratory disorders (15.9%), circulatory disorders (10.6%), infectious and parasitic diseases (9.4%), genitourinary disorders (8.4%), digestive disorders (7.5%), and external causes (6.0%). During this period—excluding hospitalization for causes related to pregnancy, childbirth, and the puerperium—no significant variations according to sex were observed in the distribution of morbidity.

## SPECIFIC HEALTH PROBLEMS

### Analysis by Population Group

#### *Health of Preschool Children*

Recent improvements in the evolution of morbidity and mortality indicators among children stem from the interaction of various demographic, economic, and social factors. Specific health-sector interventions, such as immunization, use of oral rehydration therapy, and promotion of breastfeeding, were key to the eradication of poliomyelitis, the virtual elimination of deaths from measles, the dramatic decline in neonatal tetanus, the reduction by half of deaths from diarrhea, and the reduction of malnutrition, especially the severe forms. The sustained decline in infant mortality can be attributed to a reduction in the most frequent causes of death in the postneonatal and late neonatal periods. At present, causes originating in the perinatal period account for more than half of all infant deaths from defined causes.

The mean values of national indicators tend to mask large disparities between urban and rural areas, among regions, among states in the same region, and among *municípios* within the same state. Of all deaths of children under age 1, half occur in the Northeast, where 29% of the country's population resides. In that same region, 39% of the reported deaths of children under the age of 1 year in 1993 were attributed to ill-defined causes, whereas in the Southeast the proportion was only 6%. The qualitative deficiency of the data in the poorest areas is associated with high rates of underreporting of deaths, which makes analysis of mortality by cause difficult. The lack of data is most noticeable in the case of diseases typical of underdevelopment, such as diarrhea and acute respiratory infections.

With regard to morbidity, 22% of hospital discharges in the public health care system in 1995 were of children under the age of 1 year; and the principal causes of hospitalization were pneumonia (30%), diarrheal diseases (25%), and conditions originating in the perinatal period (13%). Of the hospital deaths occurring in this age group, 32% were due to condi-

tions originating in the perinatal period, 11% were due to pneumonia, and 8% were due to diarrheal diseases. Prematurity and low birthweight accounted for 69% of all perinatal deaths. Considering that the coverage level of care during the prenatal period and at childbirth is high, even in rural areas, these data demonstrate the need to focus efforts on improving the quality of the care provided.

Overall malnutrition among children under 5, according to anthropometric indicators, has declined significantly since the 1970s, particularly in urban areas. Even in the Northeast, the region with the largest proportion of malnourished children in the country, it will be possible to attain the target proposed for the year 2000 (6.4%) if the current rate of reduction of malnutrition is maintained. The incidence of low birthweight decreased from 10% in 1989 to 9.2% in 1996, a very slight reduction compared with the decrease in prevalence of malnutrition and infant mortality.

In 1990 a system of information on live births (SINASC) was implemented in virtually the entire country. Data for the system are supplied directly by hospitals. SINASC will provide a better basis for calculating infant morbidity and mortality rates at the municipal level in addition to supplying information for the development of a profile of live births by birthweight and other variables.

### *Health of Schoolchildren*

Only 0.7% of the deaths reported in the country in 1994 occurred in the 5–9-year age group. External causes were responsible for 45% of the deaths in this group, followed by malignant neoplasms (12%) and diseases of the respiratory system (10%). Close to 60% of deaths from all causes occurred among male children; the proportion rises to 66% when only external causes are considered.

Information on health care for the school-age population is not consolidated at the national level. In 1996, the Ministry of Education launched an integrated health care project (PAISE) aimed at carrying out health education and preventive and curative activities for elementary school students residing in impoverished areas of capital cities in Brazil.

### *Health of Adolescents*

External causes are responsible for the largest proportion of deaths in the group aged 10–19 years. According to data from 1993, this group of causes accounts for 53% of all deaths from defined causes in the group aged 10–14 years and for 70% of deaths in the group aged 15–19 years. Homicide and injury from traffic accidents accounted for a total of 63% of the deaths due to external causes in the group aged 15–19;

the vast majority occurred among males (93% of the homicide deaths and 74% of the deaths from traffic accidents). The second leading cause of death in the groups aged 10–14 and 15–19 is malignant neoplasms, which accounted for 10% and 5% of total deaths, respectively.

The specific fertility rate among women aged 15–19 years increased from 75 to 87 children per 1,000 women between 1965 and 1991. The increase was most evident in urban areas, where fertility rose from 54 to 80 per 1,000. Although the data from 1996 suggest a change in this trend, they also indicate that 14% of the women in the 15–19 age group had already given birth to a child.

Another problem of growing importance in this age group is drug use. Surveys conducted in 1987, 1989, and 1993 in primary and secondary schools in 10 capital cities showed that the six most frequently used drugs are alcohol, tobacco, solvents, tranquilizers, amphetamines, and marijuana, in that order. Of a sample of 24,634 students surveyed in 1993, 23% had used drugs at least once and 19% drank alcohol frequently.

### *Health of Adults*

Unintentional injuries and violence constitute the leading cause of death in the group aged 15–60 years. This cause accounted for 30% of all deaths from defined causes in this age group in 1994. The next most frequent causes of death are diseases of the circulatory system (24%) and malignant neoplasms (13%). The distribution of deaths by age subgroups shows a strong predominance of external causes in the groups aged 15–19 and 20–29 years (71% and 62%, respectively). This group of causes also ranks first as a cause of death in the group aged 30–39 years (38%); diseases of the circulatory system (16%) and endocrine and metabolic disorders (12%) also account for a significant proportion of deaths in this age group. In the groups aged 40–49 and 50–59 years, the leading causes of death are diseases of the circulatory system (30% and 39%, respectively), followed by malignant neoplasms (16% and 21%) and external causes (20% and 9%). Close to 70% of all deaths in adults aged 15–60 years occur in males. Excess female mortality has been noted only in the case of malignant neoplasms (breast and cervical cancers) in the group aged 30–49 years. Mortality from malignant neoplasms in persons aged 20–59 years in 1997 was estimated at 36,000 deaths, 53% of which occurred in the oldest quartile (50–59 years).

The information available on the health conditions of women relates mainly to reproductive health. Data from a national study conducted in 1996 show that 96% of births in urban areas took place in health care institutions (78% in rural areas) and 86% of the mothers had received prenatal care. The

percentage of cesarean births remains quite high, having increased from 32% in 1986 to 36% in 1996 for the country as a whole. By region, the highest rate of cesarean deliveries (52%) occurs in the state of São Paulo. Of the women of childbearing age living with a male partner, 79% of those in urban areas use some method of contraception (69% in rural areas). The most frequently used methods are female sterilization by tubal ligation (40%) and oral contraceptives (21%). Surgical sterilization is being performed on increasingly younger women, with a consequent rise in the incidence of complications. Hospital data indicate that of approximately 3 million discharges of patients hospitalized for obstetric causes in 1996, about 246,000 (8%) were due to postabortion curettage.

Maternal mortality remains high. The rate in 1991 was estimated at 114 deaths per 100,000 live births. The high maternal death rates are associated with a large proportion of high-risk pregnancies (45%), which are more frequent in rural areas (59%), where the population has less access to health services.

#### *Health of the Elderly*

Diseases of the circulatory system caused 47% of reported deaths among Brazilians aged 60 and over in 1994. The second leading cause of death was malignant neoplasms (16%), followed by diseases of the respiratory system (14%). Of the deaths from cardiovascular disease, cerebrovascular disease accounted for 34% and ischemic heart disease accounted for 28%.

In 1997 an estimated 60% of all deaths in Brazil from malignant neoplasms occurred in the group aged 60 and over. Bronchopulmonary, gastric, and prostate cancers were the most frequent forms (13.6%, 13.0%, and 7.3%, respectively).

Steady growth of the elderly population, in both absolute and relative terms, has led to higher spending for the care of chronic and degenerative diseases and has resulted in reorganization of the health care system to meet the needs of this age group. Studies conducted in the state of Rio Grande do Sul have shown that elderly patients who are hospitalized do not receive adequate medical and psychosocial care. A large proportion of these patients have problems typical of old age—such as incontinence, balance and mobility problems, dementia, delirium, and depression—which these studies found were often not diagnosed or were treated improperly.

Of the total 12.7 million hospitalizations in 1995, almost 17% were persons 60 years or over, among whom the hospital discharge rate is 197 per 1,000. This figure contrasts with the rates found in the groups aged 0–14 and 15–59 years, which were 53 and 93 per 1,000, respectively. The average hospital stay for patients aged 60 and over was 7.1 days, whereas for those aged 15–59 it was only 5 days and for those under 15 it was 5.5 days.

#### *Workers' Health*

Information on accidents in the workplace comes from claims submitted to the social insurance system. The system does not provide the type of data necessary for constructing an epidemiologic profile that shows the distribution of these accidents. In 1994 a total of 338,304 work-related accidents were reported in the country. Analysis of these records indicates that close to 90% of the accidents occurred in the Southeast and South regions, and approximately half occurred in the industrial sector. Among male workers, those employed in the construction industry have the most accidents. Almost 60% of the accidents reported involved workers between 18 and 35 years of age; this age group also accounted for a similar percentage of total mortality from work-related accidents. Male workers have three times as many accidents as female workers, and deaths from work-related accidents are 26 times more frequent among males.

#### *Health of the Disabled*

There are no data at the national level to indicate the magnitude of the problem of disability. A study conducted in 1985 in the municipality of Salvador, Bahia, found the prevalence of disability to be 5.3%. This statistic suggests that the mean prevalence nationally could exceed 1%, based on census data from 1991. Between 1993 and 1996 studies of the prevalence of disability were carried out in various cities and states utilizing a research protocol developed by PAHO. The findings indicated rates ranging from 2.8% in Brasília to 9.6% in Feira de Santana, Bahia. Disorders of the nervous system and sense organs were found to be the most frequent causes of disability, followed by mental disorders and diseases of the osteomuscular system, connective tissue, and circulatory system. These studies also showed that disability was generally associated with lack of steady income, low educational levels, substandard housing, and limited access to health care.

#### *Health of Indigenous People*

The indigenous population has been reduced to about 300,000 persons (0.2% of the Brazilian population), grouped in 206 ethnic groups, which occupy 554 "indigenous territories" distributed across 24 states. Approximately 50% of the indigenous population lives in the North region. The state of Amazonas is home to 25% of the country's indigenous population (3.2% of the population of the state). Roraima is the state with the largest proportion of indigenous people (10.4% of the total). The living and health conditions of indigenous communities are generally poor, owing in large part to the ag-

gressive economic exploitation to which they have been subjected and which has steadily reduced their territories and caused environmental deterioration and loss of their cultural identity.

Since the early 1990s, efforts have been under way to coordinate intersectoral health care activities for indigenous peoples, and two national conferences on the subject have been held, one in 1986 and the other in 1983. In the state of Roraima, the Yanomami Health District has been created. However, current legislation assigns responsibility for indigenous health care to a variety of governmental entities. The Ministry of Health is responsible for preventive activities, control of communicable diseases, and basic sanitation.

In the absence of a national policy that would ensure comprehensive care for the indigenous population, the information available is disparate and does not lend itself to comparison or provide a complete picture of the health of these population groups. Among the most common problems detected in 1996 were acute respiratory infections and diarrheal diseases. Malnutrition, parasitic diseases, anemia, tuberculosis, and skin disorders, especially scabies, are also common. As a result of changes in lifestyle, an increase in alcoholism and in accidental and violent injuries has also been observed. In the Amazon region, malaria, cutaneous leishmaniasis, and hepatitis B are common. In the Yanomami territory, which occupies 9.4 million hectares, with 7,882 inhabitants organized in 169 communities, 17% of deaths are due to acute respiratory infections and 10% are due to malaria. The leading cause of death in the Yanomami population is malaria (2,142 cases in 1996, 753 caused by *Plasmodium falciparum*). Onchocerciasis is endemic throughout the region.

In 1996, investments in basic sanitation benefited 39,000 indigenous persons and financed the construction or upgrading of 481 simplified water supply systems. Various institutions trained personnel in health care for the indigenous population. A total of 2,306 persons received such training, and 1,322 of them were members of the indigenous community.

### *Health of the Black Population*

The black population in Brazil shows some unique characteristics from the genetic standpoint, having resulted from the mixture of individuals of diverse ethnicity from several regions in sub-Saharan Africa. In 1993, the black or *pardo* population was estimated at 66.7 million, or 45% of the total population. Among the genetic diseases that affect the black population, the most prominent is sickle cell anemia. Other common diseases, such as high blood pressure, diabetes mellitus, and glucose-6-phosphate dehydrogenase deficiency, are aggravated by the poor socioeconomic conditions in which most of the black population lives. Sickle cell anemia is the

most common monogenic hereditary disease, with 8,000 cases and 2 million carriers of the hemoglobin S gene. The implementation of a sick cell anemia control program and other governmental initiatives have been aimed specifically at improving health care for the black population. The inclusion of race on death certificates beginning in 1997 will provide mortality data for this population group.

## **Analysis by Type of Disease**

### *Communicable Diseases*

**Vector-Borne Diseases.** Approximately 19 million persons (12% of the Brazilian population) live in areas at risk for malaria. These areas are located in the Amazon region, where more than 99% of the 444,049 cases of the disease reported in 1996 occurred. The annual parasite index (API) was 29.6 per 1,000 in 1995. Ninety-five municipalities in the Amazon region have an API of more than 50 per 1,000, which puts them at high risk for malaria. The three states that reported the largest number of cases in 1996 were Pará (33% of the total number of cases), Rondônia (2%), and Amazonas (16%). Few outbreaks of malaria occurred outside the high-risk areas. Of the cases reported in 1996, 128,418 (29%) were caused by *P. falciparum*, a reduction of 51% with respect to the number reported in 1988. *Plasmodium vivax* and *Plasmodium malariae* were responsible for 71% and less than 1%, respectively, of the cases reported in 1996. Virtually all *P. falciparum* cases are believed to be chloroquine resistant to some degree. Malaria mortality decreased 67% between 1988 and 1995. The persistence of malaria in Brazil is due mainly to low coverage of integrated control activities; unregulated emigration to urban, agricultural, and mining areas; and delays in the process of decentralizing services in the highest-risk areas.

No cases of yellow fever have been reported in urban areas in Brazil since 1942, although *Aedes aegypti*, the urban vector of the disease, is abundant. The reasons for this are not clear, given that the level of vaccination being carried out is probably not sufficient to prevent transmission. Cases of jungle yellow fever continue to occur every year. Between 1993 and 1996 a total of 102 cases were reported in the states of Amazonas, Goiás, Maranhão, Minas Gerais, Mato Grosso do Sul, Pará, and Roraima. In 1996, 14 cases and 12 deaths from jungle yellow fever were reported, all in the state of Amazonas. The high case fatality rate probably indicates a high rate of underreporting. The principal measure for prevention of yellow fever is vaccination. In the past two years more than 3.6 million persons were vaccinated, almost all of them were either residents of the states where jungle transmission occurs or persons who travel in those areas.

The incidence of dengue is increasing in the country. More than 175,000 cases were reported in 1996. Despite the high number of cases reported annually, which exceeds the number reported in any other country on the continent, there are few cases of hemorrhagic dengue. In the past four years 127 cases have been reported, with 14 deaths, and in 1996 there were only 6 cases and 1 death. Indigenous cases of dengue have been reported in 20 Brazilian states. In 14 of those states two serotypes of the virus, dengue-1 and dengue-2, are circulating. Sequential infection by two different serotypes is the most important risk factor for hemorrhagic dengue, which suggests that there is high risk of a major epidemic. Given the potential seriousness of hemorrhagic dengue and urban yellow fever, the Government has implemented a plan to eradicate *Aedes aegypti*, under which it proposes to spend US\$ 4,300 million over the next 3-year period in 2,000 infested *municípios* located in 26 of the 27 states.

Of the five triatomid species that are vectors of Chagas' disease, the most important is *Triatoma infestans*. The area infested by this vector has been reduced from 711 municipalities in 1992 to 83 in 1993. The success of the national control program was fundamental for the launching, in 1991, of the initiative of the Southern Cone countries to eradicate *T. infestans* and interrupt transmission of *Trypanosoma cruzi* through blood transfusions. In 1996 insecticide spraying was carried out in 104,500 dwellings, mainly in residual foci that persist in the northern portion of the state of Rio Grande do Sul, in the western portion of Bahia, in the southeastern portion of Tocantins, and in the northeastern region of Goiás. In studies conducted between 1989 and 1996 among schoolchildren aged 7–14, in which some 180,000 samples from 18 states and 662 municipalities were analyzed, a seroprevalence level of 0.2% was found. In 1996 almost 2 million blood samples were processed in blood banks, yielding a seropositivity rate of 0.8%. The continuity of the activities and the attainment of the eradication goals makes it possible to anticipate that transmission of the disease by *T. infestans* will have been stopped by the year 2000.

Schistosomiasis is endemic in almost all the states of the Northeast and in two states in the Southeast (Minas Gerais and Espírito Santo). In addition, there are foci in all other regions of the country: North (northeastern Pará), Central-West (Federal District), and South (Paraná and Santa Catarina). Despite numerous systematic activities for the diagnosis of stool samples and treatment of cases (2.7 million examinations in 1995), it has not yet been possible to extend the control activities—which include improvements in household sanitation and environmental management—to all the endemic areas. In some areas the prevalence continues to exceed 25%, which poses a serious risk for the development of the more severe forms of the disease. Generally speaking, however, the trend is toward reduction of the prevalence and clinical severity of the disease.

Visceral leishmaniasis (kala-azar) is concentrated in the Northeast region, which accounts for more than 90% of the 2,000 cases reported annually. There are also major foci in the North, Southeast, and Central-West. Since the 1970s the disease has tended to become endemic in urban areas, a trend associated with poor living and nutrition conditions among the affected population. Epidemics in the capital cities of the states in the Northeast during the period 1981–1985 and 1993–1994 necessitated emergency control measures. The incidence of cutaneous and mucocutaneous leishmaniasis increased from 10 to 23 cases per 100,000 inhabitants between 1985 and 1995. This form of the disease is most common in the North and Northeast regions. The increase is associated with two distinct epidemiologic phenomena: one is the expansion of the agricultural frontier and the other is growth in outlying urban regions, with a possible adaptation of the parasites to reservoirs outside the jungle.

The remaining foci of plague in Brazil—almost all of them located in mountain and plateau regions in the Northeast—are controlled. Nine human cases were reported in 1995 and one case was reported in 1996.

The principal focus of lymphatic filariasis is in the metropolitan area of Recife, Pernambuco, where more than 1,500 cases were reported in 1995. Efforts are under way to implement a national plan to eliminate the disease through mass application of new treatments.

Onchocerciasis affects mainly the indigenous Yanomami population living along the border with Venezuela. Cases have been reported in nearby tribes and also in white individuals who were visiting the region, which poses a potential risk for spread of the endemic to other parts of the country.

**Vaccine-Preventable Diseases.** The last cases of poliomyelitis in Brazil were reported in 1989, and interruption of the indigenous transmission of wild poliovirus was certified in 1994. The incidence of acute flaccid paralysis in children under the age of 15 years—the indicator used by the epidemiologic surveillance system to monitor the disease—has remained at a mean annual rate of 0.9 cases per 100,000 inhabitants.

The incidence of measles has declined dramatically throughout the country since 1992, when measles vaccine was administered to more than 90% of the under-16 population. Since then, epidemiologic surveillance and outbreak control activities have been intensified, with a view to eliminating the disease. Measles was ruled out in more than 70% of the 4,000 suspected cases reported and investigated annually since 1994. In 1995 there were 19 laboratory-confirmed cases and 887 cases were clinically consistent with measles. No measles deaths were reported in the country in 1995 and 1996. Two outbreaks in 1996, in the states of Santa Catarina and São Paulo, represented a setback in the plan to eliminate

the illness. In June 1997, the São Paulo outbreak continued to worsen, with 383 laboratory-confirmed cases since the beginning of the year, more than half of which were in persons aged 20–29 years.

Neonatal tetanus continues to occur sporadically in Brazil. More than half the cases are concentrated in small municipalities in the North and the Northeast. In 1995, 127 cases were reported, about half the number reported in 1992. The other forms of tetanus occur mainly in adults. Between 1992 and 1994 a total of 1,238 deaths from tetanus were reported, with the highest rates occurring among persons over the age of 40. In 1995, 900 cases were reported (0.6 per 100,000 inhabitants).

The incidence of diphtheria has declined steadily. Two hundred cases were reported in 1995 (0.1 per 100,000), with 62 deaths during the 1992–1994 period. The highest rates occur in the South and in the 1–4-year age group.

Whooping cough was the reported cause of 124 deaths during the 1992–1994 period, and almost all (118) were infants. In 1995, 3,236 cases were reported (rate of 2.1 per 100,000), with the lowest rates occurring in the Southeast region.

**Cholera and Other Intestinal Infectious Diseases.** From the beginning of the cholera epidemic in 1991 up to 1994, a total of 150,000 cases were reported nationwide, with 1,700 deaths. In 1995, 5,000 cases were reported, approximately 10 times less than in the preceding year. In 1996, there were only about 900 confirmed cases. Throughout the period, the transmission area of the disease has expanded steadily, and it now encompasses 1,226 Brazilian municipalities (22% of the total), almost all of them in the North and the Northeast. In the past two years the disease has continued to spread in practically all the vulnerable areas, where poor sanitation conditions are favorable for endemicity.

The use of oral rehydration therapy increased 35% in the Northeast region between 1991 and 1996, which helped to significantly reduce mortality from diarrhea. Nevertheless, in 1995 and 1996, 25% of hospital discharges of children less than 1 year old reported this as the cause of hospitalization.

**Chronic Communicable Diseases.** The downward trend of tuberculosis observed during the 1980s has slowed in recent years, and the incidence of the disease has begun to increase in some major cities, including Rio de Janeiro. Some 6,000 deaths annually are attributed to tuberculosis. In 1995, a total of 91,013 cases of all clinical forms of the disease were reported, making the incidence 29 per 100,000 inhabitants. Approximately half these cases were the pulmonary form. Of the 258,616 patients with respiratory symptoms examined in 1995, 10% had positive sputum smears. The North region has shown the highest incidence of laboratory-confirmed pulmonary cases, followed by the Northeast. The state of Rio de

Janeiro, in the Southeast, had the highest reported rates in 1995 for all types of tuberculosis (127 per 100,000) as well as for the pulmonary form (56 per 100,000). Recent data indicate worrisome levels of multidrug resistance. A nationwide epidemiologic study to more accurately determine the magnitude of the problem is currently under way. Tuberculosis occurs as an opportunistic infection in 15% of AIDS cases.

Leprosy remains a significant problem. As of late 1996 there were 105,744 known cases, which makes the prevalence 6.8 per 10,000. In the same year, 39,792 new cases were diagnosed (detection rate of 2.5 cases per 10,000). The most affected regions continue to be the North and the Central-West. However, as a result of the activities of the national control program, especially multidrug therapy, notable progress has been made toward eliminating the disease as a public health problem, which means achieving a prevalence of less than 1 per 10,000. During the 1991–1996 period the number of reported cases decreased from 278,692 to 105,744, a reduction of 172,948 cases. During the same period, the prevalence fell from 18.2 to 6.8 per 10,000 inhabitants.

**Acute Respiratory Infections.** Acute respiratory infections are one of the three leading causes of illness and death among Brazilian children. Data from a national study carried out in 1996 indicate that in the 15 days preceding the household survey, 47% of children under the age of 10 years had suffered cough accompanied by difficult breathing, 25% had suffered fever, and 18% had been seen in health services for symptoms of respiratory infection. Children aged 6–23 months are most frequently affected.

**Rabies and Other Zoonoses.** The incidence of human and canine rabies has been reduced enormously since the national control program was instituted in the 1970s. A priority activity under the program has been annual canine vaccination campaigns in urban areas. In 1995, 31 human cases and 712 canine cases were reported. In 1996 there were 25 human cases. The canine vaccination rate in 1996 was 89%. The disease was eliminated in the southern states of the country during the 1980s. Over the 1980–1996 period a total of 76 cases of human rabies transmitted by vampire bats were reported, almost all of them in rural settlements in the Amazon region. Prophylactic antirabies treatment for humans has been standardized and adopted nationally.

Human leptospirosis is endemic in the principal urban centers and seasonal outbreaks occur during periods of flooding. Between 1986 and 1995, a total of 25,482 cases and 2,966 deaths were reported. Since then, an increase in the incidence of the disease has been observed.

The seriousness of the problem of taeniasis-cysticercosis is evident from the fact that some 100 deaths from neurocysticercosis are reported every year in the states of the Southeast

and the South, where the best conditions for diagnosis of the disease exist. Human hydatidosis continues to be an important problem, mainly in the southernmost region of the country.

Tuberculosis and brucellosis in animals are considered diseases of low prevalence, although the incidence may be medium to high in cattle in some dairy regions. Reporting of human cases of brucellosis is not required in Brazil.

In the period 1990–1993 there were 81,611 reports of snake bites, with 355 deaths. Some 8,000 scorpion stings are reported annually, mainly in children under 14, with a case fatality rate of 1%. The incidence of spider bites is 1.5 per 100,000 inhabitants; most cases occur in the South and Southeast regions. Eighteen deaths from this cause were reported during the period 1990–1993.

**AIDS.** The AIDS epidemic began in 1980 in the cities of São Paulo and Rio de Janeiro and has since spread to all the other states in the country. As of February 1997, 103,262 cases had been reported, and 74% of them were in the Southeast region. For the entire period, the mean cumulative incidence for the country as a whole was 74 cases per 100,000 inhabitants. By region, incidence ranges from 125 per 100,000 in the Southeast to only 21 in the Northeast. The human immunodeficiency virus (HIV) has not tended to spread rapidly in the interior of the country, especially in rural areas. At least one case has been reported in 1,740 of the 5,508 municipalities in Brazil, but only 427 municipalities have reported five or more cases. Preliminary estimates indicate that between 338,000 and 448,000 adults aged 15–49 years may be infected with HIV. Serologic surveys show high HIV-positive levels among the prison population. Nationwide, AIDS continues to spread fairly slowly, especially in comparison with what is happening in the areas where the epidemic started and has affected large segments of the population.

Significant changes in the epidemiologic profile of the disease have been observed in recent years. Sexual transmission continues to predominate (66% of all cases for which the route of transmission is known), but around 1990 the initial concentration of cases in homosexual and bisexual males began to decline steadily and the number of cases detected in heterosexual males and females began to increase. As for acquisition of the virus through exposure to infected blood (31% of cases for which the route of transmission is known), intravenous drug use has become the primary risk factor (87.4% of reported cases in 1995), replacing blood transfusion, which accounted for 40% of cases in 1986 but only 11% in the 1993–1996 period. The latter reduction stems from the implementation of blood donor screening throughout the country. An HIV seroprevalence rate of 0.49% was found among blood donors in 1995. There has been a gradual rise in perinatal transmission, which was responsible for 3.8% of the cases reported in 1995 (86% of pediatric cases).

A steady increase in cases among patients with low levels of education is being observed. In 1994, 70% of the cases reported were in patients who had only an elementary education or were illiterate. In females, the proportion was 78%.

There has been a steady decline in the excess incidence of the disease among males. The male-to-female ratio decreased from 28:1 in 1985 to 3:1 in 1993, which may indicate an increase in heterosexual transmission by bisexual males and heterosexual drug users. Among women, 27% of the cases reported up to 1995 occurred among drug users and 12% occurred among partners of bisexual men.

**Other STDs.** Between 1987 and 1996, a total of 504,219 cases of sexually transmitted disease (STD) were reported in Brazil. In descending order of magnitude they were distributed among the following categories: nongonococcal urethritis (28.5%), venereal syphilis (28.3%), gonorrhea (27.7%), condyloma acuminata (11.3%), chancroid (1.8%), lymphogranuloma venereum (1.0%), congenital syphilis (0.9%), granuloma inguinale (0.3%), and gonococcal conjunctivitis (0.2%). The majority of cases occur in the South (40.9%), but the available data are believed to reflect large variations in the reporting systems of each state, which mask the true epidemiologic situation. According to data from public blood banks, 1% of blood samples collected from blood donors in 1995 tested positive for syphilis; by region, the seropositivity rate was 0.5% in the South and 2% in the North.

**Emerging Diseases.** About 28,000 cases of meningitis are reported annually, and 15%–20% of them are considered to be meningococcal meningitis. Since 1985 *Neisseria meningitidis* serogroup B has been the most common causal agent, although since 1987 a progressive increase in the frequency of serogroup C has been observed, especially in the South and the Southeast, where in some states these two serogroups occur with about the same frequency. The most commonly affected age group has been children under the age of 4 years. The overall case fatality rate for meningococcal meningitis in the country was approximately 20% in 1995–1996. Other important causes of meningitis are pneumococcal infections (responsible for 6% of all meningitis cases), *Haemophilus influenzae* type B (5%), *Mycobacterium tuberculosis* (2%), and viral infections (30%). Of the 1,500 cases of *H. influenzae* meningitis reported annually, more than 90% occur in children under 5 years old.

Viral hepatitis is very common in Brazil and in 1995 and was responsible for 16,851 hospitalizations and close to 800 deaths. Various studies have demonstrated the enormous impact that hepatitis B and hepatitis delta have on the population of the western Amazon region. Both types of hepatitis have also recently been found to be highly endemic in states in the Southeast (Espírito Santo) and the South (Santa Cata-

rina). Data from public blood banks in 1995 showed seroprevalence rates of 1.2% and 0.6% for hepatitis C and B, respectively, among blood donors.

Like other countries, Brazil is seeing a worrisome emergence of diseases caused by previously unknown agents. During the 1970s, the Rocio virus, a new arbovirus, caused about a thousand cases of encephalitis in the state of São Paulo. In the 1980s, Brazilian purpuric fever caused by *Haemophilus aegypti* led to outbreaks of septicemia among children in the states of São Paulo and Paraná. In 1993 a family outbreak of Hantavirus infection was detected serologically. This and other episodes demonstrate the need to pay greater attention to new infectious diseases. In 1995 a project of scientific and technological training in emerging and re-emerging diseases was launched, with special emphasis on biosafety.

### *Noncommunicable Diseases and Other Health-Related Problems*

**Nutritional Diseases and Diseases of Metabolism.** Data on malnutrition among children under 5 in Brazil in 1996 show that 10.5% had height-for-age deficits, 2.3% had low weight-for-height, and 5.7% had low weight-for-age. During the past two decades, a steady decline in malnutrition has been registered among children under 5 years old (malnutrition is defined as weight-for-age two standard deviations or more below the expected mean value), with a reduction of 60% between 1975 and 1989 and 20% between 1989 and 1996. The mean height of Brazilian children born during the 5-year period 1980–1984 is significantly greater (3.3–4.6 cm) than during the 1960s, with a larger increase among girls. The reduction in malnutrition during the period 1975–1989 has changed the ratio between malnutrition and obesity, which was more than four malnourished children for each obese child and is now two malnourished children for each obese child. During the same period, the proportion of obese adults almost doubled, rising from 5.7% to 9.6%. In 1989 the proportion of obese women exceeded the proportion of malnourished women in all income groups; among men, this occurred only in the middle- and high-income groups.

The most important micronutrient deficiencies are vitamin A, iodine, and iron deficiencies. Vitamin A deficiency is common in the Northeast, where more than 40% of children have serum retinol concentrations under 20 ( $\mu\text{g}/\text{dl}$ ). This deficiency is also considered to be endemic in the Jequitinhonha Valley in Minas Gerais and in the Ribeira Valley in São Paulo. In these areas, 6.5 million children between 6 and 59 months of age are given food that has been fortified with vitamin A.

In 1975, a national survey of the prevalence of endemic goiter in the school population found rates ranging from 1% to 33.5% in different states. Subsequent studies carried out

in 1984, 1989, and 1990 in municipalities selected to participate in the activities of the national endemic goiter control program showed a general downward trend in the prevalence in these areas, although increases were reported in some municipalities.

Iron deficiency anemia is a major problem, especially among pregnant women and children under the age of 2 years. Among pregnant women receiving prenatal care, the prevalence of iron deficiency anemia has been found to range from 25% to 44%, with an extremely high value of 65% in the state of Pará. Among children under 5, published studies show a prevalence that ranges from 59% in São Paulo to 70% in Pará. In the state of Pernambuco, 85% of children aged 6–11 months, 82% of those aged 12–23 months, and 17% of those aged 5 to 6 years were found to be anemic. The only national study on iron consumption in the Brazilian population, conducted 20 years ago, showed adequate mean values, with marked deficiencies in the low-income population.

The practice of breast-feeding has increased steadily in recent years as a result of concerted action by government agencies, professional health associations, scientific institutions, and other organizations. Between 1989 and 1996 the mean duration of breast-feeding increased from 5 to 7.5 months, and the frequency of exclusive breast-feeding increased 11-fold in infants up to 3 months of age and 25-fold in infants 4–6 months of age. In 1996 the general prevalence of breast-feeding for infants aged 0–3 months and 4–6 months was estimated at 85.4% and 63.7%, respectively; the prevalence of breast-feeding as the predominant form of feeding was estimated at 43.5% and 18.4%, respectively; and that of exclusive breast-feeding was estimated at 0.3% and 12.8%, respectively. These prevalence rates are considered very unsatisfactory, given that more than 95% of Brazilian children are breast-fed at birth. However, exclusive breast-feeding is being discontinued very early and weaning is taking place long before it should.

A multicenter study on diabetes mellitus conducted in nine Brazilian capital cities between 1986 and 1988 showed a mean prevalence of 7.6% in the urban population aged 30–69 years, with higher values in São Paulo (9.7%) and Porto Alegre (8.9%). Between 5% and 10% of the cases were insulin-dependent. The prevalence of diabetes was found to rise steadily with age, from 2.7% in the group aged 30–39 years to 17.4% in the group aged 60–69, with no significant variations according to sex.

**Cardiovascular Diseases.** In recent decades diseases of the circulatory system have been responsible for an increasing proportion of total mortality. Between 1930 and 1980 mortality due to these causes rose from 11.8% to 30.8% in the capital cities. More recent analyses of all deaths reported in Brazil in the period 1990–1994 indicate that 33.9% were due

to cardiovascular diseases, which are the leading cause of death in all regions of the country. Mortality from this cause is proportionally higher among women (36.2% of the deaths in 1986 compared with 29.0% among men). This difference is explained by the greater frequency of external causes of death in males. In 1991 the most frequent specific causes of death from diseases of the circulatory system in the capital cities were cerebrovascular disease (11.6%), ischemic heart disease (9.8%), and hypertension (2.3%).

In 1991 health system spending for the care of patients with cardiovascular diseases was estimated at about US\$ 500 million for hospital care alone. When the costs of outpatient care, prostheses, and special materials are added to this sum, the figure rises to US\$ 1,000 million. Diseases of the circulatory system are responsible for 25% of all hospitalizations according to hospital discharge records and they consume 13% of total health care resources.

**Malignant Tumors.** With decreasing birth and infant mortality rates and the consequent increase in life expectancy, malignant neoplasms have assumed a more important role in the morbidity and mortality profile in Brazil. According to estimates of morbidity for 1997, the six principal cancer sites, in decreasing order of frequency, were breast (28,310 new cases), uterine cervix (22,500), stomach (19,820), lung (19,015), colon and rectum (17,630), and prostate (14,020). The female population suffers a disproportionate cancer burden, especially in the younger age groups, because the two most frequent forms of cancer occur exclusively in women. The overall incidence of all types of cancer is 176 cases per 100,000 females and 162 per 100,000 males. Among males, lung cancer is the most frequent form, with an incidence of 20.1 per 100,000, which far exceeds the estimated rate in females (5.9 per 100,000), among whom lung cancer is the sixth most frequent malignant neoplasm. The next most frequent cancer sites in males are the prostate and the stomach. Gastric cancer is much more frequent in males (18.6 per 100,000) than in females (8.5 per 100,000), among whom it is the fourth most frequent type. Colon and rectal cancer is the fourth most frequent type in males and the third in females, with similar incidence rates in both sexes (12.4 and 11.6 per 100,000).

It is estimated that in 1997 deaths from malignant neoplasms in all sites totaled 97,700. The largest number were due to lung cancer (11,950 deaths) and stomach cancer (11,150), followed by deaths due to breast cancer (6,780), cervical cancer (5,760), colon and rectal cancer (5,440), and prostate cancer (4,690). Unlike morbidity, mortality from cancer is higher among males (72.5 deaths per 100,000, compared with 60.7 per 100,000 in females).

The cancer morbidity and mortality profile varies somewhat from region to region. Among males, prostate cancer

ranks first in the Southeast and Central-West regions, whereas in the North and Northeast cancer of the stomach is the leading cause and in the South lung cancer predominates. Among females, breast and cervical cancer are the two most frequent types in all regions, but the third most frequent type in the North and Northeast regions is stomach cancer, whereas in other regions of the country colon and rectal cancer ranks third.

**Accidents and Violence.** Accidents and violence (external causes) have ranked second as a cause of death in Brazil throughout the present decade. They account for close to 15% of all deaths from defined causes, with a rate of 70 deaths per 100,000 inhabitants. In the group aged 5–39 years they are the leading cause, and in the group aged 15–19 they are responsible for almost 80% of all deaths. Homicide ranks first among all external causes of death, accounting for close to 30% of deaths attributable to this group. Between 1977 and 1994 the specific death rate due to homicide increased 160% nationwide. The principal victims are young adult males, particularly those between the ages of 20 and 29. Among all the external causes, one of the most important is traffic accidents, which increased rapidly until the mid-1980s and began to decrease slightly in 1990. Mortality from this cause is greater among males than females, with a ratio of 3:1.

Morbidity from external causes account for 6% of hospitalizations. However, because hospital discharges are not classified by the nature of the injury, no data are available on morbidity from specific causes within this group.

According to national statistics on traffic accidents, in 1995 there were 255,000 accidents with injuries; a total of 321,000 people were injured and there were 25,513 deaths, of which 80% were males and 70% were in the 15–59 age group. The total cost of these accidents is estimated at US\$ 966 million. Since 1992 there has been a slight decrease in the mortality rate from traffic accidents, which was 9.6 deaths per 10,000 vehicles in 1995. A large proportion of the deaths were pedestrians who were struck by automobiles. In 1995 such pedestrian accidents made up 28% of all reported accidents. In 1997 a national transportation safety program was implemented with a view to reducing accident rates, deaths, and the severity of injuries. Over a 5-year period US\$ 400 million in resources from the Inter-American Development Bank (IDB) will be used for this program.

**Behavioral Disorders.** The most recent data on the distribution of mental disorders in the Brazilian population come from a study conducted in 1990–1991 in three metropolitan regions. Neurotic disorders, especially anxiety and phobia, were found to be most frequent, with prevalence rates ranging from 7.6% in São Paulo to 17.6% in Brasília. Nonpsychotic depression was detected in 14.5% of women in Porto Alegre.

The prevalence of various forms of alcoholism point to a significant potential demand for psychiatric care in the population over the age of 15, with rates ranging from 4.5% to 8.7% and up to 15% among males in some cities.

Drug use is a growing problem, especially among young people; illegal drugs are the most frequently used type of drug in this population group. Alcoholism and drug use together account for close to 20% of all hospitalizations for mental disorders in Brazil. The proportion is as high as 28% in the South, according to data for 1995. Alcoholism was the underlying cause of 3,621 deaths (only 10.8% of those were women), 35.5% of which were of persons under the age of 40. A study conducted in the five state capitals found the proportion of street children who use drugs—excluding alcohol and tobacco—to be 82.5% in São Paulo and 90.5% in Recife. Intravenous drug use is an increasingly important factor in the transmission of AIDS, accounting for 20.7% of all cases reported up to 1996. Use of illegal drugs is also associated with an increase in violence and prostitution, problems that impact in various ways on the health situation in urban areas.

It is estimated that some 30 million Brazilians smoke and that 80,000 deaths each year are due to causes related to tobacco use. Control activities have prioritized the dissemination of educational materials in schools and workplaces, restriction of advertising, and prohibition of smoking in public places.

**Oral Health.** The prevalence of dental caries in the Brazilian population has declined markedly in recent years. Surveys by the Ministry of Health in state capitals show that the index for decayed, missing, and filled teeth (DMFT) index among 12-year-olds fell from 6.67 in 1986 to 3.06 in 1996 as a result of various educational and preventive activities implemented with the participation of the public sector and dentistry entities. In 1996, 42% of the population had access to fluoridated water through public water supply systems.

**Natural Disasters and Industrial Accidents.** The most frequent types of disasters in Brazil are floods, landslides, cave-ins, and droughts, which have the heaviest impact on low-income populations in urban slum areas. Data on the state of São Paulo indicate a progressive increase in the number of technological accidents since 1978, with 215 recorded in 1995 and 398 in 1996. The majority of the accidents reported between 1978 and 1996 involved modes of surface transport (39%) or maritime transport (12%), or they occurred at fuel storage sites (8%), households (8%), and industrial areas (6%). The chemical products most frequently involved in these accidents were flammable liquids (41%), corrosives (14%), and gases (11%). In 1995, the explosion in a shopping center in the municipality of Osasco, São Paulo, caused 45 deaths; and in 1996, a plane crash in a residential

neighborhood close to the São Paulo airport caused some 100 deaths.

The national civil defense system is responsible for disaster preparedness and response activities. Created by law in 1993 and coordinated by the Special Secretariat for Regional Policies within the Ministry of Planning and Budget, the system encompasses state and municipal subsystems. Its priorities are training human resources to respond to chemical disasters, to practice radiation safety in hospitals, and to care for the population affected by floods and droughts. Most companies in the chemical and petrochemical sector—whether private or state-run—have accident prevention programs and procedures for emergency situations.

## RESPONSE OF THE HEALTH SYSTEM

### National Health Plans and Policies

The social policies of the Government of Brazil that provide the framework for the health policy are coordinated by the Social Policy Committee, which is composed of the ministers of the social sectors with the participation of the Ministries of Finance and Planning, under the direction of the President of the Republic. This committee establishes strategies for coordinated action by the various agencies responsible for carrying out social programs.

During the 1980–1990 period, public spending on health as a proportion of GDP peaked in 1989 at 3.3%. This percentage decreased dramatically over the next several years and then began to rise again in 1994, reaching 2.7% in 1995. If private spending by individuals—estimated at 34% of all health spending in 1990—is included, total health spending in 1995 was about 4.1% of GDP. This may be an underestimate, because the tremendous reduction in public spending on health between 1990 and 1993 led to an increase in direct out-of-pocket spending by individuals to pay for private services. Federal spending on health activities carried out by the Ministry of Health in 1996 represented approximately 10% of tax revenues, compared with 19% in 1989.

Government action in the area of health is geared toward the achievement of two basic objectives: improvement of the health situation, especially reduction of child mortality, and political and institutional reorganization of the sector aimed at modernizing and enhancing the operating capacity of the health system. To achieve the first objective, activities are being carried out with regard to communicable disease control, prevention and treatment of malnutrition, integrated management of maternal and child health, and improvement of basic sanitation. Joint effort by the health and sanitation sectors seeks to reduce infant mortality to 22.6 deaths per 1,000 live births in 1999. The political-institutional reorgani-

zation will entail broad reform of the health care model. The priority strategy in this effort will be intensification of the decentralization process. These objectives are specified in the plan of priority goals and activities for the 1997–1998 biennium, implemented in March 1997 by the Ministry of Health. The plan stresses prevention, with emphasis on primary care, as well as improving the quality of services and interaction of the health system with society through strengthening of the health councils. A basic instrument for implementing the activities and achieving the goals of the plan is a financial agreement signed by the Ministry of Health with the IDB and the World Bank for the execution, beginning in 1997, of the Unified Health System Reorganization and Strengthening (RE-FORSUS) project. The project's specific objectives are to strengthen the physical and technological infrastructure of the health services system and develop the system's management capacity at its various levels. The project prioritizes maternal health care and emergency care in large urban centers, hemotherapy and public health laboratory networks, and family health activities. It also encourages innovations in sector management, information and evaluation in the health field, formulation of policies on health system decentralization, managerial training for personnel in management units, and quality assurance in health systems and services. The project will run for three years with a total budget of US\$ 650 million; it will cost US\$ 195 million for the first year.

### *Health Sector Reform*

Health reform efforts in Brazil grew out of the Eighth National Health Conference, held in 1986, and are aimed at bringing about broad financial, organizational, and institutional restructuring of the public health sector, with three main objectives: (a) to transfer responsibility for the provision of health care benefits from the national government to the local governments; (b) to consolidate the financing and delivery of public health services, seeking to achieve equity and comprehensive care; and (c) to facilitate the effective participation of the community in planning and control of the health system. The legal and institutional foundation for the reform is provided by the Federal Constitution of 1988 and subsequent legislation.

The Federal Constitution of 1988 deals specifically with health in the chapter on social security. The Constitution makes health a right of all and a responsibility of the State, which it should fulfill through economic and social policies aimed at reducing the risks of illness and other health impairments, as well as through universal and equitable access to activities and services for the promotion, protection, and recovery of health within a Unified Health System (UHS) that is public, federal, decentralized, and participatory in nature

and provides comprehensive care. The constitutional framework that allows for the development of the UHS has been complemented by subsequent legislation, including organic health laws (8.080/90 and 8.142/90), decree 99.438/90, and the basic operational guidelines of 1991, 1993, and 1996. Law 8.080/90 regulates the UHS, which is responsible, though not exclusively, for giving concrete expression to the constitutional principles regarding the right to health. The UHS encompasses all public services (at the federal, state, and municipal levels) as well as private services that have been duly accredited by contract or agreement.

The changes sought through health sector reform are not intended to be "quick fixes" or compensatory measures but rather are part of a process of structural change that includes (a) a cultural change and affirmation of the rights of citizens, in which the right to health is considered a determinant of the quality of life; (b) the consolidation of a national public system in which the federal, state, and local levels work in a complementary and harmonious fashion and have the necessary instruments of power; (c) the organization and regulation of a private health care system, with specific objectives that are consonant with the constitutional precepts of universal, comprehensive, and equitable health care; (d) competitive functioning of the public and private subsystems, as a means of promoting quality and reducing costs; (e) the adoption of innovative technical and operational models aimed at providing care that is comprehensive, personalized, appropriate, and accessible to all; (f) the implementation of a system of monitoring, control, and evaluation that will help to effectively reduce unnecessary spending; and (g) the introduction of decentralized management practices that will prevent inefficient and unfair duplication of effort.

In the framework of MERCOSUR, studies are being conducted with a view to harmonizing national legislation applicable to the health sector, a process that will be intensified in the next four years to meet the requirements of specific trade and production agreements. Pursuant to recommendations of the third meeting of ministers of health of MERCOSUR, a working subgroup on health was established for the general purpose of harmonizing quality parameters for health-sector goods, services, and production factors and health regulatory mechanisms.

## **Organization of the Health Sector**

### *Institutional Organization*

The Brazilian health services system comprises a complex network of health care providers and financers in the public and private sectors. The public segment of the system consists of public providers at various levels of government, in-

cluding the federal level—the Ministry of Health—which oversees national management of the UHS; university hospitals operated by the Ministry of Education; and the Armed Forces health services. The state and municipal levels include a network of establishments operated by entities at those levels. The public health services, complemented by private services that work under contract with the Government in the framework of the UHS, cover 75% of the population. The exclusively private segment consists of for-profit services paid for directly by individuals and private institutions that provide care under private health insurance plans. Most inpatient hospital services are provided under a system of public reimbursement for services provided by private entities (80% of hospitals that provide services within the UHS are private). In contrast, 75% of outpatient care within the UHS is provided by public establishments.

Private health insurance plans fall into four main categories: (a) group practices, a prepayment modality that represents 47% of the private health care market; (b) medical cooperatives, a prepayment modality that represents 25% of the market; (c) company health care plans, which combine self-managed services and services purchased from third parties in various modalities and represent 20% of the market; and (d) traditional indemnity insurance, through which benefits are paid to the insured or to third parties, which represent 8% of the market. In 1995, 20% of the Brazilian population, some 34 million persons, were covered under private health insurance plans, at a total cost of US\$ 6,400 million.

### *Management, Regulation, and Delivery of Services*

Basic operational guidelines (BOG) for the UHS were approved under the organic health legislation. At present BOG 01/96 is being implemented. This BOG defined the managerial responsibility of each level of government within the UHS. In addition to strengthening managerial functions and the capacity of the municipal governments and the Federal District to deliver services to the population, BOG 01/96 promotes the process of decentralization through mechanisms for the automatic transfer of federal resources to the states and municipalities. It also strengthens processes of shared management between the Federal Government and the state and municipal governments through tripartite and bipartite joint management commissions, which serve as permanent forums for negotiation and consensus-building. The municipal UHS card is an instrument that helps to ensure citizen access to the health care system. It is a document that is valid nationwide, entitles the UHS user to receive services outside his or her area of residence, and insures reimbursement of the costs to the system that provided the services.

BOG 01/96 establishes a mechanism for joint integrated

programming and defines responsibilities, requirements, and prerogatives for health management at the municipal and state levels. Municipalities are entitled to take over full management of basic health care or of the entire municipal system; those that do not opt to do so continue to be service providers within the state system. Similarly, the states are entitled to take over full management of the state system.

The joint management commissions are intended to facilitate coordination between the municipal, state, and federal governments and ensure unified management of the system at each level, without duplication or omission of activities. The tripartite joint management commission is composed of equal numbers of representatives of the Ministry of Health, the National Council of State Secretaries of Health, and the National Council of Municipal Secretaries of Health. It is a forum for negotiation and agreement between managers of the three levels of public health administration for the implementation of national policies and guidelines. The bipartite joint commissions are made up of equal numbers of representatives of the state secretariat of health and the representative entities of the municipal secretaries of health within the state.

The health councils are permanent advisory bodies established at each level of government. Their principal functions are to formulate strategies for the implementation of sectoral policies and to oversee the execution of health policies and activities, including their economic and financial aspects. They consist of equal numbers of representatives of the various groups of users (labor unions; neighborhood associations; associations of retired persons, patients, and disabled persons; and other groups of society) and representatives of the various segments of the health sector (governments, service providers, and health professionals). At the federal level, the National Health Council was created pursuant to legislation enacted in 1990 and has been functioning regularly and systematically since its creation. Health councils are now operating in all 26 states, the Federal District, and almost 3,000 municipalities.

Health conferences are held regularly as a means of encouraging social participation in the development of the health system. They are convened every four years to assess the health situation and propose guidelines for the formulation of health policies. In preparation for the national conference—the most recent one was held in September 1996—health conferences are held at the municipal and state levels.

### *Organization of Health Regulatory Activities*

**Delivery of Health Services: Health Care Facilities and Standards of Care.** The construction and upgrading of health care establishments is regulated by technical standards set by the Ministry of Health for physical infrastructure pro-

jects, taking into account cost-related criteria and the needs of the health care system. The training program in health facility architecture includes two specialized courses at the federal universities of Brasília and Bahia.

Evaluation and certification of health services is one of four strategic projects being carried out under the Brazilian quality and productivity program for the 1996–1998 period. The Ministry of Health also has several initiatives aimed at enhancing quality management in health services, with emphasis on hospital management. Another line of action in this area is the process of health service accreditation. Two institutions were recently created for this purpose: the Brazilian Institute of Hospital Accreditation (1995) and the Pará Institute of Hospital Accreditation (1996).

Special mechanisms have been instituted to monitor and evaluate procedures that are considered highly complex and costly for the UHS. For example, technical regulations have been established for the operation of renal therapy services, which set specific standards for units that perform kidney dialysis and transplants. In addition, a specific federal law regulates the extraction of human organs, tissues, and body parts for transplant and treatment purposes and lays the foundation for the creation of a national transplant system.

**Certification and Practice of Health Professionals.** Authorization to practice the various health professions is granted by the respective professional boards to candidates who hold a degree from a university or technical school. These boards are autonomous public entities created by law and entrusted with regulating and monitoring the practice of professionals in their respective areas of specialization throughout the country.

**Basic Health Markets: Technologies, Drugs, and Other Inputs.** Technology assessment has been a constant feature of health reform in Brazil and is seen as a means of establishing appropriate criteria for the use of technological resources. The general basis for action in this area is provided by the Organic Health Law and the conclusions of the First National Conference on Health Science and Technology. A set of proposed policy guidelines on health technology is currently under discussion within the Ministry of Health.

The health regulations on drugs, equipment, and cosmetic and hygiene products are enforced by the Health Surveillance Secretariat within the Ministry of Health. Federal legislation regulates the manufacture of these products and requires market authorization before they can be sold. Within the framework provided by the Constitution of 1988 and the legal instruments adopted subsequently, in particular those that created the UHS and the consumer protection code, a national health surveillance system has been established. This system facilitates intersectoral coordination and defines the

responsibilities of the three levels of government within the health system. The National Health Quality Control Institute serves as a national reference and quality control laboratory for an integrated network of state and university institutions. A technical and administrative structure for the national health surveillance system, which will enable it to fulfill its assigned responsibilities, is still being developed.

**Environmental Quality: Water, Air, Soil, Housing, and Chemical Safety.** The foundations for Brazilian environmental policy are established by the Constitution and by Law 6.938/81, which created the national environmental system. Decentralization of the execution of environmental policy to the state and municipal levels is currently a priority. Guidelines have been formulated for the establishment of a national health and environment plan oriented toward ensuring sustainable development, with broad multisectoral participation.

Several World Bank-financed projects for the cleanup of rivers, bays, and watersheds in major Brazilian cities are currently under way. Recent federal legislation created the national system for the management of water resources, which regulates the use of watersheds through specific interinstitutional committees. To alleviate the housing shortage (there are 5.1 million housing units that lack adequate infrastructure or are located in extremely overcrowded areas), the national housing system invested US\$ 2.83 million in 1995–1996, benefiting 393,000 families.

Air pollution is a major problem in large urban areas, especially the São Paulo metropolitan region. In every month of the year this region registers pollution levels that exceed the limits considered tolerable, especially particulate matter and carbon monoxide, mainly from automobile exhaust.

Control of agricultural toxins is regulated by intersectoral legislation and involves the Ministries of Health, Agriculture, and Environment. The health sector is responsible for toxicology assessments. Eleven Brazilian states are currently participating in the system that monitors the health effects of agricultural toxins.

**Food Control.** Food control is a component of the national health surveillance system. Specific legislation establishes basic regulations for the registration, control, and labeling of food products as well as product identification and quality standards, monitoring, and related administrative procedures. The state secretariats of health participate in technical analysis for product registration processes, and health inspection activities are decentralized to state or municipal agencies. The Ministry of Agriculture, through the Secretariat for the Protection of Agriculture and Livestock, is responsible for registration and inspection of products of animal origin, beverages, pesticides, and pharmaceutical products for veterinary use. In the case of agricultural products intended for ex-

port, regulatory activities are carried out directly at the federal level. The National Codex Alimentarius Committee and the Technical Advisory Commission on Food are currently operating. The National Health Quality Control Institute coordinates regulatory activities relating to laboratories.

## Health Services and Resources

### *Organization of Services for Care of the Population*

The UHS encompasses the diverse activities carried out at the three levels of government to meet health care and environmental health needs. Health care services for individuals or groups are provided through outpatient facilities, hospitals, or home health care services. Environmental health activities focus on control of vectors and hosts, operation of environmental sanitation systems, and health conditions in the home and work environment. Policies outside the health sector deal with the social determinants of the health-disease process.

The establishments that make up the municipal level of the UHS need not necessarily be owned by the municipality or located within its territory. The important thing is that they organize and coordinate among themselves so that the municipal government can ensure the population's access to health services and the availability of comprehensive care.

**Health Promotion.** Since 1994 the Ministry of Health has been carrying out a program of family health as a strategy for reorganizing primary health care. The program seeks to incorporate health promotion into traditional medical care through reorganized health units that focus on families and their social relations within a given area. As of December 1996 the program had been extended to 228 municipalities. The community health agents program is also being expanded. The objective of this program is to develop community-based health care and organize basic activities at the local level. As of December 1996, there were some 45,000 health agents working in the program.

Several programs at the national level are aimed at ensuring comprehensive care for the health of women, children, and adolescents. They emphasize education and prevention, identification of risk groups, and early detection of health problems. Maternal and child health care also include specific activities carried out under the programs on immunization, breastfeeding, care for children with physical and mental disabilities, control of specific nutritional deficiencies, care for malnourished children and pregnant women at nutritional risk, and control of AIDS and other STDs. Since 1995 the project on reduction of infant mortality has been coordinating specific maternal and child health and basic sanitation activities in the 913 municipalities with the highest levels of poverty.

The national policy on aging includes guidelines on health of the elderly, which seek to ensure prevention and health promotion activities for this population group as well as care for the recovery of health at the various levels of the UHS. The policy also encourages the participation of the elderly in social management of the health care system.

Some of the municipalities that have made the most progress in decentralization have succeeded in mobilizing the local community and initiating intersectoral health promotion activities in the framework of the healthy communities strategy. A pioneering experience launched in 1993, in Campinas, São Paulo, highlighted the importance of formulating policies aimed at improving the living conditions of the poor population through public programs and projects on public housing, sanitation and public services in low-income housing developments, food processing, assurance of a minimum family income, creation of jobs, etc. As a result of this experience, in 1996 Campinas received the Latin American "Healthy Community" award, granted by PAHO. Similar activities were carried out in the state of Paraná under a project in the municipality of Palmeira. These initiatives have served as models for other districts in the country.

Health promotion efforts receive an important boost from the national mass communication campaigns carried out by the Federal Government to focus attention on priority areas of action. The Government spends some US\$ 50 million annually on these campaigns, which are developed by advertising agencies and broadcast on television and radio. AIDS prevention is one of the major campaigns.

The press is also devoting increasing attention to health issues in response to concerns revealed by public opinion surveys.

**Disease Prevention and Control Programs.** Communicable disease control activities are carried out through specific programs and initiatives overseen by the National Health Foundation, with variable degrees of interinstitutional articulation and coordination. The creation of the UHS and the general process of sector restructuring have necessitated the development of new models for the management of these activities, with managerial decentralization to the municipal level and organization of statewide and nationwide technical support systems in strategic areas (information and research).

In the area of vector-borne disease control, similar efforts are under way to replace the traditional model of intervention, based on short-term centrally managed campaigns, with ongoing intersectoral activities managed at the local level. These efforts have stressed training of personnel in decentralized services in the application of control instruments whose use was previously very limited. Interaction with the academic sector and scientific associations, such as the Brazilian Society of Tropical Medicine, provides technical support for

government actions and is a source of crucial input in specific areas. Among the most noteworthy of the programmatic initiatives carried out thus far are the integrated malaria control project, the plan for the eradication of *Aedes aegypti*, the extension of training in entomology, and joint projects with states and municipalities for the control of schistosomiasis, filariasis, and onchocerciasis. An important element of support of the process of decentralization is the program for the development of zoonoses control centers to monitor animal populations that serve as reservoirs and vectors of disease. Eighty-five of these centers are currently operating in large and medium-sized Brazilian cities.

National programs for the control of lung diseases and skin diseases of public health importance have been decentralized for many years and are carried out by the general health services system with technical support from the Ministry of Health. In the case of tuberculosis and other lung diseases, support is provided by a national reference center and by macroregional technical units in close coordination with the Brazilian Society for the Study of Lung Disease and Tuberculosis. One of the activities planned for the future is the implementation of an emergency plan for tuberculosis control in 250 municipalities in which 70% of the country's tuberculosis patients reside. With regard to leprosy and other skin diseases of public health importance, there are three national reference centers and a plan for the elimination of leprosy as a public health problem by the year 2000. State control programs have been strengthened and epidemiologic stratification of the problem to the municipal level has been undertaken with a view to developing differentiated interventions in some 400 municipalities where 85% of all leprosy patients are concentrated. Projects for the detection of cases in areas surrounding the principal Brazilian capitals are also under way.

Control of vaccine-preventable diseases is routinely carried out by the health services system. Special strategies are adopted for certain types of vaccines or specific areas, in accordance with the programming established jointly by national, state, and municipal managers of the UHS. Data on coverage and doses of vaccine administered have been available in all municipalities of the country since 1995. The oral polio vaccine continues to be given annually on two national immunization days, when 90% of children under the age of 5 are vaccinated. Other vaccines are also administered on these immunization days, selectively and according to local needs. To prevent a buildup of susceptible people after the mass measles vaccination campaign carried out in 1992, a new campaign was conducted in 1995. As a result of these campaigns, 86% coverage has been achieved among children under age 4. Mean annual coverage levels among children less than 1 year old for the routinely administered vaccines are approximately 95% for BCG, 75% for DTP, and 80% for the measles vaccine. The percentage of children who fail to com-

plete the three-dose DTP series is about 15%; the North and Northeast regions have the lowest coverage rates. Vaccination against groups A, B, and C meningococci is carried out sporadically in response to epidemic situations. In areas with a high prevalence of hepatitis B, children under the age of 1 are routinely vaccinated. The governments of six states in the South and Southeast have utilized their own resources to implement routine administration of the triple measles-rubellamumps vaccine. Some municipal health programs have also begun to use the *H. influenzae* type B vaccine.

Under a national program for the control of cervical cancer launched by the National Cancer Institute in 1996, pilot projects are to be implemented in five state capitals.

**Epidemiologic Surveillance Systems and Public Health Laboratories.** The national epidemiologic surveillance system comprises a set of technical norms and procedures applicable at all levels of the health system to make relevant and timely information available to guide activities for the control of specific diseases and health impairments. At the national level, the Ministry of Health determines which diseases are reportable and establishes the corresponding requirements. The state and municipal secretariats of health are responsible for carrying out the activities in their respective territories, complementing the regulatory guidelines, and adding to the national list other diseases of regional or local importance. When necessary, the technical agencies of the Ministry of Health provide additional support to the states, including investigation of epidemics. Currently, there are 25 diseases that are required to be reported at the national level in Brazil. The list includes communicable diseases targeted by national control programs. Food and nutrition surveillance is carried out by a specific system, which is currently operating in 1,050 municipalities.

In recent years the Ministry of Health has been working to ensure better coordination of the activities of its various technical agencies. The creation of the National Epidemiology Center in 1990 was an important step in this direction. This center provides standardized instruments for the collection of data and disseminates information regularly by means of a national epidemiologic bulletin. The system is currently in the process of adapting to the changes in the sector through the establishment of local structures, which implies decentralization of activities that have traditionally been carried out by national health agencies and training of central-level personnel to support the state and municipal systems.

Laboratory support for disease control activities is coordinated nationally through a network of specialized services composed of reference centers and macroregional laboratories that provide technical support for state and municipal epidemiologic surveillance systems. As of 1994 the network included reference laboratories for meningitis, diphtheria, tuberculosis, leprosy, leptospirosis, cholera and other bacterial

infections, hepatitis, arboviruses, enteroviruses, measles, rubella, rabies, Chagas' disease, and leishmaniasis. With financial support from the Ministry of Health, this network produces technical manuals, trains human resources, provides technical assistance and supervision, and produces some diagnostic reagents.

**Drinking Water and Sewerage Services.** Constitutional provisions specify that municipal governments are responsible for the management of basic sanitation services. Available information indicates that approximately 15% of Brazilian municipalities are managing these services directly and 75% have services managed by state-run sanitation companies. No information is available for the remaining 10%. Funding for the national sanitation policy is provided out of the national budget and user contributions. The Ministry of Health manages part of these resources directly through the National Health Foundation.

Data from 1995 indicate that 76% of households nationwide are connected to a water supply system. In urban areas the proportion is 90%, and in rural areas it is about 17%. By region, coverage levels are highest in the Southeast (96%), followed by the South (93%), the Northeast (84%), the Central-West (82%), and the North (70%).

Of the households included in the national survey carried out in 1995, 60% overall were connected to a sewer system or had a septic tank, but the coverage was much higher in urban areas (71%) than in rural areas (14%). By region, the highest coverage is in the Southeast (87%), followed by the South (72%), the Northeast (47%), the North (46%), and the Central-West (42%). Septic tanks are used in 20% of households (23% in urban areas and 45% in rural areas), while 29% of households (25% in urban areas and 45% in rural areas) have rudimentary cesspits or dispose of their waste in rivers or irrigation trenches. In comparison with the 1991 census, there has been a reduction of 4.3% in the number of households that lack any sanitation facilities or any system of waste elimination. Of the total amount of wastewater collected, only 20% is treated at a water purification plant, stabilization or aerobic-anaerobic lagoon, oxidation pond, or by some other method.

**Management of Municipal Solid Waste.** In 1995, 72% of Brazilian *municipios* had regular refuse collection by public or private sanitation services. In urban areas, 87% of households have refuse collection services, but the proportion is only 10% in rural areas. In the other municipalities (28%) refuse is burned, buried, or simply dumped in vacant lots, lakes, rivers, or the ocean. In urban areas, data from 1989 indicate that of all the waste collected daily, 49% is disposed of in open-air dumps, 22% is disposed of in controlled landfills, 23% is dumped in sanitary landfills, and only 6% is composted, recycled, or incinerated.

**Prevention and Control of Air Pollution.** Resolutions of the National Council on the Environment (CONAMA) have established national air quality standards and have also established air pollution standards for the development of an emergency plan to be applied in critical situations. A program to control air pollution produced by motor vehicles has been in operation since 1986 and has established maximum emission levels. As of 1997, all new cars are required to meet maximum emission levels similar to those in developed countries. Almost one-third of the national vehicle fleet runs on hydrated alcohol fuel, and all gasoline must be blended with alcohol. Air pollution from fixed sources, especially industry, is regulated in the case of new industries through the establishment of emissions standards for combustion processes.

**Food Protection and Control.** A national system for epidemiologic surveillance of foodborne diseases is currently being organized. In 1996, 349 outbreaks were registered in seven states, with 11,341 cases. Investigation of the outbreaks revealed *Staphylococcus aureus*, *Salmonella* sp., and *Clostridium perfringens* as the causal agents. The principal determining factors were faulty raw materials; lack of hygiene; incorrect food-handling, cooking, or reheating practices; and storage at improper temperatures. New food-processing technologies are being introduced, and risk analysis as well as analysis of critical control points is being applied. A total of 1,040 professionals have been trained in this area in the past five years.

**Food Aid Programs.** To combat vitamin A deficiency, close to 5.8 million children received vitamin A supplements during the immunization campaigns carried out in the Northeast region between 1983 and 1991. In 1994 the program was extended to other endemic areas, and a coverage level of more than 80% was achieved.

In 1995 new legislation relating to iodine deficiency disorders was enacted. The Ministry of Health is responsible for ensuring the supply of iodine to salt distributors. Regulation of this supplement and establishment of a higher standard for salt iodization (from 40 to 60 mg/kg) have been important steps toward reducing this problem in the country.

Activities at the national level aimed at controlling iron deficiency anemia are limited to ensuring the availability of ferrous sulfate supplements through health services within the health care system.

#### *Organization and Operation of Personal Health Care Services*

According to the most recent data on current capacity of the health sector, in 1992 there were 49,676 health care establishments: 27,092 (55%) in the public sector and 22,584 (45%) in the private sector. There were 24,016 outpatient

care facilities (65% public); 7,415 hospitals (28% public); 8,440 emergency care facilities (38% public); 16,400 specialized diagnostic centers (25% public); 1,078 blood banks (28% public); 7,050 specialized treatment centers—radiation therapy, chemotherapy, etc. (28% public); and 429 psychiatric care facilities (20% public). Eight percent of public establishments and 24% of private establishments provide inpatient care. The country has 544,357 hospital beds, or 3.6 per 1,000 inhabitants, 25% in the public sector and 75% in the private sector. The vast majority of psychiatric hospital beds (100,749, of which 30% are in public-sector facilities) are concentrated in the Southeast (63%), compared with the North (less than 1%), and the Northeast (18%). The Southeast and South regions of the country possessed about 60% of the total installed capacity in terms of establishments and available beds.

The implementation of the REFORSUS plan is expected to enhance the current capacity of the UHS. The objectives are to upgrade the physical facilities and technological capabilities of the health system—especially in the areas of obstetric, perinatal, and emergency care in large urban areas—as well as to expand the family health program and improve the capacity and quality of the hematology and hemotherapy system and the public health laboratories.

In some states intermunicipal health consortia are being formed. These are civil associations established by the governments of several municipalities. The consortia pool institutional resources of the municipalities and ensure referral to public facilities that provide hospital and specialized care for the entire population living in the intermunicipal area, thus reducing dependence on health care facilities in the large urban centers.

### *Inputs for Health*

**Drugs.** Brazil is one of the world's 10 largest consumer markets for drugs, with a 1.5%–2.0% share of the world market. Gross receipts in the domestic drug market totaled US\$ 9,700 million in 1995, a 15% increase with respect to the previous year. The pharmaceutical industry directly generated 47,100 jobs in 1996, with overall investments of US\$ 200 million in that year. The sector comprises some 500 companies, including drug producers, chemical-pharmaceutical industries, and importers. There are 45,000 pharmacies that sell 5,200 products in 9,200 different forms. The population segment whose income is more than 20 times the minimum wage—which comprises 15% of the total population—accounts for 48% of all spending on drugs, with a mean annual expenditure of US\$ 193 per capita. The segment whose income is 4–10 times the minimum wage makes up 34% of the population and accounts for 36% of spending on drugs, with

a mean annual expenditure of US\$ 64 per capita. Another 51% of the population accounts for 16% of spending on drugs, with a mean annual expenditure of US\$ 19 per capita.

The government drug program is administered by the central drug exchange (CEME). This is an agency linked to the Ministry of Health, which is responsible for the procurement and distribution of drugs for 23 specific programs coordinated by the Ministry, with an approximate value of US\$ 1,000 million in 1997. Of the resources allocated by the CEME to meet this demand, 47% are from public-sector laboratories, which supply 38% of the products procured.

In 1995, pursuant to MERCOSUR agreements, the Secretariat for Health Surveillance officially adopted the good manufacturing practices recommended by WHO. The same year, a national program for the inspection of the pharmaceutical and pharmacochemical industries was established and several courses on good manufacturing practices were offered. Inspection activities have been stepped up considerably during the past few years.

**Immunobiological Products.** Since 1985 the country has had a program for national self-sufficiency in immunobiological products, aimed at ensuring the availability of the vaccines and sera used in public health programs. The program has strengthened national institutions, mainly in the public sector, which have gained experience in the development of immunobiological products. In its 11 years of existence, some US\$ 100 million in federal funds have been invested for the construction and improvement of laboratories, purchase of equipment, and training of human resources. To ensure the quality of the products supplied to health services, whether or not they are manufactured in Brazil, the program sends each production lot to the national quality control institute for analysis.

In 1996, the national immunization program used 196 million doses of 26 different types of vaccines and sera worth a total of around US\$ 84 million. Of this amount, close to 76 million doses were manufactured in the country, which was sufficient to meet the total demand for BCG, tetanus toxoid, double antigen, yellow fever, and human and canine rabies vaccines as well as antivenom, antitetanic, antipertussis, and antirabies sera. If all the production facilities currently under construction are completed, by the year 2000 Brazil will be in a position to supply other South American countries with DTP vaccine and its components, BCG, antitoxins, and antivenins.

**Equipment.** The total national stock of medical and hospital equipment in the public sector has an estimated worth of US\$ 7,000 million. However, 20%–40% of this equipment is inoperative because of procurement-related problems, poor quality, improper use, deficient management and maintenance, and lack of regular programs to finance investment in

modernization. This situation is related to the shortage of equipment management and maintenance units, which exist in only 1% of hospitals with more than 120 beds, and also to the shortage of specialized professionals (maintenance engineers and technicians). Consumption of medical and hospital equipment and materials in Brazil in 1995 totaled close to US\$ 2,000 million, which represents 1.7% of the world market for these products. Domestic industries met about 60% of internal demand, with equal participation by the public and private sectors.

Since 1991 the Ministry of Health has been promoting the establishment of equipment management and maintenance systems, training of specialized human resources, institution of quality assurance systems, and development of proposals for technology assessment. These initiatives, though not yet consolidated, have produced notable results in the institutionalization of professional training programs, assessment and establishment of regulations relating to equipment, and projects for investments in the health services system, especially projects financed with external resources, such as REFORSUS.

### *Human Resources*

Brazil has 513,338 health professionals, of which 40.1% are physicians, 26.8% are dentists, 13.2% are professional nurses, 10.1% are pharmacists, and 9.8% are veterinarians. There are 757 inhabitants per physician, 1,132 per dentist, 2,330 per nurse, and 2,981 per pharmacist. Increasing numbers of women are entering the medical profession. In 1996, 31.9% of all practicing physicians in the country were women.

The distribution of health services and health professionals in the country is characterized by a heavy concentration of human resources in the most developed regions and in the state capitals. Fifty-nine percent of all physicians, 51% of nurses, 50% of pharmacists, 63% of dentists, and 44% of veterinarians reside in the Southeast. The region with the smallest proportion of medical professionals is the North, which has only 5.3% of the human resources in all categories.

The number of graduates in the medical profession during the 1992–1994 period remained relatively stable, with a slight upward trend in the fields of dentistry and pharmacy and a reduction in the area of physical therapy. Data from 1992 indicate that there were some 300,000 health professionals who had not completed a degree or certification program. These professionals make up 56% of the total health work force in Brazil and 52% are employed in the public sector.

The health sector accounts for about 8% of all jobs in the formal economy of the country. One-third of these health sector jobs are in public administration at one of the three levels of government.

### *Research and Technology*

In recent decades, activity in the area of health science and technology in Brazil has come to depend on extrasectoral support, mainly from federal development agencies, which have allocated 25%–35% of all the funds they invest to health. This support has strengthened the infrastructure for research, especially in the biological sciences. Nevertheless, in the sectoral sphere, institutional research has been weakened and has become increasingly less responsive to the needs of the health system.

With regard to Brazilian scientific output, records from the LILACS (Latin American and Caribbean Literature on Health Sciences) database for the 1981–1992 period show that more than half the indexed publications were Brazilian. According to the database of the Institute for Scientific Information, the number of citations with one or more Brazilian authors increased from 1,317 in 1981 to 2,841 in 1992, totaling 23,975 publications for the period in 1,429 specialized journals; only nine of these journals were published in Brazil.

The need for guidelines for the development of science and technology in the country led to the organization of the First National Conference on Health Science and Technology, which brought together representatives of institutions from all concerned segments of society. This conference approved a set of basic principles for the development of a national policy in this area. One of the most important outcomes of this process was the adoption by the National Health Council—in 1996, after a broad process of social consultation—of guidelines and standards to regulate research on human subjects.

### *Expenditures and Sectoral Financing*

According to the Constitution, the funding allocated for the UHS includes financing for the social security system, which is organized by the Government and encompasses health, social insurance, and social welfare services. The resources come from public budgets at the three levels and from direct taxes on wages, billing, benefits, and financial transactions. In the framework of the REFORSUS project, external resources will be invested in the service delivery infrastructure, in managerial training for personnel in the state and municipal health secretariats, and in the family health program.

Public spending on health at the three levels of government, which in 1989 was US\$ 13,200 (US\$ 96 per capita), declined enormously in subsequent years, dropping to US\$ 8,700 million (US\$ 63 per capita) in 1992. This sharp reduction paralleled a reduction in federal spending, which historically has accounted for three-fourths of total public spending, and was 42% lower in 1992 than in 1989. In 1993, federal public spending began to rise again gradually, reaching US\$

14,000 million in 1996, approximately 25% more than in 1989.

In January 1997 the country instituted a temporary tax on financial transactions, aimed at raising funds to address the urgent needs of the health sector. The tax, which was to remain in effect until February 1998, was expected to generate some US\$ 4,800 million, making it possible to increase the federal health budget by approximately 30%. After the tax is discontinued, the higher level of health spending is to be financed through alternative sources of funding created as a result of a constitutional amendment formulated by the National Congress and in negotiation with the Federal Government.

In 1995, private insurance plans mobilized resources totaling US\$ 6,400 million. The median per capita value of the resources managed by private insurers ranges from US\$ 83 to US\$ 150 monthly.

#### *External Technical and Financial Cooperation*

Brazil receives international technical cooperation for health from a broad range of sources, most of it aimed at meeting needs relating to management and quality control in connection with the establishment of the UHS. This cooperation is formalized through projects with an average duration of three to five years.

Scientific cooperation is provided in response to the needs of Brazilian and foreign investigators, generally on a sporadic and short-term basis without formal agreements between the parties involved.

Currently, Brazil is participating in bilateral technical cooperation initiatives with Canada, China, France, Germany, India, Italy, Japan, Russia, Spain, the United Kingdom, and the United States. The characteristics of this cooperation differ with each country. Some involve single, long-term projects and a large

volume of resources (the United Kingdom); in other cases the projects are smaller and are renewable every two years (France). Diversified cooperation is not the norm, except as in cases where training programs are linked to the projects (Japan). Brazil offers attractive conditions for foreign projects in the field of clinical research, but before allowing such research projects to be carried out the country has had to establish agreements on technology transfer, intellectual property rights, internationalization of production, and compliance with legal provisions concerning research on human subjects.

Brazil cooperates bilaterally on health matters with various developing countries, including Bolivia, Colombia, Cuba, El Salvador, Paraguay, Venezuela, and Palestine. There are also official cooperation arrangements with several foreign non-governmental organizations, which are mainly interested in health of the indigenous population.

With regard to multilateral cooperation, the Brazilian health sector participates in technical commissions in various spheres: MERCOSUR, the Treaty for Amazonian Cooperation, entities that regulate medical care on the country's southern border, and the Community of Portuguese-Speaking Countries. PAHO cooperation with Brazil is based on strategic and programmatic orientations validated in the country by means of a joint evaluation process that establishes biennial priorities and regular programming instruments.

Two major sources of international financial cooperation in the area of health are the United Nations Population Fund, which contributes significantly to the program on women's health, and the World Bank, which has supported large-scale projects, such as those for control of endemic diseases in the Northeast and control of malaria in the Amazon region. The REFORSUS project, as noted above, is being financed by the IDB and the World Bank. Also under way are two projects for the prevention and control of drug use, which are receiving support totaling US\$ 2.4 million from the United Nations International Drug Control Program.