

BRAZIL



Sources: Second Administrative Level Boundaries Dataset (SALB), a dataset that forms part of the United Nations Geographic Database, available at: http://www.who.int/whosis/database/gis/salb/salb_home.htm, and the Digital Chart of the World (DCW) located at: <http://www.maproom.psu.edu/dcw>. The boundaries and names shown here are intended for illustration purposes only, and do not imply official endorsement or acceptance by the Pan American Health Organization.

The Federative Republic of Brazil shares borders with all the countries of South America, except Ecuador and Chile. It has a constitutional system of government, with a president as head of state.

GENERAL CONTEXT AND HEALTH DETERMINANTS

The country's political-administrative organization comprises 26 states, 5,561 municipalities, and the Federal District, seat of the federal government. Constitutionally, the Government of Brazil consists of three independent branches: legislative, executive, and judicial. The Federal Constitution of 1988 consolidated the return of democratic government after two decades of military regimes. The country is divided politically and geographically into five regions (North, Northeast, Southeast, South, and Center-West), which share some common physical, human, economic, and cultural features (1).

Social, Political, and Economic Determinants

According to the *Human Development Report 2005* (2), Brazil ranks 63rd in the classification of countries based on the human development index (HDI). Its HDI was 0.71 in 1990, 0.74 in 1995, 0.76 in 2000, and 0.79 in 2003. In 2000, the highest HDI levels were registered in the Federal District (0.84), Santa Catarina (0.82), and São Paulo (0.82), and the lowest were in Maranhão (0.64), Alagoas (0.65), and Piauí (0.66) (3). In 2000, HDI-M (HDI at the municipal level) among the white population was 0.81, while among the black population it was 0.70. If the white population made up a separate nation, that country would rank fourth in the world and would be considered highly developed (HDI of 0.80 or over). The black population, with its medium level of human development (HDI of 0.50–0.79), would rank 10th. Clearly, there is a sizeable gap between whites and blacks. Between 1980 and 1991, the HDI-M of the black population rose relatively more than that of the white population, and the same trend was observed between 1991 and 2000. Over those two decades, the HDI climbed from 0.64 to 0.77 (an increase of 18.8%). The index among the black population rose 24.9% (from 0.56 to 0.70), whereas that of the white population increased 16.5% (from 0.70 to 0.81). Despite this greater growth in the HDI among the black population, however, the difference between the two groups remained significant: in 1980, the HDI-M of the white population was 24.4% higher than that of the black population, and in 2000, it was 16% higher. The difference in human development between these two populations is manifested mainly in income (one of the variables which, together with health and

education, are used to compute the HDI). However, as incomes changed little over the two decades—and in fact, they declined between 1980 and 1991—it was the other two factors that contributed the most to the rise in the HDI-M in both groups: education in the case of blacks and longevity in the case of whites. The educational component accounted for 55.5% of the improvement in the HDI-M among the black population between 1980 and 2000, reflecting a decline in illiteracy and an increase in school enrollment; longer life expectancy accounted for 36.3%, and higher income for 8.2%. In the case of the white population, higher life expectancy was the most important factor (51.1%), although education also played an important role (40.6%); higher income accounted for 8.4% of the improvement.

Per capita gross domestic product (GDP) in Brazil was R\$ 6,485.64 (6,485.64 Brazilian *reais*) in 2000 and rose to R\$ 8,694.47 in 2003. According to data from the Institute of Applied Economic Research (IPEA), the percentage of poor population (monthly income under half the minimum wage) was 33.3% in 2001 and 32.0% in 2004, with major inequalities between the country's various regions and ethnic groups. While per capita GDP in the Northeast region in 2003 was R\$ 4,305.86, in the Southeast it was R\$ 11,257.54. Similarly, the Northeast and North regions had the largest proportions of poor population in 2004 (55.47% and 43.30%, respectively), while the South and Southeast had the smallest proportions of poor population (17.84% and 20.43%, respectively).

Brazil is committed to achieving the goal of eradicating extreme poverty and hunger. One of the parameters used to measure extreme poverty in the country is the percentage of the population living on less than US\$ 1 a day, measured on a purchasing power parity basis (US\$ 1 PPP/day) (4). Between 1990 and 2003, extreme poverty decreased by almost half, dropping from 9.9% to 5.7% of the population, a 42.4% reduction. This fall in the rate of extreme poverty is attributed mainly to improvement of the situation in rural areas, where extreme poverty decreased from 24.2% to 13.5% between 1990 and 2003. In contrast, during the same period, the rate in urban areas changed hardly at all, standing at 4.8% in 1990 and 4.2% in 2003. One of the population groups most affected by extreme poverty is that of young people, who encounter difficulties entering the labor market, and when they do find jobs, they generally earn very low wages. In 2003, the unemployment rate among the population aged 16–24 was 19%—almost double the rate for the population as a whole

(10%). The situation is even more serious among young women, for whom the unemployment rate was 24.4%, versus 15% among their male peers.

Opinions regarding inequality in the distribution of income are somewhat divided: according to data from a recent report on Brazil's progress towards the Millennium Development Goals (MDGs) as of 2005 (4), inequality has remained unchanged in the last four years. In 1992, the poorest 20% of the population received scarcely 3% of total income, and in 2003 the figure had gone up by only one percentage point overall, although the size of the change varied with income level. In the poorest parts of the Northeast, the share of the poor rose from 1.5% to 4.4%, while in the Southeast the increase was only from 4.2% in 1992 to 4.5% in 2003. Despite this relative improvement in the situation of the poorest Brazilians, there was virtually no change in the income gap between the poorest and richest segments of the population. In 2003, as in 1992, although there were some regional variations, the richest quintile continued to account for more than half of total income. In the Northeast, for example, the gap between rich and poor decreased, but only because the share of the wealthiest 20% in that region fell from 60.7% in 1992 to 54.6% in 2003. In the Southeast region, on the other hand, the income of the richest quintile increased from 51.8% to 54.1% during the same period. According to the same report, blacks and mulattos are most affected by income inequality. Those two groups make up 68% of the poorest decile, whereas the richest decile is 87% white. Moreover, 32.2% of the poorest members of the population are black. In contrast, another report states that income inequality decreased significantly between 2001 and 2004 (5) and that the proportions of the population living in poverty and extreme poverty must therefore also have diminished substantially. Data from this report indicate that income inequality at the national level fell 4%, with a concurrent decrease in the Gini coefficient from 0.593 to 0.569. This improvement has been attributed to the development of a more effective social protection network, growth in local labor markets, and a reduction in both inequalities associated with education and differences in income by educational level. This study did not address regional differences, which are very marked. It is generally agreed, nevertheless, that there continue to be enormous disparities in income at the national level and that it will take another 20 years or so for income inequality in Brazil to approach the averages found in countries with similar development levels.

One of the most noteworthy changes currently taking place in Brazilian society is the worsening of poverty and social exclusion in metropolitan areas. The rapid exacerbation of social inequalities in the major cities has given rise to the expression "urbanization of poverty" to describe this phenomenon, which has been occurring since the middle of the last decade. The following data highlight the scale of the problem: (1) between 1993 and 2002, unemployment increased in Brazil's large cities in general and in

those of the Southeast in particular, where the unemployment rate rose from 9.3% to 13.2%, whereas during the same period the national rate increased from 6.3% to close to 10.0%; (2) employment in the formal sector fell from 55.5% in 1993 to 49.7% in 2002 in metropolitan areas, but increased from 37.5% to 38.4% for the country as a whole; (3) employment opportunities in unskilled jobs (jobs for workers with four to seven years of schooling) also decreased in metropolitan regions; and (4) in 2002, the rate of unemployment among women worsened in metropolitan areas (16.1%) and in the Southeast region, in comparison with the national average (11.7%), as did unemployment among heads of household (6). The growth of urban poverty is not being met with institutional responses that enhance the effectiveness of government policies, and the various levels of government rarely take into account this new geography of social exclusion and the need to address it when making the decisions and coordinating the activities that come under their responsibility (7).

The illiteracy rate among the population over 15 years of age was 11.4% for the country as a whole in 2004, with virtually the same rates among men (11.6%) and women (11.4%). There is considerable difference between the rates in urban areas (8.7%) and rural areas (25.8%), with regional variations ranging from 22.4% in the Northeast (with a high of 29.5% in the state of Alagoas) to 6.3% in the South. In the North, Northeast, and Southeast regions, illiteracy rates were higher among males than among females; in the Southeast and South regions, females had higher rates. The illiteracy rate also varied according to ethnic origin: 7.2% among whites, 16.5% among blacks, and 16.2% among mulattos. The functional illiteracy rate (inability to read, write, and interpret a short, simple text) was 24.4% for the country as a whole, with higher figures among men (25.0%) than among women (23.9%). Functional illiteracy among the rural population was twice as high as among the population living in urban areas (47.5% versus 20.1%). Among the regions, the rate ranged from 37.6% in the Northeast (59.4% for the population residing in rural areas) to 18.1% in the Southeast. Blacks and mulattos showed higher rates of functional illiteracy (32.0% and 31.2%, respectively) than whites (18.1%) (8).

Brazil is close to achieving universal primary education. The challenge now is more one of educational quality than of universality. A significant proportion (19%) of children who finish fourth grade do not perform adequately in reading and mathematics. High rates of enrollment also obscure the fact that more than 700,000 school-age girls still do not attend school because they live in remote rural areas, they are victims of sexual exploitation or child labor, or they suffer from some deficiency. Grade repetition and dropout are common: in 2003, some 2.8 million children left school before the end of the year. Many teachers are not adequately qualified, and their wages are generally extremely low in relation to the importance of the work that they perform (9).

The National Household Sample Survey (PNAD 2004) provided, for the first time, a direct indicator of food security among the Brazilian population, as measured by the Brazilian Food Insecurity Scale (EBIA) (10). Food security is understood to mean that residents of a household have not suffered food shortages, in terms of either quantity or quality, in the three months preceding the interview, and they are confident that they will not face this problem in the near future. At the other end of the scale, severe food insecurity is considered to exist when the residents of a household have gone hungry on at least two days during the three months preceding the interview. Food security was found to exist in 65.2% of the households surveyed, while 34.8% (approximately 72 million people) suffered from food insecurity. The survey's most noteworthy findings were: (1) food security was less frequent among households with at least one member under the age of 18, in comparison with households with no under-18 members; (2) food security rates were lower among household members under the age of 18 and increased with age, with the highest levels being among older adults (aged 65 and over); (3) food insecurity was consistently more common in households headed by women (in both urban and rural areas), and among such households, those that had seven or more members and whose members included children under 18 years of age were more likely to suffer from moderate to severe food insecurity; (4) among households with severe food insecurity, the largest proportion were black or mulatto households; and (5) severe food insecurity was substantially more frequent among households with a per capita income equal to one minimum wage or less.

In summary, Brazil is not a poor country, but it is an extremely inequitable and unequal one, in which a great many people continue to face enormous difficulties in exercising their citizenship. It is a fundamentally urban country, in which the urban poverty rate did not decline to the same extent as the rural poverty rate during the period 1990–2003, and in which labor force growth has outpaced job creation.

Urban violence and environmental degradation both worsened during the 1990s, and those trends continue today. Violence grew in the country's cities and became one of the most important factors in the loss of quality of life among urban populations. It permeates all facets of urban life, with devastating results, and breeds relationships among citizens that are characterized by feelings of insecurity, helplessness, aggressiveness, and self-defense, limiting the exercise of their citizenship and transforming public spaces into unhealthy environments (11).

Since 2003, the National Public Safety Secretariat (SENASP), the agency responsible for the planning, implementation, and monitoring of the national public safety policy, has been working to implement the Unified Public Safety System (SUSP). SENASP views information as the main tool for the work of public safety agencies, and is seeking to build for the first time in the

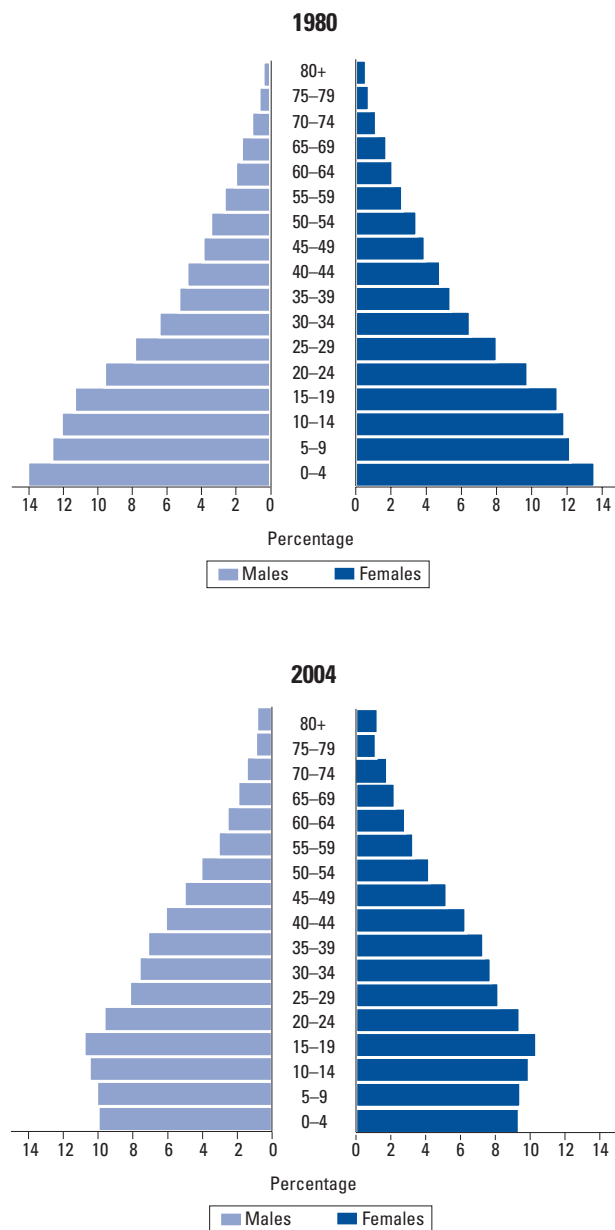
country an information system to support those responsible for planning public safety policies at the national and local levels (12).

Demographics, Mortality, and Morbidity

According to data from the Brazilian Institute of Geography and Statistics, in 2004 the Brazilian population numbered 186 million, and the average population density was 21.9 inhabitants per km², with values ranging from a high of 86.1 in the Southeast region to a low of 3.9 in the North. In 2004, 83.0% of the total population lived in urban areas. The sex ratio was 95 males per 100 females, with a higher proportion of men in the North region (101.4). The lowest male-female ratios were found in the metropolitan regions of Recife, Rio de Janeiro, and the Federal District (87.4, 87.9, and 87.6, respectively). The annual geometric population growth rate decreased from 1.9% during the 1980s to 1.6% during the period 1991–2000, with the lowest rates in the Northeast region (1.31%). The crude birth rate in 2004 was 20.6 per 1,000 population. Whites made up 51.4% of the population, mulattos 42.1%, and blacks 5.9%. While blacks constitute the largest proportion of the population in the North, Northeast, and Center-West regions (75.6%, 70.2%, and 56.1%, respectively), whites make up the majority in the South and Southeast (82.8% and 61.2%, respectively).

The total fertility rate has shown a downward trend, dropping from 2.9 children per woman in 1991 to 2.1 in 2004. This decrease has occurred in all regions, both among white women (2.4 in 1991 and 1.8 in 2004) and among blacks (3.5 in 1991 and 2.4 in 2004). The highest total fertility rates are found among white and black women in the North region (2.4 and 3.0 children per woman, respectively). Among women with eight or more years of schooling, the total fertility rate was 1.5 children, while among those with three or more years of schooling it was 3.9. Life expectancy at birth has risen from 67.0 years (1991) to 71.7 years (2004). For men, life expectancy increased from 63.2 years (1991) to 67.9 years (2004), and for women, from 70.9 years (1991) to 75.5 years (2004). Life expectancy at birth varies by sex and subpopulation. For white men, for example, it increased from 58.7 in 1980 to 64.4 in 1991 and to 68.2 in 2000, while for black men, life expectancy rose from 54.1 (1980) to 58.2 (1991) to 63.3 years (2000). Among white women, the corresponding figures were 63.4 years, 71.8 years, and 73.8 years (2000), and among black women, 60.6 years, 65.6 years, and 69.5 years, respectively (13).

The proportion of children under 5 decreased from 13.8% in 1980 to 9.7% in 2004, as Figure 1 shows. During the same period, the proportion of Brazilians aged 60 and over climbed from 5.8% to 7.8% (men) and from 6.4% to 9.2% (women). In 2004, the economically dependent population (under 15 and over 65 years of age) amounted to 35.4% of the total population.

FIGURE 1. Population structure, by age and sex, Brazil, 1980 and 2004.

The Northeast region continues to experience significant emigration of its population to other regions in the country. In 1991, the proportion of emigrants in relation to natives of the region was 15.1%, and in 2004 the proportion increased to 17.7%. Most of these emigrants move to the Southeast (10.4% of Brazilians born in the Northeast were residing in the Southeast in 1991, and by 2004, it had risen to 12.1%). The Center-West region is home

to the largest proportion of residents born in other regions of Brazil (31.4% in 1991 and 31.1% in 2004).

Mortality in Brazil has changed markedly over the years, with a decline in some infectious diseases and a resurgence of others, and with changes in the frequency of some non-infectious diseases and conditions, such as heart disease, diabetes, cancer, and death due to violence. The Mortality Information System (SIM) of the Ministry of Health recorded 1,024,073 deaths nationwide in 2004, of which 126,922 (12.4%) were due to ill-defined causes (Table 1).

Among the deaths from defined causes, cerebrovascular diseases were the leading cause, accounting for 10.1% of deaths, and ischemic heart diseases were the second leading cause (9.7%). These findings reflect the growing concentration of deaths in older age groups, coupled with the improvement of living conditions and the impact of public policies (for example, policies relating to basic sanitation, access to health services, and immunization) on the health of children and the consequent reduction in childhood deaths. Homicide ranks third as a cause of death in the general population and is the foremost threat to the lives of persons aged 10–59. Homicide is the third most frequent cause of death for males, but does not even figure among the first 10 causes for females. Males between the ages of 10 and 19 are six times more likely to be homicide victims than females of the same age. For men aged 20–59, the risk is seven times greater than among women in the same age bracket. Land transport accidents were the fourth cause of male death, but, again, do not figure among the 10 leading causes of female death. Diabetes mellitus was the third most frequent cause of death among women and the ninth among men.

The only communicable diseases among the first 20 causes of death were pneumonia and influenza, which ranked sixth. This may reflect problems with reporting of deaths, since pneumonia may be listed as the immediate cause of death, but there may be other, underlying causes that are not reported.

A comparison of mortality data for 1996 and 2004 reveals an increase in the risk of death from homicide (8.8%), diabetes mellitus (30.5%), and hypertensive diseases (38.0%). The risk of death from perinatal problems has declined 27.3% overall, although during the aforementioned period the risk of death from birth trauma increased 6.5%. The risk of death from land transport accidents fell 13.0%, possibly as a result of the adoption of more rigorous traffic laws in 1997.

During the period 1996–2004, deaths of children under 1 fell by 34%. By cause, the largest reductions were seen in deaths from meningitis (86.3%), human immunodeficiency virus (HIV) infection (69.8%), and intestinal infectious diseases (65.1%). Although mortality in the group aged 10–19 declined 11.0%, the risk of death from homicide increased 26.3%; in the group aged 20–59, the risk increased 6.1%. In the latter age group, the risk of death from alcoholic liver disease and from diabetes mellitus also rose (39.9% and 11.2%, respectively).

TABLE 1. Leading causes of death (rate, percentage change, and proportion of total mortality), Brazil, 1996 and 2004.

Cause category	Rate			Proportion of total mortality	
	1996	2004	% change	1996	2004
Total deaths	580.2	571.8	-1.4		
Ill-defined causes	87.5	70.9	-19.0	15.1	12.4
Defined causes	492.7	500.9	1.7		
Cerebrovascular diseases (I60–I69)	51.7	50.8	-1.9	10.5	10.1
Ischemic heart diseases (I20–I25)	47.0	48.5	3.0	9.5	9.7
Acute (I20–I24)	38.5	40.0	3.8	7.8	8.0
Chronic (I25)	8.5	8.5	-0.6	1.7	1.7
Assault (homicide) (X85–Y09)	24.8	27.0	8.8	5.0	5.4
Certain conditions originating in the perinatal period (P00–P96)	23.8	17.3	-27.3	4.8	3.5
Birth trauma and other obstetric causes (P01–P03, P10–P15)	1.4	1.5	6.5	0.3	0.3
Immaturity and related disorders (P05–P07)	2.2	1.8	-19.4	0.4	0.4
Respiratory disorders specific to the perinatal period (P20–P28)	13.9	7.7	-44.6	2.8	1.5
Bacterial sepsis of newborn (P36)	2.6	2.5	-3.4	0.5	0.5
Hemorrhagic and hematological disorders (P50–P61)	0.6	0.5	-29.8	0.1	0.1
Heart failure (I50–I51)	23.5	17.9	-24.0	4.8	3.6
Land transport accidents (V00–V89)	22.5	19.6	-13.0	4.6	3.9
Influenza and pneumonia (J10–J18)	21.7	21.0	-3.2	4.4	4.2
Chronic lower respiratory diseases (J40–J47)	20.0	21.5	7.3	4.1	4.3
Diabetes mellitus (E10–E14)	16.8	21.9	30.5	3.4	4.4
Hypertensive diseases (I10–I15)	12.5	17.2	38.0	2.5	3.4

HEALTH OF POPULATION GROUPS

Children under 5 Years Old

This group made up 9% of the population in 2004 and accounted for 6.1% of total mortality. Data from SIM indicate that most of these deaths occurred in the under-1 age group (87%). The Live Births Information System (SINASC) of the Ministry of Health, with an estimated coverage of 90%, recorded 3,026,548 births in 2004. Data for the period 2000–2004 indicate that around 8.0% of liveborn infants had low birthweight. The Southeast region had the highest proportion of low-birthweight babies during the period (9.0%), while the North and Northeast regions had the lowest proportions (6.6% and 7.1%, respectively). Those figures were higher than would be expected under optimum intrauterine growth conditions, although they are lower than the maximum of 10% established as a goal at the global level (14).

Three national studies on breast-feeding, carried out in 1975, 1989 (15), and 1999 (16), found a steady increase in the proportion of children who were still being breast-fed at 6 months of age (69% in 1999). At 12 months of age, however, the situation remained unchanged from 1989 (37%) to 1999 (35%), except in the Center-West region, where the proportion of babies still being breast-fed increased from 17% to 38%. As for exclusive breast-feeding, half of the children studied in 1999 were no longer being exclusively breast-fed at 30 days of age, and deficiencies exacerbated by that cause were observed in those children at 4 months

of age (18%) and at 6 months (8%), with no significant variations among the major regions. Brazil has a National Network of Breast-milk Banks, which in February 2006 included 187 units and 29 storage and distribution facilities; the network is operational in all states of the country (17, 18).

An analysis of the profile of liveborn infants by race or color showed differences in the following characteristics: (1) indigenous and black babies were more likely than white babies to have adolescent mothers; (2) white babies were more likely than indigenous or black babies to have mothers who had received seven or more prenatal checkups, while indigenous and black babies were more likely to have mothers who had not received any prenatal care; (3) white babies were more likely to have been born by cesarean section than black babies; (4) indigenous babies were more likely have been born premature; and (5) black babies were more likely to have been born with low birthweight, but both black and white babies in the Southeast, South, and Center-West regions were more likely to have been born with low birthweight than those in the North and Northeast regions (19).

The infant mortality rate decreased from 33.7 per 1,000 live births in 1996 to 22.5 per 1,000 in 2004. The causes of infant mortality have changed in recent decades, with a decline in deaths from infectious and parasitic diseases. In 1996, intestinal infectious diseases accounted for 8.0% of deaths of children under 1, but by 2004 the proportion had dropped to 4.0%. During the same period, the proportion of infant deaths due to perinatal

causes increased from 57.0% to 61.2%. The geographic inequalities are evident from the figures for 2004, when the risk that a child would die before reaching the age of 1 year was 2.23 times greater in the Northeast than in the South (20). The states with the highest and lowest rates, respectively, were Alagoas (47.1 per 1,000 live births) and Santa Catarina (13.6).

More infant deaths have tended to occur in the neonatal period as the proportion of avoidable deaths has decreased, thanks to basic health and sanitation interventions. In 2004, 66.5% of infant deaths occurred in the first month of life and 50.9% in the first week; in 1996, these figures were 60% and 47%, respectively. In 2004, the Northeast region had the largest proportion of infant deaths in the post-neonatal period (35.3%).

Among children 1–4 years old, the leading causes of death in 2004 were influenza and pneumonia (13.5%), congenital malformations (8.6%), intestinal infectious diseases (6.5%), land transport accidents (6.3%), and drowning (6.0%). Between 1996 and 2004, the risk of dying from influenza and pneumonia decreased 43.5%; from intestinal infectious diseases, 41.3%; from land transport accidents, 34.6%; and from meningitis, 88.5%. The Northeast region accounted for 56% of deaths from intestinal infectious diseases.

The implementation of several programs and activities since 1996 has helped to bring about a marked decline in infant mortality, among them the Comprehensive Women's Health Program (PAISM), the Comprehensive Child Health Program (PAISC), the strategy of Integrated Management of Childhood Illness (IMCI), the National Immunization Program (PNI), incentives to encourage breast-feeding, and monitoring of child growth and development. In addition, the Family Health Program has experienced substantial growth since 1999, achieving a coverage level of 47.7% of the Brazilian population—83 million people—in August 2006. The program boasts 26,000 teams comprising a doctor, a nurse, and a community health agent. Basic sanitation and poverty reduction programs have also played an important role, as have certain demographic factors, such as the decline in the fertility rate (21).

Children 5–9 Years Old

Primary-school-age children made up close to 9.0% of the population and accounted for less than 0.5% of total deaths in 2004. The main causes of death in this group were land transport accidents (18.1%), drowning (9.2%), leukemia (5.9%), influenza and pneumonia (5.5%), and congenital malformations (4.9%). During the period 1996–2004, the risk of dying from influenza and pneumonia fell 26.0%; from land transport accidents, 38.5%; from meningitis, 88.6%; from drowning, 17.8%; and from leukemia, 6.8%.

In 2005, 457,338 children from this age group were admitted to public hospitals (4.0% of total hospital admissions). The leading causes of hospitalization were diseases of the respiratory sys-

tem (29.2%), especially pneumonia (12.1%) and asthma (8.7%), and communicable diseases (17.9%), especially diarrhea and other intestinal infectious diseases (10.7%).

Adolescents 10–14 and 15–19 Years Old

Adolescents represented about 20.3% of the country's population and accounted for 2.4% of total mortality in 2004, with most of the deaths in this group being male deaths caused by accidents and violence. The death rate among adolescent boys (99.0 per 100,000 population) was far higher than the rate among girls of the same age (34.9 per 100,000 population). The leading causes of death among males in this group were assault (34.2%), land transport accidents (16.9%), drowning (6.3%), events of undetermined intent (4.0%), and intentional self-harm (3.2%). During the period 1996–2004, deaths from assault increased 26.3%, but the risk of dying from the other causes decreased—for example, the risk of death from land transport accidents fell 22.3%; from drowning, 28.2%; from suicide, 8.5%; and from leukemia, 8.0%. The mortality profile of this group differs between males and females. Among males, the first five causes of death are external, while among females the first two causes of death are external, but causes related to pregnancy and childbirth rank third (4.6% of deaths).

Injuries due to accidents and violence accounted for 9.4% of the total of 1,314,408 hospital admissions recorded in this age group in 2005. The leading external causes of hospitalization were falls (41.8%) and transport accidents (15.8%).

In 2004, a total of 661,290 births to adolescent mothers aged 10–19 were reported (21.8% of all births), a slightly lower proportion than in 1998 (24.0%). An estimated 26,726 live births (0.9% of the total) in 2004 were to mothers aged 10–14. The prevalence of low birthweight in this group (13.5%) was higher than the average in the general population (8%).

Adults 20–59 Years Old

Adults constituted 52.7% of the total population and accounted for 32.1% of all deaths registered in 2004 (37.9% of male deaths and 24.2% of female deaths). The mortality rate in the adult male population (501.5 per 100,000 population) was a little over twice the rate in the female population (219.8 per 100,000 population). The leading causes of death were assault (12.7%), land transport accidents (8.4%), ischemic heart diseases (7.7%), cerebrovascular diseases (7.1%), and cirrhosis and other diseases of the liver (4.8%). Between 1996 and 2004, the risk of dying from assault increased 6.1%. At the same time, mortality from other causes decreased, as did the risk of dying from land transport accidents (10.7%), cerebrovascular diseases (16.2%), ischemic heart diseases (3.3%), and HIV disease (38.1%). The risk of dying from external causes for a man 20–59 years of age (rate of 77.0 per 100,000 population) was 10 times higher than the risk for a

woman in the same group (5.9 per 100,000 population). The risk of dying from land transport accidents was six times higher for men than for women (rates of 47.1 and 7.8 per 100,000, respectively). Breast cancer (5.5%) and diabetes mellitus (4.6%) figure among the five main causes of death for women.

Maternal mortality in 2004, calculated for nine states that had consistent data, ranged from 44 deaths per 100,000 live births in the Federal District to 84 deaths per 100,000 live births in Mato Grosso do Sul. Although maternal deaths statistics are known to be deficient, it is estimated that the average rate for the country is probably around 76 deaths per 100,000 live births, based on an adjustment factor (1.4) obtained from a 2002 study of mortality among women aged 10–49. In 2004, 61.4% of maternal deaths were due to direct obstetric causes, notably eclampsia and antepartum hemorrhage. Important indirect causes—i.e., preexisting conditions complicating pregnancy—include infectious diseases, diabetes, anemia, and cardiovascular disorders.

In 2005, about 6 million hospitalizations of adults were recorded in public institutions, predominantly of women (67.3% of the total). Most were due to conditions related to pregnancy, childbirth, and the puerperium, which together accounted for 33.1% of all adult hospital admissions and for 49.1% of admissions among women. Excluding that group of causes, the main reasons for hospitalization were diseases of the digestive system (13.8%), circulatory system (12.9%), and genitourinary system (12.0%). External causes accounted for the largest proportion of hospital admissions among men (17.6%), followed by diseases of the digestive system (14.6%). Among women, excluding hospitalizations for pregnancy, childbirth, and the puerperium, diseases of the genitourinary system were the leading cause (18.2%).

In 2004, data on 3 million births showed that 52% of the mothers had seven or more prenatal visits, with the percentages ranging from 22% in Amapá to 69% in Paraná. The proportion of cesarean births was 41.8%. In 2000, support mechanisms were introduced with a view to establishing state systems for hospital referral of women with high-risk pregnancies, and special resources were allocated to humanize care during childbirth and newborn care, as well as to improve access, coverage, and quality of care. Data from the Ministry of Health on the first evaluation of the impact of the activities aimed at humanizing care during childbirth in the 29 principal maternity hospitals showed a reduction of 6.9% of neonatal deaths between 2004 and 2005.

Older Adults 60 Years Old and Older

In 2004, older adults made up 9.0% of the total population and accounted for 58.4% of total mortality. The proportion of adults over 60 years of age in the general population has increased steadily in all regions of the country, with women outnumbering men in this age group. In 1991, 7.8% of all Brazilian women and 6.8% of all Brazilian men fell into this age group; in 2004, the corresponding proportions were 9.2% and 6.8% (22, 23). The aging

of the Brazilian population is the result of the combination of high fertility rates in the past and lower mortality in younger age groups in recent decades. The proportion of people of advanced age within this group has also grown: persons older than 80 made up 0.8% of the population in 1991 and 1.1% in 2004.

The number of deaths among persons over the age of 60 has risen steadily, from 38% of all deaths during the three-year period 1979–1981 to 54% in 1998 and 58.4% in 2004. In the latter year, the proportions ranged from 45.8% in the North region to 63% in the South. The main causes of death were cerebrovascular diseases (13.6%), ischemic heart diseases (12.5%), chronic lower respiratory diseases (6.5%), diabetes mellitus (5.9%), influenza and pneumonia (5.2%), and heart failure (5.0%). During the period 1996–2004, the risk of dying from chronic respiratory diseases increased 3.0%; from diabetes, 28.5%; and from influenza and pneumonia, 14.0%. The risk of dying from cerebrovascular diseases and from ischemic heart diseases, on the other hand, fell 3.0% and 2.2%, respectively. The mortality profiles of males and females in this age group are very similar. Although a high percentage of deaths continue to be attributed to ill-defined causes (14.4%)—a proportion which is higher than the average in Brazil and is growing in the oldest subgroups—this figure represents an improvement in the quality of information on causes of death in comparison to the figure recorded in 1998 (18.0%).

The older adult population accounted for 9.5% of admissions to public hospitals in 2005, the main causes of hospitalization being diseases of the circulatory system (28.9%), respiratory system (17.7%), and digestive system (10.2%). The activities aimed at this segment of the population are governed by the National Policy on the Health of Older Adults, adopted in 1999 (24), which establishes guidelines, general strategies, and program priorities for promoting healthy aging, maintaining and improving the functional capacity of the elderly, preventing specific diseases, treating the sick, and rehabilitating persons with limited functional capacity. One of the major preventive interventions for this group is vaccination against influenza and pneumococcal pneumonia. Influenza immunization for those aged 65 and over was introduced in 1999, and the target population was subsequently expanded to include those aged 60 and over. Vaccination coverage rates reached the goal of 72% in 2000 and 84% in 2005. In 2006, 13.5 million people in this age group were vaccinated—a coverage rate of 85.7%.

Workers

Responsibility for workers' health in Brazil is shared by the health, labor, social welfare, and environmental sectors, each of which has specific functions and spheres of action. In the health sector, various recent federal regulations guide technical and operational activities aimed at improving the coverage and quality of services for workers. Information on occupational diseases

and accidents comes primarily from the system of coverage for injuries, disability, or death established under the country's social insurance scheme, which covers only the population working in the formal sector. In 2004, there were 31.4 million workers in the formal sector (17% of the population). The Southeast region had the heaviest concentration of formally employed workers (51.8%), while the Northeast and South regions claimed 17.0% and 17.9%, respectively. During the period 2002–2004, employment in the formal sector increased 9.5%, with the entry of 2.7 million workers into the formal labor market.

An analysis of information on sick leave benefits during 2004 reveals that the most frequent causes of absenteeism among workers were diseases of the musculoskeletal system and connective tissue—which accounted for 30% of all sick leave benefits—external causes (18.0%), diseases of the circulatory system (11.0%), and mental and behavioral disorders (10.8%) (25). Among Brazilian industrial workers a high prevalence of several risk factors for cardiovascular disease was found: arterial hypertension (25.2%), current tobacco use (15.9%), diabetes mellitus (3.2%), elevated total cholesterol (7.9%), obesity (13.4%), and sedentarism (17.2%) (26).

Ethnic Groups

Since 1999, the Ministry of Health has exercised direct responsibility for indigenous health through 34 special indigenous health districts linked to the National Health Foundation (FUNASA). Each district has a health team that provides basic care, with linkages to the formal health care system, under the supervision of local and district indigenous health councils. Villages and communities all over the country are served by indigenous health agents trained in basic health care. These services are linked to formal health care services at the secondary and tertiary levels by means of indigenous health units located in municipal referral centers. To support the indigenous health activities carried out at the community level, FUNASA implemented the Indigenous Health Care Information System (SIASI) in 2000.

In 2003, the Brazilian indigenous population was estimated at 770,000 people, who belong to some 210 groups and speak more than 170 languages. Although they make up only 0.2% of the total population, indigenous peoples are found in all states of the country. Each group has its own forms of social, political, and economic organization and its own way of relating to the environment and utilizing the land. Close to 44% of the indigenous population and 98.7% of indigenous lands are concentrated in the North and Center-West regions. During the period 2000–2004, SIASI recorded 4,584 deaths in the indigenous population, 45% of them among children under 5 years of age. In 2003, SIM recorded 2,116 deaths, 33% among children under 5. The main causes of death were external causes (16.8%), diseases of the circulatory system (16.5%), diseases of the respiratory system (13.9%), and infectious diseases (13.8%).

The indigenous population receives the vaccines provided for under the health system in accordance with the basic immunization schedule for this population. Since 2003, Brazil has been taking part in Vaccination Week in the Americas, a joint initiative of the Ministry of Health and the Pan American Health Organization (PAHO) that resulted in increased vaccination coverage in 2006.

The black population of Brazil, which includes both blacks and mulattos, is the largest of any country outside the African continent. This population has some distinctive genetic features resulting from miscegenation—or mixing of races and cultures—of individuals from various ethnic groups originating from different regions of sub-Saharan Africa (27). In 2004, this population was estimated at 10.7 million blacks and 76.6 million mulattos, and it made up 48.0% of the total national population. Approximately 80% of blacks reside in the Northeast and Southeast regions. Additionally, there are remnants of some 1,000 fugitive slave communities scattered around the country. In 2003, approximately 350,000 deaths of black persons were recorded, some 280,000 of which were of mulattos.

The leading defined causes of death among the black population were diseases of the circulatory system (29.9%), external causes (20.6%), neoplasms (12.4%), and diseases of the respiratory system (9.1%). In that year, the black population was at greater risk than the white population of dying from infectious diseases, endocrine diseases, and complications of pregnancy, childbirth, and the puerperium. The mulatto population had a higher risk of dying from causes related to pregnancy, childbirth, and the puerperium and from external causes than the white population, but a lower risk of dying from neoplasms and from diseases of the circulatory, respiratory, digestive, and genitourinary systems. However, rates of death among mulattos may be underestimated because they are often listed as being of unknown race/color and also because a wide variety of people are classified as mulattos (since in the various regions of Brazil mulattos may be the result of different race/color combinations). The most frequent health problems in the black population—malnutrition, drug use, septic abortion, and violence, among others—are associated with long-standing social inequalities that lead to poverty and reduce access to health services. These inequalities are aggravating factors in diseases such as arterial hypertension, diabetes mellitus, and glucose-6-phosphate dehydrogenase deficiency, which seem to be more prevalent in the black population.

Among the genetically determined diseases that occur in this population, the principal one is sickle cell anemia, the most common monogenic hereditary disease in Brazil (28). It is estimated that between 8,000 and 50,000 persons have the disease and between 2 million and 10 million carry the sickle cell gene, which implies a high degree of underreporting of cases, since only around 4,000 cases have been identified. An estimated 80% of those with sickle cell anemia die by the age of 30, but 85% of these deaths are not accurately registered (29). In 1995, a Gov-

ernment initiative aimed at improving the situation of the black population (30) helped mobilize civil society, the scientific community, and health professionals, resulting in the formulation of a program for control of sickle cell anemia and other measures to protect the interests of this population group.

HEALTH CONDITIONS AND PROBLEMS

COMMUNICABLE DISEASES

Vector-borne Diseases

Malaria is endemic throughout the Brazilian Amazon region, which encompasses the whole of the North and parts of the states of Maranhão (Northeast) and Mato Grosso (Center-West). More than 99% of the cases reported in the last 10 years occurred in this area, where the annual average number of positive exams was 530,000. The incidence of malaria surged in this area in 1999, returning to 1970s levels. Some 632,600 new cases were reported—34% more than in 1998—resulting in 21,100 hospitalizations, mainly of adult and adolescent males aged 15–34. The high endemicity of malaria in the Amazon region is related to changes in extractive activities, which lead to internal migration and the establishment of unplanned rural settlements. In 2000, the Ministry of Health launched the Plan for Intensification of Malaria Control Activities in the Amazon Region (PIACM), which facilitated a restructuring of local health services designed to include malaria control in the network of health services, employing a strategy that emphasizes early diagnosis and immediate treatment. By the end of 2002, the number of malaria cases had decreased 45% in comparison to 1999. In 2003, the Ministry of Health introduced the National Malaria Control Program (PNCM) with a view to maintaining the successes achieved under the PIACM through strengthening of the structure of services. Despite all the resources invested, however, the number of cases rose 17.3% (408,795 cases) from 2002 to 2003. The number continued to rise in 2004 (464,231 cases, an increase of 13.6% over 2003) and in 2005 (599,690 cases, 29.2% higher than in the previous year). The increase in malaria cases is due mainly to intensive and unplanned growth of the peripheral areas surrounding the major cities.

No cases of urban **yellow fever** have been reported since 1942. However, since the 1970s there has been a progressive reinfestation of the national territory by the *Aedes aegypti* mosquito, the urban vector of the disease. Sylvatic yellow fever is endemic in some regions, although the number of cases has fallen steadily since 1999 as vaccination coverage rates in the endemic areas have risen. In 1999, 76 cases were reported, and in 2005, three. Over the period 1999–2001, epidemics occurred mainly in the Center-West region. The last outbreak began among simians in the Amazon region and then spread to the savanna region in the Center-West part of the country. The virus continued to spread in

a southeasterly direction, with epizootics occurring in 54 municipalities in six states. In 2000, human cases were detected in São Paulo and Bahia, both of which had been free of the disease since the 1950s. In 2001, an outbreak of human cases occurred in the state of Minas Gerais, and there were epizootics in the state of Rio Grande do Sul, in areas that theretofore had not been considered susceptible to yellow fever. In 2003, 64 cases of yellow fever were confirmed, with 22 deaths. Cases were reported in 18 municipalities in the states of Minas Gerais, Rio Grande do Sul, Mato Grosso, Roraima, and Pará. Most of the cases since 1999 have occurred among men (more than 80%) and among farmers and ecotourists. From 1999 to 2003, based on the cases reported to the surveillance system, the case fatality rate was around 40%. Brazil's immunization policy with respect to yellow fever calls for vaccination after 6 months of age for all persons residing in endemic areas, vaccination after 9 months of age for all persons residing in transition zones, and vaccination of all persons traveling to endemic areas.

The mosquito vector of **dengue**, *Aedes aegypti*, is found in all cities of the country, except in the states of Rio Grande do Sul and Santa Catarina. The dengue virus was reintroduced into Brazil in 1981 and 1982. The first clinically documented and laboratory-confirmed epidemic occurred in Boa Vista (Roraima) and was caused by serotypes 1 and 4. Other epidemics have occurred since 1986, affecting Rio de Janeiro and several capital cities in the Northeast region, and dengue has now become endemic in Brazil, with epidemic spikes. The number of cases decreased from 794,000 in 2002 to 118,000 in 2004, but 2005 brought a new increase: 217,000 cases, including 447 cases of dengue hemorrhagic fever, with 43 deaths. Circulation of serotypes DEN1, DEN2, and DEN3 has been detected.

During the 1960s, areas at risk of household transmission of **Chagas' disease** were identified in more than 2,000 municipalities in 18 Brazilian states. *Triatoma infestans* was detected in 711 municipalities in 13 states. The prevalence, based on serological screening, was 4.2% for the country, with values as high as 8.8% in Minas Gerais and Rio Grande do Sul. The Initiative of the Southern Cone Countries for the Elimination of *T. infestans* and Interruption of Transfusional Transmission of American Trypanosomiasis has helped to consolidate the control of this species, which is the main, and virtually the only, vector for household transmission. In 1998, national commissions began carrying out reviews in the states, which were followed by international evaluations in 1999. An intergovernmental meeting held in Rio de Janeiro in 2000 certified the interruption of transmission in six states (Goiás, Mato Grosso, Mato Grosso do Sul, Paraíba, Rio de Janeiro, and São Paulo). In the ensuing years, with the intensification of operations in the other states, transmission was interrupted and certification was obtained in the states of Minas Gerais, Pernambuco, Piauí, and Tocantins. In 2005 and 2006, the international commission evaluations sponsored by PAHO recommended certification of the interruption of trans-

mission for the last three endemic states: Paraná, Rio Grande do Sul, and Bahia. The current challenge is to strengthen epidemiological surveillance, especially in the Amazon region, and to ensure medical care and social services for those who were infected in the past.

Little information is available on the frequency of **lymphatic filariasis** in the country as a whole. The main focus of the disease is in the metropolitan area of Recife, in the state of Pernambuco. A residual focus exists in the state of Alagoas, although no cases were detected there in 2005. Under the National Program for the Elimination of Lymphatic Filariasis (PNEFL), being carried out as part of the WHO-led global effort to eliminate the disease, old foci of the disease are being reassessed, and states not considered to be at risk are being included in surveillance of lymphatic filariasis morbidity.

Transmission of **schistosomiasis** is most intense in the Northeast region and the northern portion of the state of Mato Grosso, but the disease is widely distributed across the country. Analyses by health services of stool samples from the population show a reduction in the prevalence of the infection. In the last 15 years, the percentage of samples testing positive has ranged from 5.5% to 11.6%. Of the slightly more than 4 million tests conducted during the period 2000–2005, the prevalences were 7.1% (2000), 6.4% (2004), and 5.5% (2005). The expansion of water supply and sanitation coverage based on epidemiological criteria, coupled with greater medical care coverage, has helped to reduce the frequency of schistosomiasis cases and deaths.

Visceral leishmaniasis, or kala-azar, has shown an upward trend, with epidemics reported during the 1980s and the 1990s. In 1999 and 2000, a new upsurge in cases occurred (close to 4,000 per year), mainly in the Northeast region. The rise in the prevalence of leishmaniasis in several regions of Brazil in recent years can be explained by changes in the disease's pattern of geographic distribution, which has spread toward the periphery of urban centers as a result of mass migration of the rural population to the cities. At the same time, the process of organizing the health care system, together with better diagnosis and treatment, has resulted in increased detection of cases. In 2004, 3,386 cases were reported.

During the period 1987–2004, reported cases of American **cutaneous leishmaniasis** ranged from 13.5 per 100,000 population to 23.0 per 100,000. In 2004, 28,575 cases were reported. The North and Northeast regions account for the largest number of cases (37% and 33%, respectively, of total reported cases during the period).

The first cases of **hantaviral disease** were detected in 1993 in São Paulo. The South region and the states of São Paulo, Minas Gerais, and Mato Grosso have had the highest incidence of this disease. Up to 2003, a total of 338 cases had been reported in 11 states, with a mean case-fatality rate of 44.5%. In 2004, 159 cases were detected. The Ministry of Health has taken steps to put in place epidemiological surveillance of the disease, develop labora-

tory diagnostic capability, disseminate information on appropriate treatment to reduce fatalities, and track the circulation of hantaviruses in wild rodents in Brazil as part of eco-epidemiological surveillance activities.

Vaccine-preventable Diseases

The National Immunization Program, which marked its 31st anniversary in 2005, provides specific vaccines, free of charge, for more than 10 diseases and has achieved high routine immunization coverage among children, adolescents, adults, and the elderly. Program implementation is decentralized, with activities in all municipalities, although procurement of immunobiologicals takes place at the central level.

The hepatitis B vaccine and the bivalent MR (measles-rubella) virus vaccine were introduced gradually into the routine immunization schedule (Table 2) after 1992, and by 2000 they were being administered in all states. The vaccine against *Haemophilus influenzae* type b (Hib) was introduced in 1999, and since 2002 it has been administered routinely as part of a combined tetravalent vaccine (DTP + Hib: diphtheria-tetanus-pertussis and *Haemophilus influenzae* type b). The influenza vaccine was introduced in annual vaccination campaigns for the older population in 1999.

TABLE 2. Basic immunization schedule, children up to 10 years old, Brazil, 2006.

Age	Vaccines	Number of doses
At birth	BCG - ID	single dose
	Hepatitis B vaccine	1st dose
1 month	Hepatitis B vaccine	2nd dose
2 months	Rota (oral human rotavirus vaccine)	1st dose
	OPV (oral polio vaccine)	1st dose
	Tetravalent vaccine (DTP + Hib)	1st dose
	Rota (oral human rotavirus vaccine)	2nd dose
4 months	OPV (oral polio vaccine)	2nd dose
	Tetravalent vaccine (DTP + Hib)	2nd dose
6 months	OPV (oral polio vaccine)	3rd dose
	Tetravalent vaccine (DTP + Hib)	3rd dose
	Hepatitis B vaccine	3rd dose
9 months	Yellow fever vaccine	single dose
12 months	MMR (trivalent measles-mumps-rubella)	single dose
15 months	OPV (oral polio vaccine)	booster
	DTP (trivalent diphtheria-tetanus-pertussis)	1st booster
4–6 years	DTP (trivalent diphtheria-tetanus-pertussis)	2nd booster
	MMR (trivalent measles-mumps-rubella)	booster
6–10 years	BCG - ID	booster
10 years	Yellow fever vaccine	booster

Source: Ministry of Health, National Immunization Program Information System. Available at: http://pni.datasus.gov.br/calendario_vacina_infantil.asp (in Portuguese only).

Vaccination coverage for the following vaccines among children under 1 year of age (3.2 million children) was over 95% in 2005: BCG (100%); OPV, 3 doses (98%); and tetravalent DPT-Hib, 3 doses (96%). Coverage for the hepatitis B vaccine (3 doses) was 92%. Coverage for the trivalent MMR (measles-mumps-rubella) virus vaccine among children aged 12 months was 100%. Of the 5,564 municipalities in Brazil, 62% had DTP3 and MMR coverage levels of over 95%.

The National Influenza Pandemic Preparedness Committee was established in 2003, and the National Influenza Pandemic Preparedness Plan was drawn up and implemented in November 2005. The various states are developing their local strategies based on the national plan, which is regularly updated. The Butantan Institute is developing a vaccine against the H5N1 influenza virus. The country already has a strategic reserve of the antiviral drug oseltamivir, and other influenza preparedness and response planning activities are being carried out at the health service level.

It was decided in 2005 that the rotavirus vaccine would be introduced into the immunization schedule starting in 2006. Brazil is the first country in the world to incorporate this vaccine into its routine immunization program.

Measles elimination activities began in Brazil in 1992 and in the Region of the Americas as a whole in 1999. In addition to surveillance, the elimination strategy included rapid interruption of viral circulation in the community by means of a single mass vaccination campaign targeting the cohort of children between the ages of 9 months and 14 years. The mass vaccination campaign carried out in 1992 brought the number of measles cases down from 42,934 in 1991 to 2,396 in 1993. The elimination strategy also called for the achievement of routine measles vaccination coverage of at least 95% in order to ensure permanent interruption of viral circulation. To address the inevitable accumulation of measles-susceptible children in each successive birth cohort (the 5% who fail to receive primary immunization), periodic follow-up vaccination campaigns must be carried out among children aged 1–4. The first national follow-up campaign was conducted in 1993. In 1997, there was a serious measles epidemic, with more than 50,000 cases reported initially and 61 deaths. A second nationwide follow-up campaign was carried out in 1997, achieving a national coverage rate of 66%. It was followed by campaigns in 2000 and 2004, with coverage levels of 93%. The number of measles cases decreased from 908 in 1999 to 36 in 2000. Since 2001, the measles vaccine has been administered to children at 12 months of age, with a second dose of trivalent virus vaccine during the preschool years. No indigenous cases of measles have been reported since 2001.

Surveillance of **rubella** was incorporated into Brazil's measles surveillance activities in 1996, and surveillance of congenital rubella syndrome (CRS) was added in 2001. The rubella vaccine was introduced in some Brazilian states in 1992, which changed the age group affected by the disease. In the outbreaks reported

during the period 1999–2002, high incidence was observed among women of childbearing age. Since 2002, all states in the country have been using the MMR vaccine in their routine childhood immunization programs, and in 2001, the country adopted a strategy of rapid control of rubella through vaccination of women of childbearing age. The impact was significant: cases of both rubella and congenital rubella syndrome dropped markedly (233 and 4 cases, respectively, in 2005).

Brazil was certified free of **poliomyelitis** in 1994 (the last case was reported in 1989). In addition to routine immunization with the oral polio vaccine (OPV-Sabin), two national mop-up campaigns are conducted each year, with high coverage rates being achieved (95% during both the first and second campaigns of 2005). In 2005, routine vaccination coverage among children under 1 year of age was 98%. Surveillance of acute flaccid paralysis (AFP) is carried out routinely. More than 80% of suspected cases were investigated in a timely manner, but stool samples were obtained promptly from only around 70% of patients with AFP in the last three years. Efforts to develop a National Plan for the Containment of Wild Poliovirus in Laboratories began in 2002, and containment activities were initiated in 2003 with a national survey of 289 high-risk laboratories in 173 institutions. Following the new recommendations of WHO (2005), the country opted to repeat the national survey in order to evaluate all active laboratories in the country.

The incidence of **neonatal tetanus** has fallen steadily for more than a decade: 66 cases in 1999, 34 in 2000, 15 in 2003, 14 in 2004, and 10 in 2005. However, cases are still being reported, mostly in areas where the coverage and quality of basic health care services are low. The Plan for Elimination of Neonatal Tetanus was launched in 1992, with the goal of reducing the incidence of the disease to under 1 per 1,000 live births. In 2000, some of the strategies for epidemiological surveillance in small municipalities were reformulated. Vaccination coverage for Td (tetanus and diphtheria toxoids) among women of childbearing age is below the national goal, and additional efforts are needed to ensure the protection of this population group. In 2005, 74% of the country's municipalities had less than 50% tetanus vaccination coverage among pregnant women. The incidence of other forms of tetanus has remained relatively unchanged in recent years (439 cases reported in 2000 and 420 in 2005). The vast majority of tetanus cases occur in men (81%).

The incidence of **whooping cough** has also remained stable in recent years, with a total of 764 cases in 2000 and 1,328 in 2005. The most serious forms of the disease and the highest number of fatal cases occur in children under 1 year of age. The number of confirmed cases of **diphtheria** fell from 46 in 2000 to 27 in 2005.

A total of 1,358 cases of **meningitis** due to *Haemophilus influenzae* type b (Hib) were reported in 1999, of which 617 (45%) occurred in children under 1 year of age. Following the introduction of the Hib vaccine that year, the number of cases fell to 153

in 2000; children under 1 continued to be the most affected group (accounting for 43% of cases). In 2005, only 108 cases of Hib meningitis were reported.

Epidemiological surveillance of **viral hepatitis** consists of mandatory reporting of confirmed cases of hepatitis B and C. A seroepidemiological study has been under way since 2004 in representative areas of the five regions of the country, with the aim of estimating the frequency of hepatitis A (IgG anti-HAV) among persons aged 5–19 and of hepatitis B (IgG anti-HBc, HBsAg, anti-HBs) and hepatitis C (anti-HCV and HCV RNA) among persons over the age of 9 (age cohorts 10–19 and 20–69).

Chronic Communicable Diseases

Tuberculosis is a high priority public health problem in Brazil affecting mainly the poorest populations at the most productive ages of life. Analysis of a 10-year time series (1993–2004) reveals that the incidence of the disease has remained quite stable, with a slight decline in all forms of tuberculosis. The states of Rio de Janeiro and Amazonas had the highest incidence rates in 2004: 94.5 and 70.6 per 100,000 population, respectively. In 2004, 91,855 cases were reported, with an incidence rate of 45.2 per 100,000 population. Of those cases, 88.1% (80,960) were new cases of tuberculosis in all its forms and, of those, 84.9% (68,744) were pulmonary cases and 62.5% (42,972) were pulmonary cases with positive sputum smears. The estimated prevalence was 50 million infected individuals, with approximately 111,000 new cases and around 6,000 deaths a year. Multidrug-resistant tuberculosis is not a significant problem in Brazil. Tuberculosis occurs as an opportunistic infection in 15.2% of AIDS cases and in around 8.0% of HIV-positive tuberculosis cases. The 2004–2007 Plan of Action established the goal of instituting the strategy of Directly Observed Treatment, Short Course (DOTS) in the 370 high-priority municipalities that account for more than 70% of the country's tuberculosis burden. The DOTS strategy was introduced in 1997 in several pilot areas of the Center-West region, but progress in extending its coverage has been slow. Nevertheless, the population covered by the strategy has grown steadily in recent years, increasing from 3% in 1998 to 52% in 2004. In the high-priority municipalities, DOTS coverage is around 70% of the affected population.

Despite progress in recent years, **leprosy** remains a significant problem, with a prevalence rate of 4.9 cases per 10,000 population in 1998 and 78,000 leprosy patients on record. In the same year, 42,055 new cases were diagnosed (detection rate of 2.6 cases per 10,000 population). In the North and Center-West, the disease remained hyperendemic (more than 4 new cases per 10,000 population), but the Northeast had the highest absolute numbers of current leprosy cases (25,267) and of detection of new cases (14,015). In 2004, Brazil began to calculate point prevalence (proportion of individuals in a population suffering from the disease at a given point in time) rather than registered active cases, which had been calculated up to 2003. In late 2005,

the registered prevalence was 1.48 per 10,000 population (27,313 leprosy patients in treatment), with a detection rate of 2.1 per 10,000 population (38,410 new cases detected). Notwithstanding the reduction in prevalence observed during the period 1985–2005—from 19.0 to 1.48 per 10,000 population—leprosy remains a public health problem, and intensified action is needed to accelerate its elimination.

Acute Respiratory Infections

Acute respiratory infections are among the leading causes of mortality among children under 5 years of age. Although **bacterial pneumonia** is not a reportable disease in Brazil, epidemiological surveillance of this form of pneumonia has been strengthened through the implementation of a system of sentinel surveillance of invasive pneumococcal disease. According to data from the Hospital Information System of Brazil's Unified Health System (SIH-SUS), from January 2005 to March 2006, pneumonia accounted for approximately 6% of all hospitalizations, 21.5% of them of children under age 5, and 6.5% of persons over the age of 60. Data for 2005 from the pneumococcal infections surveillance network of the Regional Vaccine System (SIREVA) show that in *Streptococcus pneumoniae* samples isolated from children under age 6 with pneumonia, the most frequent circulating serotypes were 14, 1, and 6B. However, these data are not representative of the country as a whole. The proportion of samples of *S. pneumoniae* with intermediate or total resistance to penicillin increased from 10.2% to 27.8% between 1993 and 2004.

HIV/AIDS and Other Sexually Transmitted Infections

In Brazil, AIDS currently affects mainly injection drug users and men who have sex with men. In the early 1980s, recipients of blood transfusions and blood products were also disproportionately affected. In recent years, incidence rates have remained high—19.2 cases per 100,000 population—owing to a steady rise in the number of cases among women. Among men, the proportion of cases due to homo/bisexual HIV transmission has remained stable, while the proportion due to heterosexual transmission has increased and the proportion due to injection drug use has declined steadily and significantly. The mean number of AIDS cases recorded annually ranges from 25,000 to 30,000, depending on the origin and source of the data consulted. The cumulative number of AIDS cases reported since the start of the epidemic is 400,000, and the number of people living with HIV/AIDS is estimated at more than 600,000. AIDS death rates rose until the mid-1990s, leveling off and remaining at around 11,000 per year from 1998 onwards. The policy of universal access to antiretroviral treatment—which combines medications with different modes of action in the regimen known as highly active antiretroviral therapy (HAART)—has led to a substantial decline in mortality. Nevertheless, the continued growth in the proportions of AIDS cases among women and among blacks and

Inequalities Have an Impact on Health

Inequality in Brazil mainly affects the black population (which refers to brown- and black-skinned persons) and indigenous peoples. Blacks account for 68% of the poorest decile, while whites account for 87% in the wealthiest one; also, 32.2% of the very poor are black. The Afro-descendent population is larger than in any other country outside Africa and presents special genetic characteristics owing to the mixture of races and cultures involving people who came from different parts of sub-Saharan Africa. In 2004, there were an estimated 10.7 million brown-skinned Brazilians and 76.6 million blacks, totaling 48.0% of the country's population. The most frequent health problems in the black population—malnutrition, drug use, septic abortion, and violence, among others—are associated with longstanding social inequalities that lead to poverty and reduce access to health services. These inequalities are aggravating factors in diseases such as hypertension, diabetes mellitus, and glucose-6-phosphate dehydrogenase deficiency. In 1995, a Government initiative aimed at improving the situation of the black population helped mobilize civil society, the scientific community, and health professionals, and resulted in the formulation of a program to control sickle cell anemia and other measures to protect the interests of this population group. The Ministry of Health and the Special Secretariat on Policies to Promote Racial Equality are working together to propose and systematize management and assistance strategies for the implementation and monitoring of actions related to the health of the black population in the National Health Plan (PNS), with the aim of promoting racial equality.

mulattos of both sexes between 1998 and 2004 points up the inequity that exists in access to early diagnosis and treatment services among the most socially and economically disadvantaged populations.

NONCOMMUNICABLE DISEASES

Metabolic and Nutritional Diseases

The Periodic Family Budget Survey (POF 2002–2003) conducted by the Brazilian Institute of Geography and Statistics (31, 32) indicated that the prevalence of **underweight** has declined in Brazil (except in the rural North), falling from 6.8% in 1989 to 5.4% during the period 2002–2003 among females and from 3.8% to 2.8% among males. In the same period, the prevalence of **overweight** and **obesity** among males increased from 29.5% to 41.0% and from 5.1% to 8.8%, respectively, while among women overweight decreased slightly, from 40.7% to 39.2%, and obesity remained virtually the same: 12.8% to 12.7%.

During the period 2002–2003, a household survey was conducted in 15 state capitals to identify risk factors in the population aged 15 and over (33). Analysis of overweight and of degree of excess weight (body mass index [BMI] $\geq 25\text{kg/m}^2$) revealed a somewhat higher prevalence in the Southeast, South, and Center-West regions (9.8%, 9.7%, and 8.4%, respectively) than in the North and Northeast regions (7.8% and 6.8%, respectively). Data from the Periodic Family Budget Surveys of 1974, 1989, and 2002–2003 show that the prevalence of obesity is rising in all regions of the country, both in rural and in urban areas, and al-

though the increase is larger among men, women have higher obesity figures. As for physical inactivity, the proportion of individuals classified as insufficiently active was highest in João Pessoa (Paraíba) (54.5%) and lowest in Belém (Pará) (28.2%); no characteristic pattern was observed among the regions. More women than men were found to be physically inactive. The highest rates of physical activity were observed in the group aged 15–24.

Cardiovascular Diseases

Diseases of the circulatory system were the leading cause of death for both sexes (284,685 deaths in 2004, 28% of total mortality). **Cerebrovascular diseases** were the most frequent cause of death in the country (10.1% of total mortality), followed by **ischemic heart diseases** (9.7% of total mortality). Analysis of the period 1990–2003 shows a downward trend in death rates for diseases of the circulatory system. The risk of death from cerebrovascular diseases and ischemic heart diseases has declined in the last 15 years among both sexes in all Brazilian states, except in the states of Pernambuco and Mato Grosso, where the risk is rising significantly.

Malignant Neoplasms

Registered deaths from cancer totaled 134,683 in 2003. The first three causes among women were cancer of the breast (15%); trachea, bronchus, and lung (9%); and cervix uteri (6.8%). Among men, the foremost cause was cancer of the trachea, bronchus, and lung (15%), followed by prostate cancer (12%) and stomach cancer (11%).

The crude mortality rate for cervical cancer in 2003 was 4.7 per 100,000 women. The risk of death during the period 1980–2003 remained stable for women aged 30–59 but increased in a statistically significant manner for women aged 60 and older. Analysis of cervical cancer mortality is limited by the high number of cases of uterine malignancies coded as unspecified (29%, with rates as high as 50% of cases of uterine cancer in some states). The crude mortality rate for breast cancer in 2003 was 10.4 per 100,000 women. The risk of death from this cause in the period 1990–2003 rose significantly in all age groups, except for the group aged 60–69. The South region had the highest rates.

The crude mortality rate for cancer of the trachea, bronchus, and lung in 2003 was 9.3 per 100,000 population. Men have a higher risk of dying of cancer than women everywhere in the country. Among men aged 30–49 years, the risk of death during the period 1990–2003 remained stable at around 4 per 100,000 population; it fell substantially among men aged 50–59, remained the same among those aged 60–69, and rose significantly among those aged 70 and over. Among women, increasing risk was observed in all age groups.

OTHER HEALTH PROBLEMS OR ISSUES

Disasters

According to data from the 2002 Global Environment Outlook (GEO) report for Brazil (34), the most common natural disasters during the period 1991–2001 were low water levels (55.1%); dry weather (19.9%); flash floods (20.6%); gradual flooding (1.7%); gales and storms (0.9%); severe gales and extratropical cyclones (0.3%); forest fires (0.4%); and hail, water-logging, and other phenomena (1.0%).

Mental Health and Addictions

A national survey conducted in 2002–2003 to identify the risk factors among the population aged 15 and over (13) found that the prevalence of cigarette-smoking was highest in Porto Alegre (Rio Grande do Sul) (25.2%) and lowest in Aracajú (Sergipe) (12.9%). Of the eight cities with the highest prevalence, seven were located in the South and Southeast regions. In all the cities surveyed, the estimates of smoking prevalence were higher among men. These sex differences were statistically significant in all cities of the North, Northeast, and Center-West regions, except for the city of Natal (Rio Grande do Norte). Among young people aged 15–24, the prevalence of tobacco use ranged from 6.8% in Aracajú to 24.1% in Porto Alegre. Among those aged 25 and over, the highest prevalence was found in Porto Alegre (25.6%) and the lowest in Aracajú (15.5%). With regard to alcohol use, the proportion of individuals who reported consuming at least one alcoholic drink in the 30 days preceding the survey ranged from 32.4% in João Pessoa to 58.6% in Florianópolis (Santa Catarina).

Oral Health

In 2003, the Ministry of Health, with the participation of academic institutions and health services, concluded a broad and comprehensive national survey of oral health, which yielded the following findings: there is a high rate of dental caries among persons older than 12; three out of four older adults have no functional teeth; less than 22% of adults and less than 8% of the elderly have healthy gums; and the prevalence of caries was 49% higher in municipalities without fluoridated water. In light of the results of this study, the Ministry of Health launched the “Smiling Brazil” program, which aims to bring about a significant increase in the number of oral health teams within the Family Health Program (PSF) and ensure the addition of fluoride to drinking water in 2,000 municipalities and the construction of specialized oral health care centers. In 2004, there was a 67.3% increase in the number of oral health teams distributed among 2,944 municipalities (35).

RESPONSE OF THE HEALTH SECTOR

Health Policies and Plans

The national health policy is based on the Federal Constitution of 1988, which sets out the principles and guidelines for the delivery of health care in Brazil through the country’s Unified Health System (SUS). This system, whose operating regulations were established in 1990 (36), is guided by the principles of universal and equitable access to services for the promotion, protection, and recovery of health, integrated in a regionalized, multi-level network under the responsibility of the three levels of government (federal, state, and municipal). The private sector plays a complementary role. The SUS operational guidelines call for decentralized management, integrated care, and community participation. Under the Constitution, the activities of the federal government are to be carried out in accordance with multiyear plans (PPAs) approved by the national congress for periods of four years.

The PPA for 2004–2007 establishes the federal government’s high-priority initiatives for the four-year period, identifying the following priorities in the area of health: (1) plant and animal health safety; (2) investment in science, technology, and innovation to promote competitive import substitution in strategic areas; (3) sanitation; (4) increased access to low-cost medicines through the Government’s *farmácia popular* program; (5) improvement of the quality of care provided through the Unified Health System (QualiSUS project); (6) monitoring, evaluation, and oversight of the health activities and financial resources transferred to states, municipalities, and institutions in the framework of the SUS; (7) formulation of regulations for implementation of Constitutional Amendment 29, which establishes the allocation of resources for the SUS; (8) oral health (through the “Smiling Brazil” program); (9) mental health; (10) women’s

health; (11) control of leprosy and tuberculosis; (12) organ transplant; (13) professional civil service in the health sector; (14) enhancement of the SUS's capacity to produce blood products, immunobiologicals, and pharmaceuticals; (15) indigenous health; (16) approval of the National Health Plan; (17) decentralization of the SUS to the regional level and improvement of its management; and (18) improvement of the quality of care provided under private health plans.

The SUS was established immediately after the adoption of the Federal Constitution of 1988 with the aim of ensuring universal and equitable access to health care. The system underwent an institutional reorganization pursuant to the regulations adopted in 1990 and the process of decentralization called for under the basic operational guidelines approved by the governing bodies of the system: the Tripartite Interagency Commission (CIT) and the National Health Council (CNS). In 2006, a new instrument of commitment was adopted, the "Pact for Life, Strengthening the SUS and Its Management" (37), the result of a long process of negotiation among stakeholders initiated in 2003. The Pact, approved by the CIT and the CNS in February 2006, establishes a new dynamic in the collective management of the SUS and introduces changes in the way the federal, state, and municipal levels of government interact with one another, including: (1) replacement of the qualification process with voluntary adherence to the Terms of Commitment for Management; (2) regionalization on a basis of solidarity and cooperation as the guiding principle for the process of decentralization; (3) integration of the various methods of federal resource allocation; and (4) harmonization of the various preexisting agreements (Basic Health Care Pact, Surveillance Pact, and other agreements).

To ensure coordination of the activities of the SUS in the three spheres of government administration, there are two negotiating and consensus-building bodies, which meet regularly: at the state level, the Bipartite Interagency Commission, with equal representation of the State Secretariat of Health and the Council of Municipal Secretaries of Health (COSEMS); and at the national level, the Tripartite Interagency Commission, with equal representation of the Ministry of Health and of the National Councils of State and of Municipal Secretaries of Health (CONAS and CONASEMS). The agreements reached by these commissions are formalized at the corresponding level of government. Social participation in the SUS occurs primarily through two formal bodies: health councils and health conferences. The councils are permanent bodies that formulate strategies and monitor the implementation of health policy, including the economic and financial aspects. The conferences are convened every four years, with broad stakeholder participation. They assess progress with regard to the health situation and they propose public policy guidelines for the sector. Government agencies, service providers, health professionals, and users are represented on the councils and at the conferences, the numbers of users and health professionals equaling the number of representatives of the other two

groups combined (38). The 12th National Health Conference, held in December 2003, formulated recommendations on a wide variety of issues relating to the SUS (39).

The health councils are organized on the federal, state, and municipal levels. They were established with the aim of ensuring the existence of functioning state and municipal councils during the process of decentralization, as a condition for the regular and automatic transfer of federal financial resources (40). The National Health Council established guidelines for the organization of the state and municipal health councils (41), and in 1999 it established training guidelines for council members (42), for which purpose it distributed several documents aimed at providing guidance for social participation and representation on the councils, especially at the municipal level. In 2005, national guidelines were approved for the process of continuing education on social oversight of the SUS, which includes training for health council members, initiatives related to continuing education policies and strategies, and health communication and information for the entire population (43).

The Ministry of Health is responsible for leading the process of regionalization of health care networks and ensuring that the public health system has adequate response capacity. To that end, it proposes and approves general guidelines and standards for regionalization, in accordance with the norms and agreements of the Tripartite Interagency Commission currently in effect. The Ministry, through the states and municipalities, is also responsible for providing technical and financial cooperation to the health regions, giving priority to the most vulnerable regions and promoting equity among regions and states.

The regulation of professional practice in the various health occupations is the responsibility of professional boards, which maintain regional delegations with jurisdiction in each state of the country. The boards are autonomous public entities, created by law, which supervise ethical and legal aspects of professional practice in the various health occupations within their respective jurisdictions. The practice of health professions is also subject to federal health oversight regulations.

The Ministry of Health establishes the criteria for regulation, monitoring, and control of the production of all goods and services in the health sector. It regulates all health activities, including those of both ambulatory care facilities and hospitals, at the various levels of the health care system (primary, intermediate, and tertiary) and the access of users to care at those levels. The strategy for regulating supply and demand in the health sector is based on "regulatory complexes," which organize all the activities relating to regulation of access to care (inpatient care, outpatient visits and exams, treatment protocols) in a coordinated and integrated manner, aiming to tailor the supply of health services to actual needs (44).

The Brazilian Hospital Accreditation Program, which has been in existence since 1995 (45), evaluates hospital services based on standards established at the federal level (46). Since 1998, health

services provided under private plans have also been subject to regulations, standards, monitoring, and oversight, in accordance with specific legislation (47). The National Supplementary Health Coverage Agency (ANS) monitors trends in the prices of private plans, as well as the activities of private providers and the use of resources; it also authorizes corporate subdivisions, mergers and acquisitions, incorporations, and modifications, and it oversees coordination with consumer protection entities (48).

Since government regulation began, important changes have taken place in the sector which have had an impact on the dynamics of the private health insurance industry and on competitive strategies. A recent study showed a reduction of 17% between 2000 and 2003 in the number of prepaid group practices and of 23% in the number of self-managed company health plans. In the same period, the number of registered insurance companies increased from 4 to 14, and the number of plan administrators grew from 28 to 37 (32%). Production and marketing of health-related goods and services, processes, inputs, and technologies are regulated by the federal, state, and municipal agencies that comprise the National Health Surveillance System. The Ministry of Health coordinates the System through the National Health Surveillance Agency (ANVISA) (49), which is also responsible for health regulation at ports, airports, and borders.

Health inspection activities are being decentralized to the state and municipal governments, which participate in technical analysis of product registration processes. At the central level, the Ministry of Agriculture is responsible for registration and industrial inspection of products of animal origin, drinks, pesticides, and drugs for veterinary use. Agricultural export products are subject to direct inspection by the federal government. The health and agriculture sectors have their own laboratory networks to support food safety activities.

Brazilian environmental policy derives from specific legislation (50) and from the Constitution of 1998, which established the National Environmental System, an advisory and deliberative body (51). The executive agency for the system is the Brazilian Institute for the Environment and Renewable Natural Resources (52).

Health Strategies and Programs

The National Health Plan (PNS) approved in 2004 (53) provides explicit guidelines for the activities of the health system during the period 2004–2007 with regard to: (1) the reorganization of health care with a view to improving quality and increasing access to comprehensive care and strengthening the system's capacity for regulation; (2) health conditions, identifying a variety of actions for prevention and control of the most prevalent diseases, and activities aimed at providing adequate protection for the most vulnerable groups (women and children, adolescents and young people, the elderly, black and indigenous populations, persons with disabilities, workers, the prison popula-

tion), as well as increasing strategic activities (oral health, mental health, healthy eating, communicable diseases control, and environmental surveillance); and (3) health sector management, including improvement of access to and quality of care, sustainability of financing, strengthening of social participation processes and participatory management practices, as well as monitoring, evaluation, and control of health activities and of the use of financial resources by the SUS, and also strengthening of international cooperation. The PNS also calls for the formulation of a National Plan for Investment in Health, aimed at enhancing the response capacity of the health services system and reducing regional inequalities.

Organization of the Health System

The health sector in Brazil comprises a complex network of services encompassing both public and private suppliers and financiers. The private sector includes for-profit providers and nonprofit charitable organizations. The private system of health plans and insurance covers 24.5% of Brazilians (54), 44% of the privately covered population being primary beneficiaries of health plans and 56% dependents of primary beneficiaries. Most of the clientele of the private system reside in the cities of the Southeast and South regions. The private system underwent considerable growth during the 1990s, especially in the second half of the decade.

The public health sector, to which access is universal, is the sole provider of health care coverage for 75% of the population, in addition to providing public health services (e.g., epidemiological and health surveillance, control of communicable diseases) for the entire population. Some of the population covered by private health plans also use the services of the SUS, especially for highly complex or costly procedures or treatments (e.g., transplants, HIV/AIDS treatment, pharmaceuticals). SUS health services are delivered through federal, state, and municipal government networks and by private contractors, including both nonprofit and for-profit entities. The SUS includes subsystems at the level of each state (state SUS) and each municipality (municipal SUS). By law, municipalities have primary responsibility for providing health care and services to their respective populations, with technical and financial assistance from the federal government and the states. Nationally, the SUS is managed by the Ministry of Public Health, which has primary responsibility for regulatory and coordination functions and plays a major role in financing of the system. The Ministry retains direct responsibility for some areas, such as health education, research, tertiary care, and delivery of special services, such as indigenous health care. Other parts of the federal government also provide health services directly, notably the system of university hospitals, health care facilities operated by the Ministry of Education, and the armed forces health services. The SUS carries out ongoing functions of coordination, planning, linkage, negotiation, moni-

toring, control, evaluation, and auditing, which are incumbent on the three levels of government.

Public Health Services

Since the mid-1990s, Brazil has been working to strengthen primary health care (first level of the health system) as a strategy for reducing inequalities in access and encouraging the reorientation of care in the framework of a universal and comprehensive model which before had been excessively focused on hospital care. The principal mechanisms used to expand coverage and reduce interregional inequalities are the basic health care package (*Piso de Atenção Básica*, or PAB) and the Family Health Program (PSF).

The PAB is a strategy for allocating resources to primary care for the implementation of previously defined activities and for the achievement of goals negotiated by means of integrated, consensus-based programming. Municipalities are responsible for providing a set of basic health care services for their respective populations. For that purpose, they receive capitation payments, which are transferred from the Ministry of Health to the Municipal Health Funds, replacing the previous fee-for-service system of resource allocation. The most important of the incentives is associated with the implementation of the Family Health Program, launched in 1994, which incorporates and builds upon a previous initiative focused on the work of community health agents. The program provides comprehensive health care to a particular population in a particular territory, assigning patients to a multi-professional team composed of at least one doctor, one nurse, nursing auxiliaries, and community health agents (one agent per 150 families, or 750 people, maximum). Each health team is responsible for some 1,000 families. The team members are trained at education and training centers located in all regions of the country. The training promotes an intersectoral approach to address the various determinants of health.

In 2005, the PSF was being carried out in 4,837 Brazilian municipalities, with 22,683 family health teams providing care for approximately 73 million people (40% of the population). The teams give priority to areas not covered by the rest of the system, and their coverage therefore varies greatly from one jurisdiction to another. The program also applies differentiated strategies in the poorest areas and the areas with lowest coverage; in particular, rural areas of the Amazon region and municipalities with fewer than 30,000 inhabitants and an HDI of 0.7 or less.

Since 2002, the Ministry of Health, together with PAHO, has been working on the design and application of a model for enhancing the Family Health Program, seeking to incorporate the dimension of quality into the principles that guide the program (targeting of a specific geographic area and population, comprehensive care and continuity, accountability to and linkage with the community, multi-professional teams, and encouragement of social participation) and into its lines of action. The dimensions of structure, process, and results are also incorporated, taking

into account relevant contextual factors. To determine the degree of user satisfaction, various mechanisms are used, including surveys and studies, in addition to the information obtained from social participation in the SUS health councils and conferences.

Since 2004, through the “Smiling Brazil” program, resources have been allocated to expand oral health teams and establish oral health care centers. In 2005, 137 such centers were operating in 86 municipalities of 21 states.

Another important specific financial incentive is the provision of essential drugs through tripartite funding mechanisms. The federal government transfers one Brazilian real (R\$ 1.00) per capita each year to the subnational levels for the purchase of essential drugs for primary care, and the states and municipalities contribute an equal amount. Municipalities targeted by the Zero Hunger Program receive R\$ 2.00. The Zero Hunger Program has several components, one of the most important being the family food subsidy (*Bolsa Família*).

Epidemiological surveillance systems also receive financial incentives for the identification and control of communicable diseases and health surveillance activities. All surveillance and disease prevention and control activities are currently overseen by the Secretariat of Health Surveillance (SVS), an area within the Ministry of Health.

With the process of decentralization, municipalities have taken on a larger role in carrying out health surveillance. States are responsible for coordination and supervision, as well as execution, of supplementary or complementary surveillance activities. Standardization and coordination at the national level remain the responsibility of the federal government (55).

The SVS is responsible for coordinating the activities of the National Epidemiological Surveillance System, the National Environmental Health Surveillance System (which includes surveillance of workplace environments), the National System of Public Health Laboratories (aspects of their work relating to epidemiological and environmental health surveillance), the Epidemiological Information Systems, and the National Immunization Program (PNI). The Secretariat is also responsible for drafting and disseminating health information for use in establishing priorities, monitoring the health situation in the country, and assessing the impact of disease prevention and control activities.

The municipal governments are responsible for basic sanitation activities, but in most communities, sanitation services are actually provided by state sanitation companies. The federal government plays a major role in financing the system, contributing resources from the regular budget and offering lines of credit. The health system also carries out basic sanitation activities in small communities, generally in conjunction with vector control activities undertaken in the framework of endemic disease prevention. The National Health Foundation (FUNASA) carries out sanitation works in communities of up to 30,000 inhabitants in rural and indigenous areas and in urban fringe areas with critically low quality-of-life indicators. Activities aimed at preventing

and controlling diseases of public health importance are undertaken in accordance with the guidelines established by the specialized technical divisions of the Ministry of Health in the form of plans and programs to be executed by municipal and state agencies of the SUS.

According to the national MDG monitoring report (56), Brazil continues to show inadequacies and inequalities in relation to housing conditions and services and in the distribution of services. The proportion of the urban population with connections to the general water supply system rose from 88.3% in 1992 to 91.3% in 2002. In rural areas, access to water supply systems remains limited although it has improved, increasing from 12.3% in 1992 to 22.7% in 2002. In many places, the reliability and quality of the water supplied are uncertain, however, owing to periodic interruptions of service or deficiencies in water treatment.

With regard to sanitation, the proportion of the urban population served either by the general sewerage system or by septic tanks grew from 65.9% in 1992 to 75.9% in 2002. Such services are scarcer in the North, Northeast, and Center-West regions. In rural areas, the proportion of population covered by sewerage systems or septic tanks increased from 10.3% in 1992 to 16.0% in 2002. The results of the National Basic Sanitation Survey (PNSB 2000) carried out by the Brazilian Institute of Geography and Statistics (57) reveal a grim reality: more than 70% of the sewage collected not only receives no treatment, but it is released directly into freshwater sources, thus worsening, not improving, environmental conditions.

Data from the same survey (57) also show inadequacies with regard to final disposal of solid waste: 64% of municipalities are still disposing of their solid waste in open-air dumps, seriously undermining the effectiveness of the policies of other sectors, including the health sector. The existence of a large number of potentially contaminated areas is recognized. The extent and complexity of the potential environmental risks associated with this situation include environmental degradation, higher incidence of diseases, loss of biodiversity, and limitations on the use of water and soil—all of which have negative economic and social consequences. In rural areas, the use of agrotoxins has increased 2.5 times over the last four years.

The National Food and Nutrition Policy (PNAN) (58), approved in 1999, seeks to guarantee the quality of foods intended for human consumption and to promote healthy eating habits, as well as to prevent and control nutritional disorders. One of the current government administration's foremost social initiatives is the Zero Hunger Program, created to bolster action aimed at ensuring an adequate diet for the entire population and to help to reduce poverty. The program seeks to combat the causes of hunger through such complementary initiatives as the mobilization of civil society, job creation and income generation, and access to food and emergency assistance programs for the most vulnerable groups. In this context, the *Bolsa Família* program was launched in 2003, and it has since become the cornerstone of

current efforts to alleviate hunger and poverty. The program provides cash transfers to the neediest families as a means of ensuring their access to such basic rights as food, health care, education, and social services. The goal of the *Bolsa Família* program for 2006 is to provide monetary assistance to 11.2 million poor families. As part of the Zero Hunger Program, the National Food and Nutrition Security Program carried out activities that include the purchase of goods produced by small farmers, the establishment of low-cost restaurants with affordable prices for the poor, and improvement of public school meal programs. A similar program provides subsidies to families who promise to ensure that their young and adolescent children will not engage in the harmful and dangerous forms of child labor and that they will attend school. The Program for the Eradication of Child Labor (PETI) assists some 980,000 children.

Individual Care Services

Access to health services seems to be assured for the vast majority of the Brazilian population. According to data from the National Household Sample Survey (PNAD 2003), 98% of the respondents who reported having sought health care during the survey period did, in fact, receive care (48). The percentage was slightly lower for the population with income equal to or below the minimum wage (97%) and higher in the population with income equal to 20 times the minimum wage (99.5%). Nevertheless, the 2003 World Health Survey revealed a high degree of user dissatisfaction (57.8%) with the services provided by the country's health systems, including both public and private. Users of private health plans and users of the SUS differed in their assessments, however: 72% of private plan users said they were dissatisfied versus 53.3% of SUS users. The organization of health services is marked by strong involvement of the private sector in the supply of hospital services and diagnostic and treatment support services; at the same time, the public sector is the major supplier of ambulatory services (59).

In 2002, 71% of the facilities in the health system (46,428) were ambulatory care facilities (with no inpatient care provided). Of those facilities, 76% (35,086) belonged to the public system and 73% (33,747) to municipal networks. Less than 15% (1,619) of the private facilities not offering inpatient care were SUS-contracted facilities. The municipal network provides basic health care and most intermediate-level care, and is composed of small health care units (health centers and posts).

In 2002, there were 7,397 hospitals, of which 4,809 were private, and 70% of the latter were providing services to the SUS (60). Approximately 95% of diagnostic and treatment support facilities (e.g., clinical analysis laboratories, radiology clinics) were private, and of those facilities, 35% were providing services to the SUS. The total number of available inpatient beds in 2002 was 471,171, including 146,319 (31%) in public facilities and 324,852 in the private system. However, in addition to beds in public fa-

cilities, the SUS covers 83% of those in private facilities, which means that close to 88% of the country's inpatient beds are accredited for use by the universal public system. SUS hospital admissions in 2005 totaled nearly 13 million; the average hospital stay was 5.9 days.

The National Transplant System (SNT) operates in 22 states and comprises 540 health facilities and 1,338 medical teams authorized by the System to perform transplant procedures. The number of transplants performed within the public system has grown steadily: in 2004, the SUS financed 13,000 organ and tissue transplants.

Ambulatory care under the SUS comprises basic care (including health promotion, disease prevention and control, and basic medical care); intermediate-level specialized care (including consultations with specialists); and tertiary care (involving the use of more complex equipment and technologies). The most recent data (48) indicate that in 2003 the number of yearly doctor visits per capita was 2.4 for the country as a whole and 1.8 in rural areas. The North region has the most problems with access to health services, owing to insufficient supply of services and to population dispersion. Oral health care is considered a critical area: 22% of the population aged 5–19 has never had any dental care. In the public system, 63% of the outpatient procedures performed were related to basic care; in the North, this figure was 72%.

The SUS Mobile Emergency Care Service (SAMU/192), established in 2003, is the main component of the National Emergency Care Policy. The Ministry of Health has equipped 94 services of this type, which are currently operating in 647 municipalities.

Human Resources

During the period 1999–2004, the number of registered physicians increased from 237,000 to 292,000; the number of dentists, from 145,000 to 178,000; and the number of nurses, from 72,000 to 98,000 (61). During the same period, the number of doctors per 1,000 population in the country as a whole rose from 1.4 to 1.6, although in 2004 there continued to be significant regional differences: 2.2 in the Southeast, 1.0 in the Northeast, and 0.8 in the North. The number of dentists per 1,000 population during the period ranged from 0.9 to 1.0, and the number of nurses, from 0.4 to 0.5, with similar differences in regional distribution. Of the 730,000 positions existing in high-level occupational categories in 2003, 64% were occupied by doctors, 12.2% by nurses, and 7.8 by dentists. Between 1999 and 2002, the job market for nurses grew more than the job market for doctors (26.7% versus 9.7%). In 2002, the public sector accounted for 45% of all physician jobs and 65% of nursing jobs. The share of the public sector in all health care jobs in 2002 was higher in the North (76%) and Northeast (65%) than in the South (48%). Training for high-level health personnel is provided by public and private institutions, with growing participation by the latter, which include both for-

profit and community-philanthropic entities. In 2002, 53 of the 115 training programs in medicine, 81 of the 275 nursing programs, and 52 of the 159 dentistry programs were affiliated with the public sector (62).

Health Supplies

Brazil is one of the largest consumer markets for pharmaceuticals and is highly dependent on imported drugs. A study by the Brazilian Government (63) revealed that the value of the 1,028 most widely used imported drugs on the Brazilian market virtually doubled between 1990 and 2000, rising from US\$ 535 million to US\$ 1 billion. This expansion of imports is only partially explained through updating of the therapeutic arsenal and the launching of new-generation drugs on the domestic market. Of all drug imports in 1998, 83% had original patents issued prior to 1977, and of these, 47% had been issued before 1962. Imports of finished drugs increased from US\$ 212 million to US\$ 1.28 billion between 1990 and 2000. The value of drug sales (excluding taxes) on the domestic market was US\$ 6.7 million in 2004 (64). Spending on drugs accounts for the largest share of family expenditure on health, amounting to 76% among the lowest-income families. The National Drug Policy (65), approved in 1998, seeks to ensure the safety, efficacy, and quality of drugs, as well as rational use and access for the population to essential products. Its implementation presupposes decentralized management of resources, based on a national list of essential drugs and a set of essential products whose supply is mandatory. The three levels of government share responsibility for financing basic drug assistance: states and municipalities are responsible for procurement and distribution of drugs, while the federal government is responsible for ensuring the availability of strategic products (antiretrovirals, blood products, and special antimicrobials) and high-cost drugs. The National Drug Assistance Policy (PNAF) (66), formulated by the Ministry of Health in conjunction with the National Drug Policy, establishes that drug assistance is to be understood as a public policy guideline for the formulation of sectoral policies. To expand the population's access to drugs, incentives have been offered for the marketing of generic products (67), which cost an average of 40% less than brand-name products. As of 2006, 1,847 generic drugs had been registered, comprising 310 active substances in 91 drug classes produced by 66 laboratories. Of these registered products, 1,449 (79%) are now being manufactured domestically and 398 are imported, with India (51%) and Canada (16%) being the largest suppliers.

With regard to the production of immunobiologicals, public laboratories are primarily responsible for the production of the vaccines and sera used in public programs. Brazil produces vaccines against tuberculosis, measles, diphtheria, tetanus, pertussis, yellow fever, and human and canine rabies, and heterologous sera (snakebite, tetanus, diphtheria, and rabies antisera). Strengthening of public laboratories has been a priority in recent

years: between 2002 and 2005, the federal government invested around R\$ 200 million for that purpose. The Institute of Immunobiological Technology (Bio-Manguinhos), a unit of the Oswaldo Cruz Foundation (Fiocruz), is the largest supplier of vaccines for the Ministry of Health. In 2002 alone it produced more than 120 million doses—meeting nearly 60% of national public demand for vaccines. Together with other Brazilian public laboratories, Bio-Manguinhos supplies the SUS with immunobiologicals for the National Immunization Program.

Quality control of blood used for transfusions began in 1980, with the offering of incentives for voluntary donation and the establishment of a network of public blood centers. The use of blood and of human tissue, cells, and organs for treatment is regulated and monitored by the National Health Surveillance Agency (ANVISA) (68), which coordinates the National Blood Surveillance System, a nationwide system for gathering and assessing information on adverse or unexpected effects of blood products use. In 2006, the network included 33 coordinating blood centers and more than 2,000 blood therapy services registered with ANVISA. The blood centers work in association with universities and contribute to the training of specialized personnel and to scientific and technological development in this area.

Research and Technological Development in Health

Research and technological development in health are financed jointly by the Ministries of Health, Science and Technology, and Education. In addition, in some states there are foundations that receive state budget funding. The Ministry of Health carries out its activities of coordination, promotion, and development of research and technology through the Secretariat of Science and Technology and Strategic Inputs (SCTIE) and Fiocruz. The Secretariat of Science, Technology, and Innovation, a branch of the Ministry of Health (69), is responsible for setting guidelines and overseeing the assessment of technologies. It also seeks to introduce new products and processes through health decision-makers, providers, and professionals. To that end, in January 2006, the Ministry of Health put in place a procedure for the incorporation of technologies in the SUS. Brazil's investment in research and development as a proportion of GDP rose from 0.8% in 1996 to 1.0% in the period 2001–2003. The number of scientific articles by Brazilian authors published in LILACS increased from 5,916 in 2000 to 7,221 in 2003, and the number of articles in the MEDLINE database more than doubled between 1999 and 2003, increasing from 3,123 to 6,418.

Health Sector Expenditures and Financing

There are three major sources of funding for the Brazilian health system: the Government (through taxes and social security contributions collected by the three spheres of government), companies, and families. As Brazil does not have a system of local

health accounts, no accurate data are available on total expenditure (public and private) on health based on internationally comparable criteria. Nevertheless, the World Health Organization (70) estimates that in 2004 total health spending in Brazil amounted to 7.9% of GDP. Private expenditure accounted for 51.9% of that total, and out-of-pocket spending by families accounted for nearly 64% of private expenditure. Private spending on health includes expenditures by both families and companies, the latter through the provision or purchase of insurance plans or through health plans for their employees and their dependents, such coverage being voluntary, not mandatory. In 1996, 9% of consumer spending by families was devoted to health (37% for drug purchases, 29% for payment of health plans and insurance, and 17% for dental services). Spending by the richest segment of the population represented a significant portion of total health expenditure, while spending by the poorest decile constituted only a very small fraction. According to the Periodic Family Budget Survey, the three wealthiest deciles accounted for 68% of total health spending, while the poorest 30% accounted for just 7% (71). There are also qualitative differences in expenditure by the richest and poorest segments: while drugs constitute the main item of expenditure for the latter, among the highest-income deciles, health plans accounted for an increasing proportion of spending, although in all income deciles spending on drugs accounted for a considerable proportion of total health expenditures. In particular, in the poorest decile, 54% of health spending went to the purchase of drugs and 6% to payment for health plans, while in the wealthiest decile 24% of spending was for drugs and 33% for health plans.

The SUS is financed by public resources from the three levels of government. In 2004, the federal government contributed 50.7% of total funding for the SUS; the states and the Federal District, 26.6%; and the municipal governments, 22.7%. Resources for the federal government come from general taxes and social security contributions. In recent years, spending by the Ministry of Health has represented 9% of the total actual (non-financial) expenditure of the federal government. Of the social areas, health accounts for the second highest level of spending, exceeded only by social security. In 1995, the budget of the Ministry of Health was R\$ 36.8 billion (in 2003 values). In 2003, R\$ 30.8 billion was allocated to the Ministry of Health, close to 50% of which was transferred to states and municipalities for the implementation of health activities and services following consolidation of the process of health system decentralization. In 1995, in contrast, direct expenditures by the Ministry of Health accounted for 72% of its total budget and only 8% was transferred to subnational entities. There are important regional differences in the allocation of public resources for health: in 2002 per capita public spending in the Northeast region was R\$ 168.43, while in the Southeast region the amount was R\$ 250.56. Federal resources represented 62% of per capita public expenditure in the Northeast region and 49% in the Southeast region. Investment in health by the Ministry of Health in 2004

amounted to around R\$ 1.9 billion, 5.1% of its total expenditure: 1.9% in direct investments and 3.2% in resources transferred for investment by states and municipalities.

Technical Cooperation and External Financing

Various programs are being carried out in Brazil with support from bilateral and multilateral cooperation organizations, including the Inter-American Development Bank; the World Bank; PAHO; the United Nations Population Fund; the United Nations Development Program; the United Nations Educational, Scientific, and Cultural Organization; and the European Union. Notable among these initiatives are three projects, one aimed at strengthening basic health care attention (Project for the Expansion and Consolidation of the Family Health Program [PROESF]), another at reorganizing health care for the indigenous population, and the third at enhancing disease surveillance [VIGISUS].

International cooperation stresses public health services and training, especially in the areas of disease management and prevention and control. This cooperation is either national in scope or it targets the states where the health situation is most precarious, particularly those in the Northeast region. The broad thematic areas for cooperation include: (1) reduction of infant and maternal mortality through promotion of women's and children's health and expansion of the Family Health Program; (2) improvement of the quality of health services through physical restructuring, strengthening of management, and training of human resources; and (3) improvement of access to health services and interventions.

Several international foundations are also active in Brazil, providing direct financing for projects or individuals in fields related to the Program of Action of the International Conference on Population and Development (Cairo, 1994) and to the achievement of the MDGs. PAHO technical cooperation in Brazil is based on rights, equity, gender, and life-course approaches (a new approach aimed at promoting neonatal care as part of a continuum of care for mothers, newborns, and children), evidence-based decision-making, and consonance with national policies. Through its communication and knowledge management activities, PAHO promotes integration of various technical areas, thus facilitating technical cooperation with the country.

Brazil also participates in cooperation initiatives in the Southern Hemisphere involving large amounts of financial resources. Several neighboring countries, including Bolivia, Colombia, Guyana, Paraguay, Peru, and Venezuela, are benefiting from control activities targeting endemic diseases such as malaria, schistosomiasis, leishmaniasis, tuberculosis, and leprosy, and from HIV/AIDS prevention activities. The MERCOSUR countries are currently engaged in intensive conversations aimed at establishing common health regulations. In addition, Brazil continues to provide support to the Portuguese-speaking countries of Africa and to East Timor.

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