

VENEZUELA



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 Bolivarian Republic of Venezuela is a federation organized into 23 states, a capital district, and federal dependencies distributed in 335 municipalities. It has a land area covering 916,446 km² and a population estimated at 26,577,423 in 2005—49.7% women (1)—with a density of 29 people per km² and an annual average growth rate of 1.7% (2).

GENERAL CONTEXT AND HEALTH DETERMINANTS

Social, Political, and Economic Determinants

The gross domestic product (GDP) grew by approximately 19% in 2004 and by 9% in 2005 (2), mainly owing to oil revenues. The poverty level, measured by income, rose from 39.1% in 2001 to 42.4% in 2005 and extreme poverty climbed from 14.2% to 17% (1). In 2003, according to the Human Development Report (3), the country ranked 14th out of 81 countries in development (11th place in 2001). The Gini coefficient fell from 0.48 in 1998 to 0.46 in the first half of 2004. The poorest 20% obtains 4.7% of the country's income and the wealthiest 20% obtains 52.3%.

Inflation grew from 12.5% in 2001 to 21.8% in 2004. As of December 2005, 65.4% of the population was economically active, 49.5% of whom were women (2). The employment rate was 91.1% (15.9% in the public sector and 84.1% in the private sector) and 47.6% of jobs were in the informal sector. The net activity rate, which refers to the capacity to engage in productive economic activities, was 65.3% in 2001, and 68.8% in 2004 (2), and the trend indicates that the percentage of people able to engage in economic activities in the country continues to grow.

Table 1 shows Venezuela's classification in social territories (units of analysis composed of a group of people who share similar sociocultural and economic profiles but do not necessarily correspond to existing geopolitical boundaries) and Figure 1 shows that life expectancy has increased in the more developed territories.

In 2004, public investment in education as a percentage of GDP was 4.9% (2). For the 2004–2005 school year, the net enrollment rate by age group was 51.7% in preschool; 90.7% in primary school; and 30.6% in secondary, upper secondary, and vocational school (2). In 2001, the illiteracy rate was 6.4% (2). On 28 October 2005, Venezuela declared itself “illiteracy free” in the wake of the Robinson Mission, which was an initiative to teach more than 1 million Venezuelans around the country to read and write.

In 2004, the housing shortage in Venezuela was about 1.1 million units, and the qualitative shortage was 1.8 million; 68% of

occupied housing is located in shantytowns and public housing projects built by the government (4).

To combat poverty, include excluded groups, and respond to the commitments to achieve the Millennium Development Goals (MDGs), the national government has implemented large-scale, rapid social programs known as “missions.” The *Misión Barrio Adentro* and the *Misión Milagro* stand out in the field of health care. Other missions promote education, culture, employment, food access, sustainable development, research, and other human development areas.

Demographics, Mortality, and Morbidity

In 2005, 31.2% of the population was under 15 years of age and 7.5% was 60 and over (1). In 2004, the birth rate was 24.4 per 1,000 population; the general fertility rate was 2.69 children per woman, and the mortality rate per 1,000 people was 4.5 (6.1 for men and 3.9 for women) (1, 2). This situation has produced a population pyramid with an increasingly narrow base (Figure 2). According to the most recent census (2001), 87.1% of the population is urban; 57% lives in the coastal area, 22% in border areas, and 21% in the central region (1).

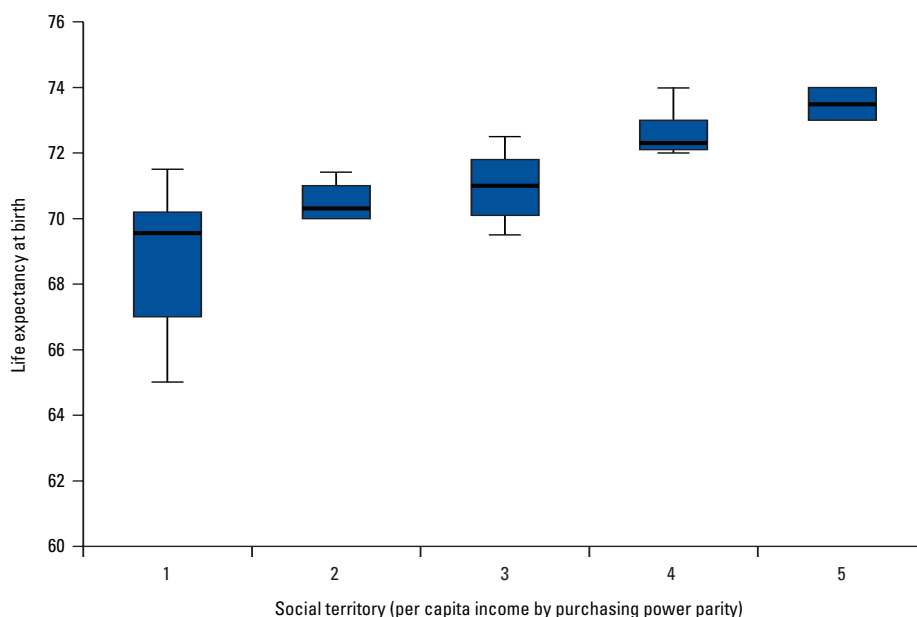
Life expectancy at birth was 72.7 years (76.6 for women and 69.8 for men) in 2002 and 73.2 years (76.2 for women and 70.3 for men) in 2005 (2). In 2004, there was a life expectancy gap of 9.4 years between the population living in the most developed and the least developed states (74.6 years in the Capital District and 65.2 years in Delta Amacuro) (1).

In 2004, the 10 leading groups of causes of death, expressed as unadjusted rates per 100,000 people, were heart disease (93); cancer (67); suicides, homicides, and other violent deaths (57.2); accidents of all kinds (32.1); cerebrovascular disease (31.7); diabetes (27.3); conditions originating in the perinatal period (20.1); chronic lower respiratory diseases (12.1); influenza and pneumonia (11); and liver disease (8.5). The differences by sex in violent deaths (100.4 in men and 10 in women) and accidents of all kinds (49.1 in men and 14.9 in women) are striking (5). Deaths due to violence were the leading cause of potential years of life lost in the country. Underreporting of mortality is between 10% and 15%.

TABLE 1. Classification of Venezuela in social territories, 2002.

| Social territory 1 (least developed) | Social territory 2 | Social territory 3 | Social territory 4 | Social territory 5 (most developed) |
|---|-----------------------|-----------------------|-----------------------|--|
| Amazonas | Yaracuy | Lara | Nueva Esparta | Capital District |
| Delta Amacuro | Sucre | Falcón | Aragua | Miranda |
| Guárico | Trujillo | Monagas | Anzoátegui | |
| | Portuguesa | Mérida | Bolívar | |
| | Barinas | Táchira | Carabobo | |
| | Apure | Cojedes | Zulia | |

Source: Data obtained from the Human Development Index and Context in Venezuela. INE-UNDP, 2002. Strata defined by per capita income using purchasing power parity.

FIGURE 1. Life expectancy at birth, by social territory, Venezuela, 2002.

Source: National Statistics Bureau. <http://www.ine.gob.ve>.

HEALTH OF POPULATION GROUPS

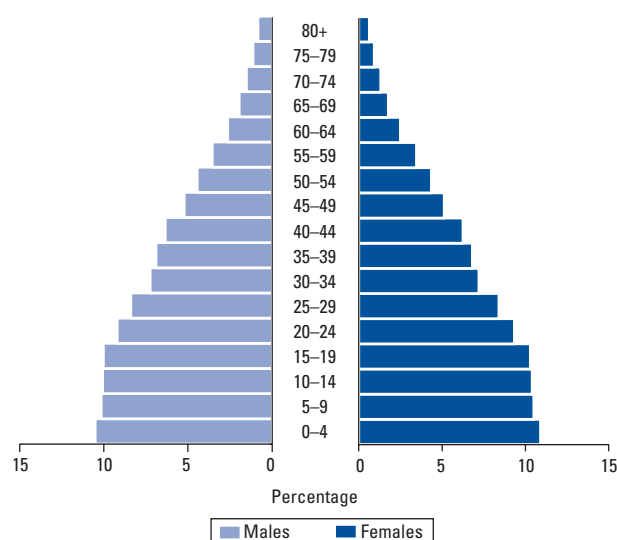
Children under 5 Years Old

In 2005, children under 1 year of age accounted for 2.2% of the general population (51.2% were boys). The prevalence of low birthweight fell from 12% in 1999 to 8% in 2002 (1). The infant mortality rate has steadily decreased in recent decades (Figure 3). Infant mortality expressed as the rate per 1,000 live births was 25.8 in 1990, 17.7 in 2000, and 17.5 in 2004 (5). Projections of this trend using the ARIMA method indicate that the country will have a rate of 10.7 deaths per 1,000 live births by 2015, which is close to the MDG of 8.5. Social territory 2 (Table 1) has the highest rate (21.7) and social territory 5 the lowest (14.6).

The deaths among children under 1 as a proportion of total deaths fell from 14.2% in 1990–1994 to 8.4% in 2000–2004. In

2004, 66.5% of deaths in children under 1 occurred in the neonatal period and 33.5% in the postneonatal period (5). The proportional contribution of the five leading causes of death was: certain conditions originating in the perinatal period 56.7%, congenital defects 16.2%, intestinal infectious diseases 8.1%, influenza and pneumonia 4.6%, and accidents of all kinds 3.5% (5).

In 2005, the 1- to 4-year age group made up 8.4% of the population (51.4% were boys) (1). In 2004, mortality from all causes expressed as the rate per 100,000 boys and girls between the ages of 1 and 4 was 73.7 (76.6 for boys and 70.7 for girls). The leading five causes of death were: accidents of all kinds (16.6), intestinal infectious diseases (13.8), influenza and pneumonia (12), congenital defects (10.7), and nutritional deficiencies (9.8) (5).

FIGURE 2. Population structure by age and sex, Venezuela, 2005.

Children 5–9 Years Old

In 2005, the 5- to 9-year age group accounted for 10.2% of the total population (51.1% were boys) (1). In 2004, mortality from all causes expressed as the rate per 100,000 boys and girls in this age group was 34.4 (40.9 for boys and 27.6 for girls). The five leading causes of death were: accidents of all kinds (12.2), cancer

(4.4), congenital defects (2.7), infant cerebral paralysis (1.7), and influenza and pneumonia (1.2). The difference between the sexes in deaths caused by accidents of all kinds stands out (16.8 for boys and 7.3 for girls) (5).

Adolescents 10–14 and 15–19 Years Old

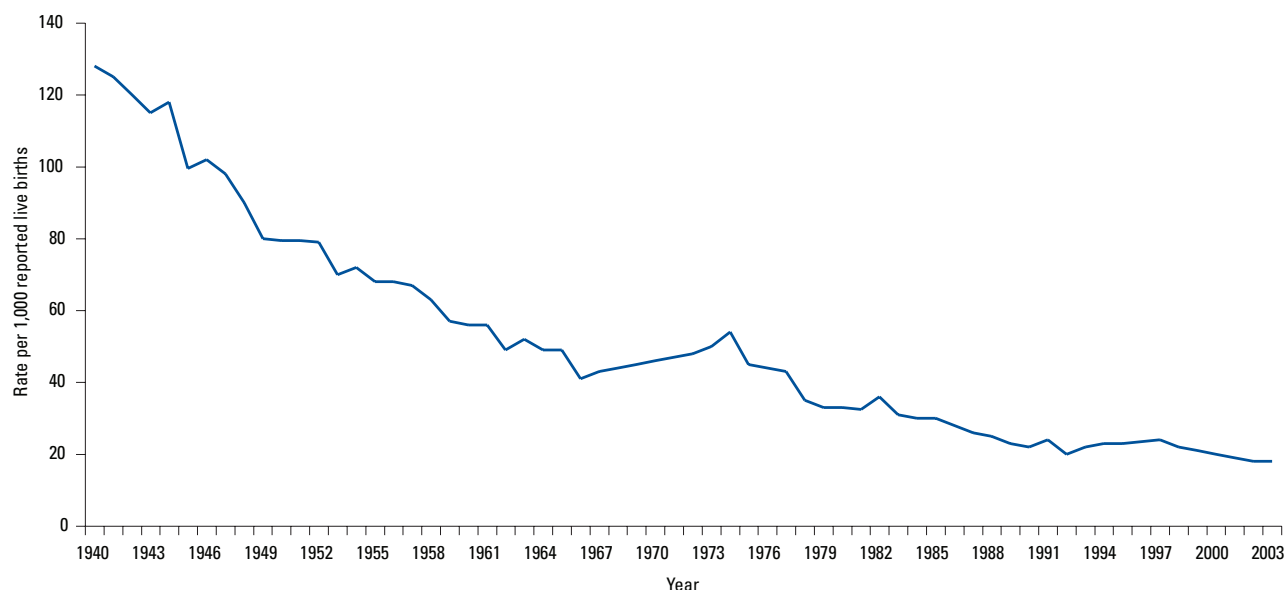
In 2005, the 10- to 19-year age group accounted for 20.1% of the total population (50.9% were males). In 2004, the specific fertility rate among girls between the ages of 15 and 19 was estimated as 91.7 per 1,000 population (1).

In 2002, the Ministry of Health reported 98,099 births in the 10- to 19-year age group (22.4% of all births), with percentages higher than the national average in the following states: Apure (31.2% of total births), Guárico (27.8%), Cojedes (27.2%), Portuguesa (26.9%), and Barinas (25.7%). The prevalence of low birthweight for babies born to mothers between the ages of 10 and 14 was 12.6%, and it was 9.2% for mothers between the ages of 15 and 19 (8% for mothers of all ages) (6).

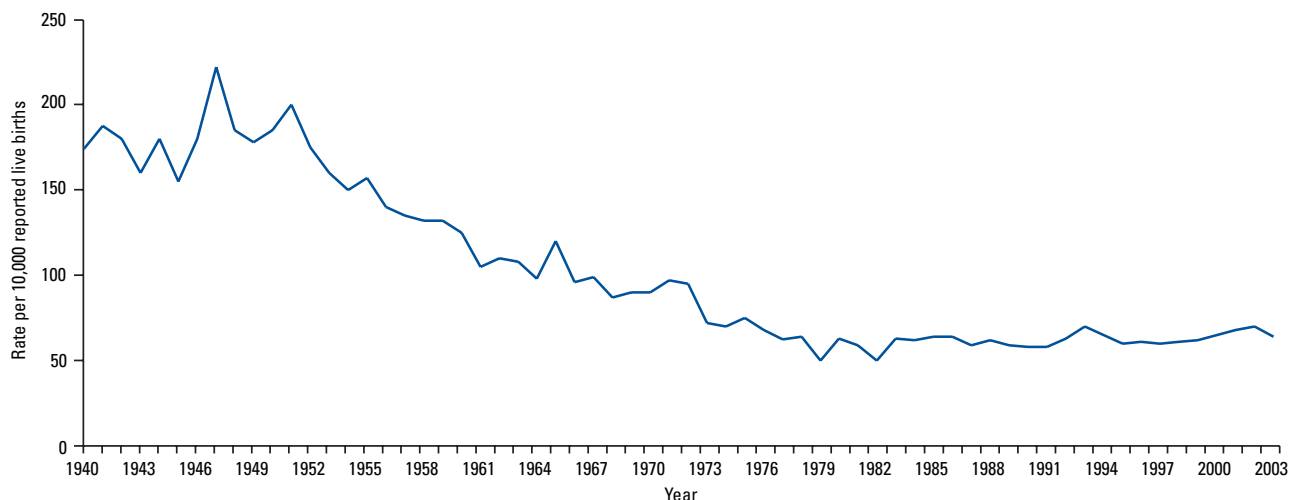
In 2004, the mortality rate for adolescents between 10 and 14 years old was 44 per 100,000 (52.0 for males and 35.0 for females) and for adolescents between 15 and 19 years of age it was 158.0 per 100,000 (253.0 for males and 59.0 for females) (1). Violence was the main cause of death in adolescent males between the ages of 15 and 19 years (5).

Adults 20–59 Years Old

In 2005, the 20- to 59-year age group made up 51.3% of the population, with one-half being males (1). In 2004, the five lead-

FIGURE 3. Infant mortality, Venezuela, 1940–2003.

Source: Ministry of Health, National Epidemiology Directorate, 2006, Venezuela.

FIGURE 4. Maternal mortality, Venezuela, 1940–2003.

Source: Ministry of Health, National Epidemiology Directorate, 2006, Venezuela.

ing causes of death (rate per 100,000 population) were: 82.3, violent events (153.4 for men and 11.1 for women); 57.3, cancer (47.7 for men and 67.0 for women); 49.2, heart disease (68.6 for men and 29.9 for women); 45.3, accidents of all kinds (76.1 for men and 14.5 for women); and 13.8, diabetes (15.9 for men and 11.7 for women) (5).

Maternal mortality fell steadily until the end of the 1970s. Since then, the level has remained stable, with slight variations (Figure 4), but inequalities persist among the social territories. In 2004, the maternal mortality rate was 59.9 per 100,000 live births. Maternal deaths in 2000–2004 averaged 331 a year (5). In 2004, the proportional contribution of the leading five causes of maternal deaths was 28.6% from edema, proteinuria, and hypertension; 22.6% from other obstetrical complications; 20.8% from pregnancies ended by abortion; 13.8% from complications related to labor and delivery; and 10.1% from complications in the puerperium (5). In 2004, institutional coverage of care during delivery was 98% and coverage of prenatal checkups in Ministry of Health establishments was 25.5% (1).

Older Adults 60 Years Old and Older

In 2005, the group aged 60 and up accounted for 7.6% of the population, 47.1% of whom were males (1). In 2004, the proportional distribution of the leading causes of death was 19.1% from heart disease, 10.5% from cancer, 6.8% from cerebrovascular diseases, 5.1% from diabetes, and 2.8% from chronic lower respiratory diseases (5). In 2005, the main causes of morbidity were arterial hypertension (17.2%), visual disorders (13.9%), respiratory disorders (12.7%), diabetes (11.3%), and osteoarthritis and osteoarthritis (10%) (7).

Workers

Occupational risks over the last decade have tended to increase as a consequence of informal employment, the use of unsuitable premises, and the use of homes as production centers. In 2004, the National Occupational Accident Prevention, Health, and Safety Administration (INPSASEL) reported 1,339 cases of muscular-skeletal disorders (68.6%), pathologies related to chemical risks (9.9%), psychosocial disorders (5.7%), respiratory disorders (4.9%), voice pathologies (4.3%), skin conditions (3.1%), occupational deafness (2.5%), exposure to extreme temperatures (0.4%), work-related zoonoses (brucellosis) (0.4%), and radiation disorders (0.3%) (8). Significant underreporting is assumed and the real figures for work-related disabilities and deaths are unknown.

Persons with Disabilities

According to the 2001 census, 4.2% of the population had a disability of some kind, for a total of 927,397 people (0.13% blindness, 0.15% deafness, 0.38% retardation, 0.15% loss of the upper limbs, 0.31% loss of the lower limbs, and 3.1% other causes) (1), although underreporting is assumed. *Misión Barrio Adentro* launched a process to strengthen comprehensive rehabilitation services.

Ethnic Groups

The indigenous population represents 2.3% of the total (532,743 people) (1) and is distributed among 36 ethnic groups who live in 10 states. The diseases that prevail in this population

are tuberculosis, malaria, hepatitis, intestinal parasitosis, malnutrition, onchocerciasis, and respiratory and digestive disorders. The Amazon Tropical Disease Research and Control Center (CAICET) reported that the incidence of tuberculosis among the Yanomami was 10 times higher than for the nonindigenous population. In the states of Amazonas and Bolívar, the four leading causes of death in this ethnic group are malaria (40.1% of reported mortality), malnutrition, hepatitis B, and intestinal infections (gastroenteritis, amoebic dysentery, and helminthiasis). The indigenous population, in particular the Yanomami and Añú, are highly vulnerable to sexually transmitted infections owing to their contact with miners and tourists (9).

HEALTH CONDITIONS AND PROBLEMS

COMMUNICABLE DISEASES

Vector-borne Diseases

In 2002, three cases of **yellow fever** were reported in Zulia, with the start of an outbreak that lasted until 2003; of the total of 34 cases, 21 were in Zulia (with 9 deaths), 11 in Táchira (with 5 deaths), and 2 in Portuguesa. Also, the surveillance system in Zulia reported 9 cases (with 6 deaths) among people from northern Santander in Colombia. In 2004, a total of 5 cases were reported, with 2 in Mérida (with 1 death) and 3 in Monagas (with 2 deaths); in 2005, there were 12 cases with 8 deaths in the country, with 3 in Mérida (with 2 deaths), 1 in Apure (with 1 death), 1 in Bolívar (with 1 death), and 7 in Portuguesa (with 4 deaths) (10).

In 2003, an unconventional surveillance system was introduced, which identified the disease in primates in Apure, Barinas, Monagas, Sucre, Guárico, and Portuguesa in 2004 and 2005. In response to the outbreak, 953 samples were processed for viral isolation between 2003 and 2005, with three isolations in humans and four in primates (11). Also, in 2004, the Anatomical-Pathological Institute of the Central University of Venezuela introduced the immunohistochemical technique. Up to 2005, 121 tests had been performed (85 in humans and 36 in primates), with 8 humans and 3 Araguato monkeys testing positive for yellow fever (12).

American cutaneous **leishmaniasis** has been diagnosed in different parts of the country even though there is no national surveillance system. For the states that keep statistics, the largest number of cases have been reported in Lara (288 human cases in 2005), Nueva Esparta (13 in 2001 and 21 in 2005, with a prevalence in dogs estimated at 15% to 20%), and Sucre (6 in 2003 and 3 in 2004) (13).

The risk zone for **Chagas' disease** covers 164 municipalities in 18 states located in the Andean foothills, the coast, the north central region, and the plains; 80% of the population at risk lives in rural communities with no basic services. In 2000, 16,670 houses were examined for the presence of contaminated vectors, with

859 of them positive for *Rhodnius prolixus* and 51 for *Trypanosoma cruzi*. In 2004, 5,746 houses were examined and 135 were positive for *R. prolixus* and 26 for *T. cruzi*. Based on the proportion of positive cases out of the total number of samples, seroprevalence for *T. cruzi* was calculated as 8.1% in 2000 and 5.8% in 2005 (14).

The population at risk of contracting **malaria** (i.e., people living in municipalities where the disease has been transmitted during two consecutive years) fell from 36% in 2000 to just under 20% in 2004. However, the incidence of the disease nearly tripled in that same period, from 0.3% in 2000 to 0.9% in 2004. Most cases were caused by *Plasmodium vivax* (90% in 2004) (15). In 2003, 31,719 cases were reported, for a rate of 611 per 100,000 people in the at-risk population and 121 per 100,000 people in the total population. The state with the highest incidence was Amazonas, with 7,131 cases per 100,000 people, and the state with the lowest incidence was Zulia, with 15 cases per 100,000 people. In 2004, 46,655 cases were reported (899 per 100,000 people in the at-risk population and 179 per 100,000 people in the total population). The parasite formula in December 2003 was 82.6% for *P. vivax*, 16.7% for *P. falciparum*, 0.6% mixed (*P. falciparum* and *P. vivax*), and 0.1% for *P. malariae* (16).

The annual parasite index (API) has risen since 2001, and in 2004 it was 8.99 per 1,000 people for all areas. The API for *P. falciparum* fell in 2004 compared with the previous year (0.89 versus 1.07), but it remained far higher than in 2001 and 2002. The API for *P. vivax* rose steadily from 2.38 in 2001 to 8.08 in 2004 (15). The Ministry of Health has begun to use an artesunate-mefloquine combination to treat uncomplicated malaria (17).

Classic **dengue fever** and **dengue hemorrhagic fever** are endemo-epidemic in the country, with four virus types circulating. The year with the highest incidence was 2001, when there were 85,262 cases, for a rate of 446.15 per 100,000 population (77,344 classic dengue and 7,918 hemorrhagic dengue). The number of cases fell gradually until 2004, when 30,693 cases were reported (28,707 classic dengue and 1,987 hemorrhagic). There was an increase in 2005, with 42,217 cases reported (39,536 classic and 2,681 hemorrhagic) (18). The progressive reduction in the number of deaths from hemorrhagic dengue in the period is worth noting; from 50 in 2001 to 19 in 2004 (5).

In 2005, the population at risk of **onchocerciasis** in Venezuela accounted for 22% of the total in the Americas. There are 625 endemic communities reported in three areas: northeast, north-central, and south; 74.4% of the cases are in the northeast. The susceptible population eligible to receive treatment with ivermectin is 99,484 people and between 2003 and 2005 coverage rates exceeded 85% (19).

Vaccine-preventable Diseases

In 2004 and 2005, coverage with routine vaccinations for children under 1 year of age was over 90% for BCG (96% and 95%, respectively) and for yellow fever vaccine (94% both years), while

coverage with the other vaccines remained between 80% and 90% in 2005 (80% OPV3, 87% DPT3, 87% Hib, 88% Hep B, and 76% MMR). Coverage with the pentavalent vaccine (DPT, hepatitis B, and *Haemophilus influenzae* type b) rose from 37% in 2004, when it was introduced in the country, to 80% in 2005 (20). To increase coverage, in 2004 the Ministry of Health implemented the National Vaccination Plan which, in addition to coverage for the population under 5 years with the vaccines included in the national vaccination model, provides vaccinations against hepatitis B and yellow fever for the at-risk adult population.

The progress made with yellow fever vaccinations for children over 1 year after the outbreak in 2003 should be emphasized. By 2005, over 15 million doses had been applied, mainly vaccinating the population over 1 year that lives in 140 high-risk municipalities in nine states, with an estimated population of 7,756,921. In those municipalities, general coverage of 90% has been achieved. Also, the yellow fever vaccine is administered regularly as part of the Expanded Immunization Program (PAI), to children 1 year of age, with coverage rates exceeding 90% in the last three years (20). Venezuela has participated actively in the Americas Vaccination Week (SVA) since 2003 and has used this initiative to strengthen its regular program and conduct campaigns.

With regard to the epidemiological behavior of vaccine-preventable diseases, in 2005 the country remained free from confirmed cases of **poliomyelitis** (the last case was reported in 1989). In the same year, one confirmed case of neonatal **tetanus** was reported (the last case was in 2001) and one of **diphtheria** (last case in 1992). The number of cases of **whooping cough** rose from 286 in 2002 to 367 in 2003 and to 715 in 2004. On the other hand, there was a marked drop in the number of cases of **rubella** confirmed clinically and in the laboratory: 2,724 in 2003 and 2,885 in 2004 compared to 4,047 reported in 2002 and 9,996 in 2001 (6).

The country was affected by an outbreak of **measles** from week 36 of 2001 to week 46 of 2002, with a total of 2,501 cases distributed among 17 of the 24 states, with 84% of the cases in Zulia, which was hardest hit. The outbreak mainly affected the under-5-year age group, particularly children under 1, with 699 cases and a rate of 122.5 per 100,000. Young adults, mainly between the ages of 20 and 34 years, also had high incidence rates. The virus that caused the outbreak was imported by a traveler from Europe who went to the municipality of Zamora in the state of Falcón and was not opportunely detected. The disease spread to the rest of the state and then to the rest of the country. Thanks to intensive control activities, the outbreak lasted only 14 months and the event is considered to be the last presentation of the measles virus (D9), which is widely endemic in the Americas.

Intestinal Infectious Diseases

Mortality in children under 5 years caused by intestinal infectious diseases expressed in rates per 100,000 people was 37.3 in

2002 (21) and 35.3 in 2004, with approximately 70% of those deaths among children under 1 year (22). There were 1,213,460 cases of **diarrhea** reported in children under 5 in 2004 and 1,214,461 in 2005 (23).

Chronic Communicable Diseases

Venezuela has been classified since 2004 among the group of countries in the Americas with a moderate burden of **tuberculosis** (TB). In 2004, 6,519 new cases of TB in all its forms were reported, for a rate of 25.1 per 100,000 people; the highest incidences were in Delta Amacuro (111.9), the Capital District (66.2), Amazonas (44.0), Monagas (43.9), Portuguesa (33.9), and Vargas (31.2). The pulmonary form accounted for 84.4% of all the new cases of TB that were reported, with 68.6% of them bacilliferous; 51.3% presented in the 15- to 44-year age group; 8.9% were in children under 15 years; and 15.3% were in people 65 years of age and over. The tubercular meningitis rate in the 0- to 4-year group was 0.2 per 100,000. AIDS/TB coinfection continues to rise and the association is present in 5% of new cases of TB and in 3.5% of reported relapses. The total number of relapses reported was 425, and 68% of them were confirmed bacteriologically. The country uses passive case detection and therefore underdiagnosis is assumed (24).

In 2004, the national prevalence rate of **leprosy** was 0.54 per 10,000 people; however, rates above 1.0 persist in the states of Cojedes, Portuguesa, Barinas, and Apure. New cases are more frequent with advancing age and in males, predominating in rural zones and unconsolidated urban settlements. The multibacillary form is the most prevalent. The detection rate was 0.27 per 10,000 people (25).

Acute Respiratory Infections

Mortality in children under 5 years from acute respiratory infections, expressed in rates per 100,000 people, was 24.5 in 2002 (21) and 27.2 in 2004, with 60% of them in children under 1 year. (22). Preliminary figures report 6,694,002 acute respiratory infections in 2004 and 6,716,211 in 2005 (23).

HIV/AIDS and Other Sexually Transmitted Infections

Between 1982 and 2005, 53,465 cases of AIDS were reported with 6,372 deaths. The epidemic is considered theoretically concentrated, with a prevalence in the population from 15 to 49 years of 0.7% and an estimated 110,000 cases of HIV infection. It should be kept in mind that AIDS was reported in only 13 of the 24 states, which suggests the existence of underreporting that has still not been estimated. The trend observed through the detection of people with the infection is an increase in heterosexual transmission and feminization of the epidemic. The male-to-female ratio fell from 9.8:1 in 1990–1994 to 3:1 in 2000–2004. The Ministry of Health offers universal access, free of charge, to antiretroviral drugs, diagnostic tests, and immunological and vi-

rological monitoring. Antiretroviral treatment rose from 52% in 2004 to 100% in December 2005 (26).

Zoonoses

Coordination of actions between the Ministry of Health and the Ministry of Agriculture and Land has been stepped up. Through regular meetings of the National Zoonoses Committee, it has been possible to effectively implement joint projects from the planning to the action stages.

The geographic distribution of **rabies** in dogs was reduced from 11 states in 1991 to 1 state (Zulia) in 2001. The annual number of cases of canine rabies in Zulia has risen continually, from 82 cases in 2001 to 181 in 2004. However, intervention by local authorities made it possible to improve the structure of the vaccination campaigns carried out in mid-2004 and to reduce the incidence by 57% in 2005 (76 cases) (27). In 2003, there were two cases of human rabies transmitted by dogs, while, in 2004, five cases of human rabies were reported, three of them transmitted by dogs in Zulia and two by hematophagous bats in Sucre; no human cases were reported in 2005 (6).

With regard to **equine encephalitis**, the Ministry of Health and the Ministry of Agriculture and Land maintain a joint vaccination program of equines in high- and moderate-risk municipalities. In 2004, 297,046 doses were applied and 303,211 in 2005. In 2004, 29 outbreaks of the disease were reported, with 13 being eastern equine encephalitis (EEE), 9 Venezuelan equine encephalitis (EEV), and 7 with positive serology for both viruses. In 2005, 5 outbreaks were reported, 4 caused by EEE and 1 by EEV (28). In 2005, a national surveillance program was carried out for West Nile virus to monitor its possible entry into the country.

In 2000, 419 cases of **leptospirosis** were reported in the wake of the floods in Vargas (29), with the number dropping gradually to 98 cases in 2004 (30). The 2005 floods caused an outbreak with 90 suspected cases and 6 deaths (31).

With regard to birds, the country has been historically free from all the viruses that cause **avian influenza**, which was corroborated through sampling at the end of 2005, with negative results for the commercially raised bird population consisting of about 78 million birds (31). A permanent surveillance system is being implemented for commercial and backyard birds, and migratory birds are being monitored.

In 2003, an epidemic of **foot-and-mouth disease** affected 63 farms; the incidence fell to 13 farms in 2005, predominantly in the western part of the country. **Vesicular stomatitis** fell from 22 outbreaks reported in 2003 to 12 farms affected in 2005, and its incidence continues to be low (27).

As for **brucellosis**, in 2003 new regulations were approved for diagnostic tests and for the destination of animals that tested positive. This led to an increase in serological tests from 504,310 in 2003 to 1,197,636 in 2005. The prevalence of the disease in an-

imals was 8 per 1,000 in the field in 2005. Vaccinations increased from 273,448 in 2004 to 478,182 in 2005 (6).

NONCOMMUNICABLE DISEASES

Metabolic and Nutritional Diseases

The prevalence of the nutritional anthropometric deficit in children under 5 was low (weight/age <10%, height/age <20%, and weight/height <5%). The main problem was low height for age (12.5%); low weight for age was 5.2% and acute nutritional deficit was 4.1%. The prevalence of overweight was 3.1%.

Of 78,405 hospital pediatric admissions (<13 years) for all causes in 24 sentinel hospitals in 2004, 1.4% had serious malnutrition, with a predominance of marasmus, with children under 1 year being the hardest hit. The highest rates for pathologies linked to malnutrition were for diarrhea (3.4%), helminthiasis (1.5%), bronchitis (1.3%), anemia (1.2%), and pneumonia (0.4%) (32).

OTHER HEALTH PROBLEMS OR ISSUES

Disasters

The torrential rains of 2002 and 2005 almost everywhere in the country, which caused flooding and mudslides, stand out: 300,000 people were left homeless and there were 98 deaths. A large number of health centers were affected (33). In 2005, 90 accidents were reported in the oil industry, which indicated a pressing need to promote or recover safety margins in the country's oil and petrochemical industries (34). The Civil Protection and Disaster Management Law was promulgated in 2003 and the Risk Management Law in 2005. In 2005, the Ministry of Health created the Emergency and Disaster Coordination Office and the Health Department of Metropolitan Caracas established a Health Risk Management Unit.

The Ministry of Health prepared the National Plan for Surveillance, Prevention, and Control to address a possible avian influenza pandemic and the National Surveillance System for Acute Respiratory Infections, Pneumonia, and Influenza was strengthened by implementing an epidemiological investigation file for acute respiratory infections (35).

Violence and Other External Causes

The Interministerial Commission for Road Awareness, Accident Prevention, and Education (CIAPEV) was established in 2003. In 2004, the Ministry of Health's National Accident and Other Violent Events Program was reactivated. In 2004, 117,227 deaths were reported, with 5,437 caused by traffic accidents (21% women), 7,348 homicides (6.2% women), and 1,034 suicides (19.4% women), with the number of deaths from accidents and violence totaling 13,819 (36).

Between 2000 and 2004, an average of 4,000 domestic violence complaints were reported each year. More than 40% of the complaints involved physical or psychological violence. In the aggressor-victim relationship, more than 80% of acts of violence are performed by the partner or former partner (37).

Addictions

Smoking by people more than 15 years old declined from 40% in 1984 (38) to 28% in 2005, according to studies conducted by the Central University of Venezuela and the National Anti-Smoking Office (39), which had national coverage. This drop was accompanied by a reduction in per capita consumption of cigarettes from 2,100 in 1984 to 900 in 2005. In the population under 15 years, the percentage of smokers increased from 2.7% in 1984 to 13% in 2000 (40). These results indicate that the policies to combat smoking implemented in the country have mainly had an impact on adults and have been less effective among youths. Resolutions of the Ministry of Health that ban tobacco advertising and restrict access to tobacco products by minors, which were approved in March 2006, constitute a strategy to reduce consumption by youths. The resolutions in question and the regulations governing tobacco products and their packaging place Venezuela among the most advanced countries in policies to control and prevent tobacco use.

In 2000, **alcohol consumption** was a factor in 50% of homicides and suicides and in 40% of traffic accidents (39). In 2003, a survey on alcohol consumption conducted by the National Commission to Combat Illegal Drug Use (41) reported that 31% of the respondents were regular alcohol users; 36.7% started between the ages of 10 and 14 years; and 48.2% started between the ages of 15 and 19. Since 1979, the country has had an Alcohol and Alcoholic Beverages Revenue Law that regulates the sale, production, taxation, and advertising of alcohol. Advertising was prohibited on radio and television between 1979 and 2004, when beer, wine, and liquor advertising was reauthorized in the media, but it was restricted again in 2005. It is also prohibited to sell alcohol to youths under 18 years and there is a tax on the sale of domestic and imported alcoholic beverages to the public.

Drug consumption in the country is moderate, according to the National Commission to Combat Illegal Drug Use. In 2005, the prevalence among people over age 15 who had tried drugs of some kind was 2.2% (4% men and 0.7% women). The age group with the highest consumption was between 20 and 39 years (3% of the population). The most widely used drug was marijuana, followed by cocaine and crack. For all of them, consumption is higher among men, except for ecstasy, where the figure for women was 5.4%, compared to 1.1% for men. The parts of the country where prevalence is highest are Vargas (4.5%), the Capital District (4.2%), and Miranda (4.1%) (39).

Environmental Pollution

Twenty-five deaths were reported from accidental poisoning and pesticide exposure in 2002 (21) and 24 deaths in 2004 (22).

Preliminary figures indicate that there were 4,028 cases of pesticide poisoning in 2004 and 3,572 in 2005 (23).

RESPONSE OF THE HEALTH SECTOR

Health Policies and Plans

The Constitution of the Bolivarian Republic of Venezuela, approved in a referendum in 1999, proposes a process of legislation and institutional reform and new strategies to bring about the necessary changes. It lays the groundwork for developing the legal nature and the organizational model for Venezuela's health sector. Article 83 establishes that health is a fundamental social right, an integral part of the right to life, and an obligation of the State. To guarantee the right to health, article 84 orders the creation of a National Public Health System (SPNS) that is intersectoral in nature, decentralized and participatory, and integrated into the National Social Security System. It is governed by the principles of gratuitousness, universality, comprehensiveness, equity, social integration, and solidarity. Article 85 establishes that its financing is an obligation of the State. Article 86 establishes that everyone has the right to social security as a not-for-profit public service that guarantees health and assures protection from different contingencies. In 2002, the National Assembly passed the Social Security System Organic Law and is in the process of drafting a Health Organic Law, which compiles policies and establishes the rules governing the sector's new institutional framework.

The Ministry of Health is the lead agency in the health sector and is responsible for regulating, formulating, designing, evaluating, controlling, and monitoring health policies, programs, and plans. Through the primary care strategy known as *Misión Barrio Adentro*, implemented under an agreement with the Republic of Cuba, it is in charge of integrating the sources of financing and allocating resources to establish the SPNS and providing comprehensive health care for all population groups, particularly low-income sectors.

During the period 2001–2005, 68 resolutions, 14 decrees, 7 laws, 3 agreements, and 1 directive were issued in the field of health. The most important are: regulation of the second-level access and medical care program, known as the Community Clinics Network, where the changes in the SPNS's care services are apparent; the requirement that the SPNS health establishments are allowed to purchase only the drugs that appear on the national basic list of essential medications; and the Workplace Accident Prevention, Conditions, and Environment Organic Law.

Health Strategies and Programs

With a view to attaining MDGs 4 and 5 by 2015, the Venezuelan government has established *Proyecto Madre*, with a vision of comprehensive and intersectoral care, whose objective is to reduce maternal and child mortality. The project is a strategy de-

signed and promoted by the Ministry of Health to improve the health of children under 5 years of age and of pregnant women. It incorporates a strong disease prevention and health promotion component, which is intended to strengthen knowledge about healthy habits and lifestyles in families and communities, and the practice of care and assistance for pregnant women and children under 5 in the home, as a way of contributing to the growth and full development of all family members (42).

Organization of the Health System

The health services system has been marked by complicated and segmented organization and functioning. It is composed of the public and private subsectors and many players that regulate, finance, insure, and deliver services.

In the 1990s, the health system began a process of decentralizing the services of the then Ministry of Health and Social Welfare to the state level, which took place in 17 states. However, the process was not consolidated and therefore the health sector has both decentralized and centralized services.

At the end of 2005, the Ministry of Health reported that there were 4,804 public ambulatory establishments on the primary level, 4,605 (96%) of which belong to the ministry, in addition to the ambulatory network of the *Misión Barrio Adentro* with approximately 8,600 consultation points. There are 296 public hospitals, with 214 reporting to the Ministry of Health or the state governments, 33 to the Venezuelan Social Insurance Administration (IVSS), 29 to the National Geriatrics Administration (INAGER), 13 to the Armed Forces Social Protection Administration (IPSA), 3 to Petróleos de Venezuela (PDVSA), 2 to the Corporación Venezolana de Guyana (CVG), 1 to the municipality of Miranda, and 1 to the Municipal Police Force of Caracas. The private sector has 344 health centers (315 for profit and 29 benevolent institutions). In 2003, the public sector had 23,858 beds in hospitals (9.2 beds per 10,000 people) (1).

The treatment capability of the system has improved with the introduction of the *Misión Barrio Adentro* and waiting times for surgery and specialized ambulatory care have been reduced under an agreement with the Cuban government to treat patients in that country, particularly through *Misión Milagro*, which offers eye surgery.

Public Health Services

Misión Barrio Adentro is a primary care strategy that consists of organizing structures, programs, and human, technical, and financial resources, with the goal of gradually extending services and expanding comprehensive health care actions to strengthen the SPNS. In 2003, the *Misión* received US\$ 169.4 million from Petróleos de Venezuela (PDVSA) to build up the primary health care network, which was administered directly by the Ministry of Health through a trust with the Economic and Social Development Bank. The agreement between the Ministry of Health and

the PDVSA also included construction of 100 primary care modules by the PDVSA.

The National Network of Public Health Laboratories is coordinated by the Rafael Rangel National Hygiene Institute and its main objective is to strengthen cooperation between the states to monitor, prevent, and control communicable diseases in the country and detect congenital hypothyroidism and phenylketonuria in neonates.

The network's most important achievements include: strengthening the capacity to diagnose and monitor communicable diseases on the national level, with a significant increase in the number of diagnostic tests processed in the network's laboratories, which rose from 123,483 in 2001 to 463,465 in 2005; expansion of diagnostic coverage of the different health programs countrywide, with the goal of providing a rapid and timely response for decision making (Caicara in Orinoco, Santa Elena in Uairén, Tumeremo, Güiria, Santa Bárbara in Zulia, and Altagracia in Orituco); the establishment and consolidation of diagnostic tests for congenital metabolic diseases, which led to an increase in the number of tests from 40,442 in 2001 to 293,186 in 2005; strengthening the program to prevent the vertical transmission of HIV, which means that all the regional laboratories screen pregnant women for HIV in addition to hepatitis B and hepatitis C; and the establishment of an information system to obtain up-to-date data on the incidence or seroprevalence of communicable diseases throughout the country. It was also ensured that the population would have access to those services free of charge (43).

Regular annual public investments in the water and sanitation sector did not exceed 0.2% of GDP between 2000 and 2005. In 2001 a national sanitation plan was consolidated, with additional funds of US\$ 88.9 million, which meant a budget increase of 26.7% for the sector. One factor that contributes to the sector's financial deficit is unbilled water, which amounts to about 63% (44).

Potable water coverage rose from 86% in 1998 to 91% in 2004 in urban zones. Areas without coverage correspond mainly to rural and unconsolidated urban areas and indigenous groups. The country has 151 treatment systems. There are shortcomings in monitoring and control of water quality in rural areas. In 2003, 66% of the rural population had household water connections (44). The population with adequate liquid waste disposal rose from 66% in 2000 to 77% in 2004 (44) and the shortfall is mainly in rural and unconsolidated urban areas and among indigenous groups.

In Venezuela, 24.3% of municipalities have controlled sanitary landfills and 59.2% use open air dumps (45). The country does not have secure disposal for hazardous materials, including hospital waste. The Solid Waste Law was promulgated in 2004 and guidelines were established for regional solid waste management plans. Trash collection in mid-sized and large cities and final disposal in general are serious problems, because the trash that is not collected is dumped into the environment without control. As a result, it becomes a risk factor for the exposed population, particularly people who work in contact with trash and who live close to final disposal sites.

The system for monitoring air quality is limited; only Caracas, Maracaibo, and Valencia have monitoring networks, mainly for particulate matter, but the information is not available and there are no published inventories of emissions. A study conducted in 2003 indicates that the average concentration of inhalable particles (PM₁₀) in Maracaibo is double the WHO guidelines (46). Lead gasoline has not been sold in the country since August 2005.

The proliferation of sources of ionizing radiation, particularly in medical activities, led the Ministry of Health to draw up a register of public and private health centers that use radiation. The following shortcomings were found: 65% of the services do not have personal radiation detection kits, 40% present structural failures, and none of them perform environmental monitoring to control exposure (47).

Nutritional availability in 2004 was fully sufficient (>110%) in iron, thiamine, niacin, and vitamin C; only just sufficient (100%–110%) in riboflavin; insufficient (95%–100%) in vitamin A; and critically insufficient (<95%) in calories and proteins. In 2002, national production of calories, proteins, and fats was low, with the greatest vulnerability in the fats group. In 2005, the average value of a standard food basket was US\$ 178, and the minimum wage was US\$ 189.

Between 2000 and 2002, 31 outbreaks of food-borne diseases were reported in Venezuela (48). The country's food control model is based on interventions by various institutions with different legal frameworks, functions, and responsibilities that do not act in coordination (49).

Under the leadership of the Ministry of Health, an intersectoral committee was established to work on a project leading to implementation of the International Sanitary Regulation (ISR) in the country. Technical groups were set up to work on specific areas: regulatory framework, diagnosis, organization, warning and surveillance systems, and information systems. In view of WHO's request to voluntarily move ahead with the points in the ISR related to preparation for a possible avian influenza epidemic, the group that has made the most progress is the group on ports, airports, and overland border crossings, which already has a protocol for evaluating basic installed capacity.

Individual Care Services

During the first 18 months of *Misión Barrio Adentro*, 163 million free medical consultations took place (6.5 consultations per person), with 14.8 million dental checkups and 3.8 million eye examinations; 1.4 million pairs of glasses have been provided. Also, 567,000 emergency consultations and 1.1 million rehabilitation treatments were carried out. As a complement, the *Misión Milagro* was launched in mid-2004, which provided surgery in Cuba for 176,000 Venezuelans with eye problems (as of February 2006), while 8,500 patients from Latin American countries were operated on in Venezuela for the same difficulties.

The services system is composed of primary care clinics, comprehensive diagnostic centers, comprehensive rehabilitation facilities, high-technology centers, and hospitals. To operate them, regional technical committees were set up in the 24 states under *Misión Barrio Adentro*, composed of representatives of the state and municipal governments, prisons, the Ministry of Health's Regional Health Directorates, the Regional Directorates of the Ministry of Housing and Habitat, the Cuban Medical Mission, the Health Committees, the Francisco Miranda Front, the National Armed Forces, and joint public and private enterprises.

The goal was for each community clinic to cover 250 families or 1,250 individuals, which means that roughly 14,000 clinics would be required. At the end of 2005, about 640 primary care clinics were operating and 1,670 were in the process of being equipped under the coordination of the Ministry of Health. There are also about 6,900 consultation points that operate out of rooms in houses facilitated by families living in low-income areas, which will gradually be replaced by 4,600 primary care clinics. The infrastructure in operation could cover 11.4 million people. The clinics have 103 free drugs for treatment of the most prevalent diseases. There are also dental clinics (1 for every 4 medical clinics) and as of November 2005 close to 2,000 Venezuelan dentists had been incorporated into the system. In addition, 470 eye clinics are operating (1 for every 6 medical clinics) and approximately 1,450 will be needed to cover the public's requirements.

In March 2006, there were 100 comprehensive diagnostic centers around the country, which operate 24 hours a day year-round and provide emergency services and intermediate and intensive care. As of the same date, they had provided 4.1 million laboratory tests, 567,000 emergency consultations, 792,000 ultrasounds, 398,000 x-rays, 324,936 electrocardiograms, 1,108 surgeries, 59,000 endoscopies, and 1.1 million rehabilitation treatments. Also as of March 2006, there were 100 comprehensive rehabilitation rooms, providing the following services: electrotherapy, cervical-lumbar traction, thermotherapy, hydrotherapy, pediatric exercises, adult exercises, occupational therapy, natural medicine and acupuncture, speech therapy, phoniatrics, and podiatry. The high-technology centers were designed as centers for medical diagnosis based on noninvasive medical imaging.

In October 2005, the Ministry of Health began a process of consultation to identify the equipment that should be installed in its 214 hospitals. The National Health Technology Evaluation Committee (CONETS), jointly with a group of experts, prepared technical protocols to determine the technologies required for the optimum functioning of the public hospitals. Sixty percent of the country's beds and 50% of its operating rooms are concentrated in 43 hospitals belonging to the Ministry of Health, most of them located in the capitals of the 24 states (50).

The Ministry of Health is responsible for coordinating all aspects of the organization, operation, monitoring, and evaluation of the blood banks in the National Blood Banks Program (PNBS), through the national coordination office. The main objectives of

Training for Comprehensive-care, General Physicians through Social Programs Known as “Missions”

To combat poverty, achieve the inclusion of socially and economically excluded groups, and respond to the commitments made to achieve the Millennium Development Goals, the Government has implemented large-scale, rapid social programs known as “missions.” The *Misión Barrio Adentro* and the *Misión Milagro* stand out in the field of health care, while *Misión Robinson* is designed to reduce illiteracy, and *Misión Mercal* to guarantee food security.

Undergraduate medical training takes a community approach and is carried out through *Misión Barrio Adentro* under an agreement with the Republic of Cuba. In the medium term, the international cooperants will gradually be replaced with Venezuelan personnel, to ensure the sustainability of the process from the technical and financial standpoints. It is a study/work program, with three days a week spent at the community clinics and two days in the classroom. The first cohort, which has been undergoing training since 2005, has 15,000 students and there are a further 2,500 students following the same program in Cuba. The goal is to train 25,000 Venezuelan doctors to replace the Cuban physicians.

the PNBS are to guarantee a safe blood supply and provide quality products and services tailored to the needs and specific rights of the population, which takes a gender and ethnic approach throughout the life cycle.

The network of blood banks is composed of 270 units, with 86 in the Ministry of Health, 28 in the Venezuelan Social Insurance Administration, 126 in private institutions, and 30 in other institutions. Transfusions are also performed in 1 community clinic and in 4 diagnostic centers (51).

Health Promotion

The Constitution establishes that health is a fundamental social right that forms part of the right to life, where many determining factors converge, including physical, biological, demographic, social, economic, and environmental factors. Accordingly, health policy forms part of a broader set of government policies that give priority to social factors. On the local level, priority is given to the policy on endogenous development nuclei through the social territories where institutional responses and community needs are coordinated.

Another constitutional mandate is participation by society in the implementation and control of public management and in the strategic development plans for local intervention. The Health Committees were established as entities for community organization and participation in solving health problems, and to date there are more than 8,000 of them around the country. In 2006, the Community Councils Law was passed to promote linkage and integration among different community organizations and permit the public to directly manage public policies and community projects. In that same year, the Ministry of Citizen Participation and Social Development was established by splitting the Ministry of Health and Social Development.

Health Supplies

The Ministry of Health regulates and oversees medications from their production to their use by patients. There are 4,347 registered pharmaceuticals that are currently sold; 33% of those products are classified as over-the-counter, while 67% need to be prescribed by a physician (52, 53). The most recent list of essential basic medications prepared by the National Therapeutic Committee of the Ministry of Health is composed of 328 active principles that are sold in 534 pharmaceutical presentations (54) and whose technical fiches are described in the National Therapeutic Form (55). The national market for drugs grew from US\$ 1.86 billion in 2004 to US\$ 2.10 billion in 2005, with 63% corresponding to multinational industries and 37% to national ones (56). The psychotropic drugs segment is represented by 10 active ingredients, with consumption in 2005 amounting to 1,073 kg. For narcotics, the segment is composed of 30 active ingredients, with national consumption in 2005 of 431 kg (57). As for pharmaceutical monitoring, the two executive centers (the National Pharmacological Monitoring Centre of the National Hygiene Institute and the Drug Monitoring Center of the Central University of Venezuela) processed 529 reports of adverse reactions to medications in 2004 and 533 in 2005, which were sent to the Uppsala Monitoring Center of Sweden (WHO Collaborating Center) (56, 57). In 2005, the distribution of four large groups of antimicrobials was restricted (quinolone, macrolides-lincosamides, third-generation cephalosporins, and drugs whose active principle is rifampicin) (58).

Human Resources

The Ministry of Health's staff totaled 150,263 in 2005, including professionals, 3.6% of whom were at the central level, 12.6% in the centralized states, 72.7% in decentralized states, and 11.2%

in reporting agencies. Of that total, 85.7% were permanent, 11% were contracted, and 3.3% were acting (59).

In 2003, the IVSS's hospital, ambulatory services, and central administration staff numbered 43,390, with 33,630 working in services and 9,770 in administration (1). In 2000, there were 20 physicians for every 10,000 people, with a marked contrast between the Capital District (42.2) and Sucre (11.5) (59). According to a census taken by the Venezuelan Medical Federation, in 2005 there were approximately 53,300 active physicians registered in Venezuela and about 1,100 of them work in *Misión Barrio Adentro* together with 15,000 Cuban doctors, and therefore in that year there were 25 doctors per 10,000 people. In 2000, there were 4.5 nurses per 10,000 people, with the highest percentage in Falcón (9.8) and the lowest in Nueva Esparta (2) (59). Training in general medicine is carried out in *Misión Barrio Adentro* under an agreement with the Republic of Cuba and takes the form of a study/work program. The purpose is, in the medium term, to gradually replace the international cooperants with Venezuelan personnel, to ensure the sustainability of the process from technical and financial standpoints. The first cohort that has been undergoing training in the country since 2005 has 15,000 students and a further 2,500 students are following the same program in Cuba. The goal is to train 25,000 Venezuelan doctors to replace the Cuban physicians.

Research and Technological Development in Health

With regard to scientific and technical information on health, in 2005, Venezuela's Virtual Health Library was made official (<http://www.bvs.org.ve>), whose executive secretariat is the Dr. Arnoldo Gabaldón Institute for Advanced Studies in Public Health, which reports to the Ministry of Health. SciELO Venezuela (<http://www.scielo.org.ve>) was consolidated and accredited and has 22 different journals in its collection.

Health Sector Expenditures and Financing

Public social investment as a percentage of GDP rose from 11% in 2000 to 12.1% in 2004. Real per capita social investment fell from US\$ 516.80 in 2000 to US\$ 226.90 in 2005. Public spending on health rose from 1.4% of GDP in 2000 to 1.6% in 2004 (2). Since 2000 public investment has increased and private investment has stabilized. The government sought to funnel part of its oil earnings to the excluded and impoverished population.

References

1. Venezuela, Instituto Nacional de Estadísticas. Available at: <http://www.ine.gob.ve>. Accessed 29 August 2006.
2. Venezuela, Sistema Integrado de Indicadores Sociales para Venezuela. Available at: <http://www.sisov.mpd.gov.ve>. Accessed 29 August 2006.
3. Programa de las Naciones Unidas para el Desarrollo. Informe sobre desarrollo humano 2005. La cooperación internacional ante una encrucijada: ayuda al desarrollo, comercio y seguridad en un mundo desigual. New York: PNUD; 2005. Available at: <http://hdr.undp.org/reports/global/2005/espanol/>. Accessed 24 August 2006.
4. Venezuela, Fundación Vivienda Popular. Situación habitacional en Venezuela. Available at: <http://www.viviendaenred.com>. Accessed 5 September 2006.
5. Venezuela, Ministerio de Salud y Desarrollo Social. Anuario de mortalidad 2004. Caracas: MSDS; 2005. Available at: <http://www.msds.gov.ve/msds/documentos/Anuario.zip>. Accessed 8 August 2006.
6. Venezuela, Ministerio de Salud y Desarrollo Social, Dirección General de Epidemiología y Análisis Estratégico. Archivos de 2001–2005.
7. Venezuela, Instituto Nacional de Geriátría. Proyección de la población de adultos mayores y sus principales causas de morbilidad y mortalidad. [Presentation by A. Capielo]. Caracas: INAGER; 2005.
8. Venezuela, Instituto Nacional de Prevención, Salud y Seguridad Laborales. Available at: <http://www.inpsasel.gov.ve/>. Accessed 25 September 2006.
9. Venezuela, Centro Amazónico de Investigación y Control de Enfermedades Tropicales "Simón Bolívar." Available at: <http://www.innova.org.ve:8000/>. Accessed in 2006.
10. Venezuela, Ministerio de Salud y Desarrollo Social. Reporte internacional periódico de vigilancia de fiebre amarilla, 2001–2005. Caracas: MSDS; 2005.
11. Universidad Central de Venezuela, Instituto Anatomopatológico. Archivos; 2005.
12. Venezuela, Ministerio de Salud y Desarrollo Social. Reunión Nacional de Zoonosis, 2006. Caracas: MSDS; 2006.
13. Venezuela, Ministerio de Ciencia y Tecnología, Instituto Nacional de Investigaciones Agrícolas; Centro Nacional de Investigaciones Agropecuarias, Laboratorio de Enfermedades Vesiculares, 2005.
14. Benítez J. Programa Nacional de Control de Chagas. Situación 2006. Caracas: Ministerio de Salud y Desarrollo Social; 2006.
15. Venezuela, Ministerio de Salud y Desarrollo Social, Programa de Malaria; 2003.
16. Organización Panamericana de la Salud. Malaria en Venezuela. Quito: OPS; 2006.
17. Villegas L. Paludismo en Venezuela. Caracas; 2004.
18. Venezuela, Ministerio de Salud y Desarrollo Social, Dirección de Vigilancia Epidemiológica. Informe anual de casos de dengue, 2004. Caracas: MSDS; 2005.
19. Venezuela, Ministerio de Salud y Desarrollo Social, Programa Nacional de Eliminación de la Oncocercosis; 2006.
20. Venezuela, Programa Ampliado de Inmunizaciones. Boletines. Caracas: PAI; 2006.
21. Venezuela, Ministerio de Salud y Desarrollo Social. Anuario de mortalidad, 2003. Caracas: MSDS; 2004.

22. Venezuela, Ministerio de Salud y Desarrollo Social. Anuario de mortalidad, 2005. Caracas: MSDS; 2006.
23. Venezuela, Ministerio de Salud y Desarrollo Social. Boletín Epidemiológico. Semana epidemiológica N° 52; diciembre de 2005.
24. Venezuela, Ministerio de Salud y Desarrollo Social, Programa Nacional de Tuberculosis y Otras Enfermedades Respiratorias; 2006.
25. Venezuela, Instituto de Biomedicina. Available at: <http://www.biomedicina.org.ve/>. Accessed 28 July 2006.
26. Venezuela, Ministerio de Salud y Desarrollo Social, Programa Nacional de Prevención de VIH/SIDA; 2006.
27. Centro Panamericano de Fiebre Aftosa. Sistema de Información Epidemiológica. Available at: <http://siepi.panaftosa.org.br/Painel.aspx>. Accessed 22 September 2006.
28. Venezuela, Servicio Autónomo de Sanidad Animal, División de Control Zoonosanitario; 2005.
29. Venezuela, Ministerio de Salud y Desarrollo Social. Encuentro Nacional de Leptospirosis. Caracas: MSDS; 2005.
30. Venezuela, Ministerio de Salud y Desarrollo Social. Informe de la situación de leptospirosis en Venezuela. Caracas: MSDS; 2005.
31. Venezuela, Servicio Autónomo de Sanidad Animal, Oficina de Apoyo y Vigilancia Epidemiológica; 2005.
32. Venezuela, Instituto Nacional de Nutrición, Sistema de Vigilancia Alimentaria y Nutricional; 2005.
33. Venezuela, Ministerio de Relaciones Interiores y Justicia, Dirección Nacional de Protección Civil; 2006. Available at: <http://www.pcivil.gob.ve/>. Accessed 11 September 2006.
34. Asociación Venezolana de la Industria Química y Petroquímica, 2006. Available at: <http://www.asoquim.com/>. Accessed 15 August 2006.
35. Venezuela, Ministerio de Salud y Desarrollo Social. Plan nacional de vigilancia, prevención y control ante una posible pandemia de influenza aviar. Caracas: MSDS; 2006.
36. Venezuela, Ministerio de Salud y Desarrollo Social. Perfil de país sobre accidentes y otros hechos violentos. Caracas: MSDS; 2005.
37. Venezuela, Ministerio del Interior y Justicia, Cuerpo de Investigaciones Científicas, Penales y Criminalísticas, 2005. Available at: <http://www.cicpc.gov.ve/>. Accessed 14 September 2006.
38. Venezuela, Ministerio de Sanidad y Asistencia Social. Estudio Nacional Antitabáquico; 1984.
39. Venezuela, Ministerio del Interior y Justicia, Oficina Nacional Antidrogas. Available at: <http://www.ona.gob.ve>. Accessed 15 August 2006.
40. Primer informe. Encuesta Mundial de Tabaquismo en Jóvenes. EMTAJOVEN Venezuela. Ministerio de Salud y Desarrollo Social; 2000.
41. Venezuela, Comisión Nacional Contra el Uso Indebido de las Drogas; Unión Europea. Informe Final. I Encuesta de Hogares sobre Consumo de Drogas en la República Bolivariana de Venezuela; 2006.
42. Venezuela, Ministerio de Salud y Desarrollo Social. Propuesta de alianza con universidades y sociedades científicas para fortalecimiento de Proyecto Madre; 2006.
43. Venezuela, Ministerio de Salud y Desarrollo Social. Red Nacional de Laboratorios de Salud Pública, 2001–2005.
44. Venezuela, Ministerio del Ambiente y de los Recursos Naturales. Informe de gestión del sector agua potable y saneamiento, 1999–2004. Caracas: MARN; 2005.
45. Organización Panamericana de la Salud. Informe de la evaluación regional de los servicios de manejo de residuos sólidos municipales en América Latina y el Caribe. Washington, DC: OPS; 2005.
46. Velásquez H, Molina B, Morales J, Cano Y, Romero A. Niveles de contaminación atmosférica por gases ácidos (SO₂ y NO₂) y partículas inhalables (PM₁₀) en dos sitios de la ciudad de Maracaibo, Venezuela. Presented at I Congreso Internacional de Cuenca del Lago de Maracaibo, August 2006.
47. Venezuela, Ministerio de Salud y Desarrollo Social. Informe de los servicios de radiofísica sanitaria. Caracas: MSDS; 2004.
48. Organización Panamericana de la Salud, Organización Mundial de la Salud, Sistema Regional de Vigilancia de las Enfermedades Transmitidas por Alimentos; 2006.
49. Organización Panamericana de la Salud; Instituto Interamericano de Cooperación para la Agricultura; Organización de las Naciones Unidas para la Agricultura y la Alimentación. Proyecto Sistema Nacional Integrado de Control de Alimentos; 2005.
50. Organización Panamericana de la Salud. Informe sobre la cooperación estratégica de país. Caracas; 2006.
51. Venezuela, Ministerio de Salud y Desarrollo Social, Coordinación Nacional de Bancos de Sangre. PowerPoint presentation.
52. Venezuela, Ministerio de Salud y Desarrollo Social. Lista básica nacional de medicamentos esenciales, 2003. Caracas: MSDS; 2005.
53. Venezuela, Ministerio de Salud y Desarrollo Social. Formulario Terapéutico Nacional, 2004. Caracas: MSDS; 2004.
54. Venezuela, Ministerio de Salud y Desarrollo Social, Dirección de Drogas, Medicamentos y Cosméticos, Departamento de Psicotrópicos y Estupefacientes. Archivos; 2005.
55. Venezuela, Centro Nacional de Vigilancia Farmacológica. Archivos, 2005.
56. Venezuela, Instituto Nacional de Higiene “Rafael Rangel.” Archivos. Caracas; 2005.
57. Intercontinental Marketing Services-Health. Global pharmaceutical market forecasts: market reports. Available at: <http://www.ims-global.com/insightr/report/global/report.htm>. Accessed 21 September 2006.
58. Venezuela. Gaceta Oficial de la República Bolivariana de Venezuela; 2 de enero de 2006; (38.348):5–8.
59. Venezuela, Ministerio de Salud y Desarrollo Social. Indicadores básicos de salud de la República Bolivariana de Venezuela, 2004. Caracas: MSDS; 2005.