

CUBA



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 Republic of Cuba is an archipelago consisting of two major islands—Isla de Cuba and Isla de la Juventud—and some 1,600 islets and keys. It covers a total area of 110,860 km² and lies at the entrance to the Gulf of Mexico, in the Caribbean Sea. It is divided into 14 provinces and the special municipality of Isla de la Juventud.

GENERAL CONTEXT AND HEALTH DETERMINANTS

Social, Political, and Economic Determinants

Cuba's economic reform process is a different, unique experience for Latin America, geared to protecting the country's social progress and advancing its economic and social development based on the efficient and effective use of available resources. Despite financial hardships, it has managed to sustain its social achievements. Utilization of an applied fee system in the health, education, culture, and sports sectors has helped improve computations of value added by these services in GDP. The country's GDP grew at an average annual rate of 5.1% during the 2000–2005 period. Growth in GDP per capita averaged 5% a year, with very little change in the population dynamics. More than 60% of current budgeted expenditures were earmarked specifically for health, education, social security, and social welfare activities. Cuba has faced a number of adversities such as hurricanes and droughts; the stepping up of the blockade, with a cumulative commercial and financial cost of over US\$ 82 billion; and an increase in the average price of oil from US\$ 25.90 a barrel in 2001 to US\$ 56.50 in 2005. The U.S. Government embargo has affected the national health care system by creating shortages of drugs, equipment, and other supplies.

The agricultural sector has been hard hit by adverse climatic factors. The drought and the 8 devastating hurricanes directly or indirectly affecting the island over the 2001–2005 period resulted in losses totaling US\$ 7.8 billion. Key economic activities such as exports; social, personal, and community services; construction; and freight shipping have recovered in the last few years.

The revival of the tourism industry brought 2.3 million tourists to Cuba in 2005, a 35.3% increase over 2000. Its foreign exchange earnings from tourism rose over the course of this same period.

Socioeconomic reforms have turned around unemployment rates in the last few years, bringing unemployment down from 5.4% in 2000 to 1.9% by 2005. The average monthly wage in government and semi-public agencies and enterprises nationwide was 328 pesos in 2005, up 40% from 2000. The Government has managed to control liquidity at levels considered appropriate in light of the country's current economic situation. The budget deficit as a share of GDP has been held at acceptable levels. The

State budget covered the implementation of budgeted activities throughout this period.

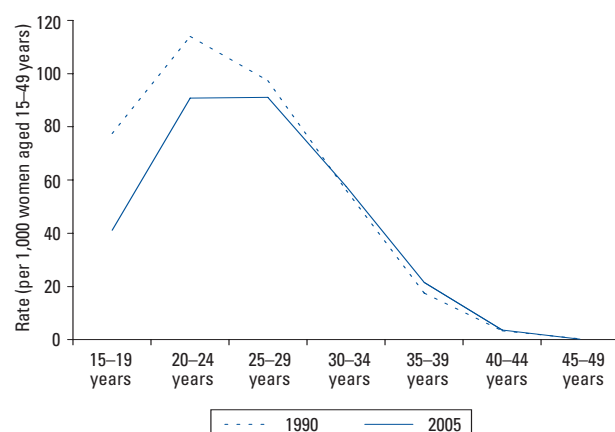
The country's limited access to external financing contributed to the slow growth of the economy. Despite this constraint, important payment obligations were met, enabling the country to gradually reduce its external debt and take on new loans, stepping up investment and trade. There are still unmet demands in the areas of new home construction and housing repairs, passenger transportation, and supplies of certain types of foods and clothing.

Demographics, Mortality, and Morbidity

The low rate of population growth over the past few years is attributable to trends and changes in the dynamics of population movement (fertility, mortality, and migration), which are closely correlated with socioeconomic development. As of 30 June 2005, the country's total population was estimated at 11,257,105, with 75.8% living in urban areas. The decline in the number of births over the last 15 years steepened in 2004 and 2005. The crude birth rate fell from 12.4 to 10.7 births per 1,000 population between 2001 and 2005. During that same period, the average annual rate of population growth fell from 2.0 to 0.2 per 1,000 population and the general fertility rate decreased from 45.7 to 39.9 births per 1,000 women aged 15 to 49. The plotting of age-specific fertility rates for 2005 by five-year age groups forms a curve with a plateau-shaped top. A comparison of this curve with the curve for 1990 shows fertility rates for younger age groups on the decline and fertility rates for older age groups on the rise (Figure 1).

The size of the population aged 60 and older has been steadily growing as a result of low mortality rates and improvements in life expectancy. The over 60 age group made up 15.4% of the total population in 2005 (Figure 2).

The crude death rate was 7.5 deaths per 1,000 population in 2005, and the risk of death, according to the age-standardized mortality rate, was 4.8 per 1,000 population, or 4% lower than in 2001. Mortality rates were higher in the central and western regions of the country, with the Havana City province showing the highest rate, at 9.0 per 1,000 population, followed by Villa Clara (8.6), with both figures being above the national average. The sex-specific mortality rate was slightly higher for males (54.1%)

FIGURE 1. Fertility rate, by mother's age, Cuba, 1990 and 2005.

than for females. Life expectancy for the 2001–2003 period was 77.0 (75.13 for males and 78.97 for females).

The country has attained three of the Millennium Development Goals, namely Goal 2 (“ensure that all boys and girls complete a full course of primary schooling”); Goal 3 (“eliminate gender disparity in primary and secondary education, preferably by 2005, and at all levels by 2015”); and Goal 4 (“reduce by two-thirds the mortality rate among children under 5”).

Infectious diseases accounted for 1.1% of all deaths in 2005. Diseases of the circulatory system were the top cause of death, with a rate of 306 deaths per 100,000 population in 2005 (Table 1). Age-adjusted rates for all causes of death, with the exception of neoplasms, decreased between 2001 and 2005. The 5–14-year-old

age group had the lowest age-specific mortality rate, and the population aged 65 and older had the highest rate.

The leading causes of death in Cuba are chronic noncommunicable diseases, which accounted for more than 90% of deaths between 2001 and 2005. These diseases and, to a lesser extent, violent deaths (accidents in particular) have emerged as new development problems with a growing impact, requiring new approaches to their prevention and control.

Heart disease, malignant neoplasms, and cerebrovascular diseases are the top three causes of death across all age groups and, together, account for more than half of all deaths (58.9%) (Table 2). The risk of death from malignant neoplasms increased by 12.4% between 2001 and 2005, while mortality rates for accidents; diseases of the arteries, arterioles, and capillaries; and intentional self-harm declined. A look at age-adjusted mortality rates for the leading causes of death shows an across-the-board decline in rates for all causes of death with the exception of malignant neoplasms, diabetes mellitus, and cirrhosis (Figure 3). Causes of death were coded according to the WHO International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10).

Sex-specific mortality rates for all causes of death except cerebrovascular diseases (0.9) and diabetes mellitus (0.5) were higher for males than for females. Malignant neoplasms, heart disease, and accidents accounted for the largest number of years of potential life lost in 2005, with 16.6, 11.2, and 7.1 years, respectively, per 1,000 population aged 1–74 (Figure 4).

HEALTH OF POPULATION GROUPS

Children under 5 Years Old

There has been a steady decline in infant mortality, which stood at 6.2 per 1,000 live births in 2005, accounting for 0.9% of all deaths across all age groups. The neonatal mortality rate decreased from 3.9 per 1,000 live births in 2001 to 3.4 in 2005, with no change in the postneonatal mortality rate during this period. Regional disparities in infant mortality rates are narrowing. Together, the five leading causes of death in children under 1 year of age in 2005 accounted for 76.5% of all deaths in this age group. The highest risk of death was associated with certain conditions originating in the perinatal period, with a rate of 2.5 per 1,000 live births, followed by congenital malformations (1.6 per 1,000 live births), influenza and pneumonia (0.3), sepsis (0.2), and heart disease (0.2). The share of children with low birthweight dropped from 5.9% to 5.4% between 2001 and 2005.

The mortality rate for all causes of death among children ages 1–4 was 0.4 per 1,000. The top five causes of death in this age group were accidents, congenital malformations, malignant neoplasms, influenza and pneumonia, and bacterial meningitis (Table 3).

Deaths of children under the age of 5 accounted for 1.1% of all deaths in 2005, with a mortality rate of 8.0 deaths per 1,000 live births. The survival rate for children in this age group was 99.2%.

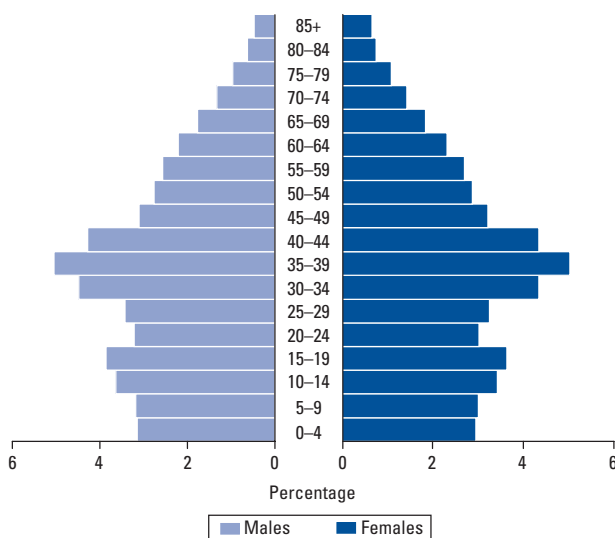
FIGURE 2. Population distribution, by age and sex, Cuba, 2005.

TABLE 1. Mortality by broad groups of causes (rate per 100,000 population), by age, Cuba, 2001 and 2005.

Broad group of causes	Age groups										Total			
	0–4		5–14		15–39		40–64		65 and older		Crude rate		Adjusted rate	
	2001	2005	2001	2005	2001	2005	2001	2005	2001	2005	2001	2005	2001	2005
Diseases of the circulatory system (I00–I99)	4.0	4.4	1.1	1.0	11.1	9.9	204.7	178.5	2,381.3	2,267.6	295.6	306.0	203.9	188.2
Neoplasms (C00–D48)	6.5	4.5	5.5	4.8	16.1	15.2	189.6	178.4	959.4	1,022.7	153.6	172.7	114.8	116.4
External causes (V01–Y98)	14.5	11.9	11.4	10.0	47.4	40.2	58.2	50.5	274.1	253.6	65.2	61.0	52.0	45.4
Communicable diseases (A00–B99, G00–G03, J00–J22)	18.6	26.1	1.8	1.6	6.5	5.5	32.3	28.7	576.9	560.9	70.0	73.9	46.7	44.4
Certain conditions originating in the perinatal period (P00–P96)	54.1	44.0	0.3	0.2	—	0.1	0.1	0.0	—	—	3.6	2.8	4.1	3.3
Other causes (A00–Y89)	51.6	49.7	5.1	5.6	19.8	18.7	112.0	103.9	774.6	864.5	119.1	137.1	87.9	91.0
Total	149.3	140.6	25.2	23.2	100.8	89.6	596.9	540.0	4,966.3	4,969.4	707.0	753.5	509.5	488.7

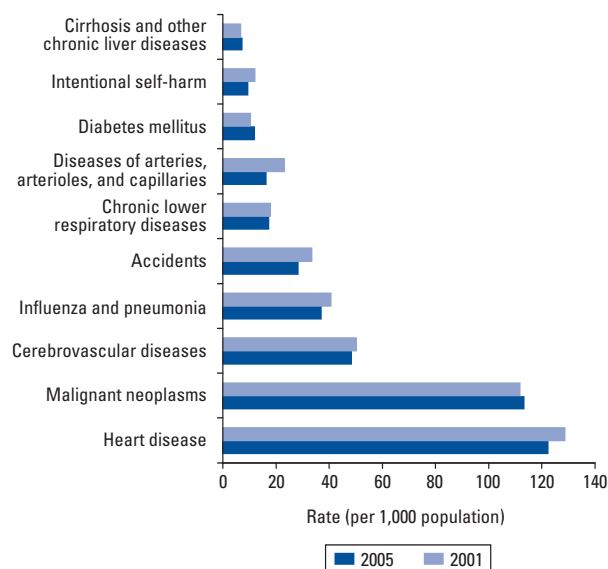
Note: Age-adjusted rate, standard population derived from the 1981 census.

TABLE 2. Leading causes of death (rate per 100,000 population) all age groups, Cuba, 2001 and 2005.

Causes	2001	2005
Heart diseases (I05–I52)	185.5	197.4
Malignant neoplasms (C00–C97)	149.8	168.4
Cerebrovascular diseases (I60–I69)	71.9	78.1
Influenza and pneumonia (J09–J18)	61.6	64.4
Accidents (V01–X59, Y85–Y86)	42.8	39.5
Diseases of arteries, arterioles, and capillaries (I70–I79)	36.3	28.6
Chronic lower respiratory diseases (J40–J47)	25.0	26.7
Diabetes mellitus (E10–E14)	13.9	17.6
Intentional self-harm (X60–X84, Y87.0)	14.7	12.2
Cirrhosis and other chronic liver diseases (K70, K73, K74, K76, K76.1)	8.7	10.2

Note: Causes of death were coded according to the International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10).

Source: Sistema de Información Estadístico de Defunciones y Defunciones Perinatales.

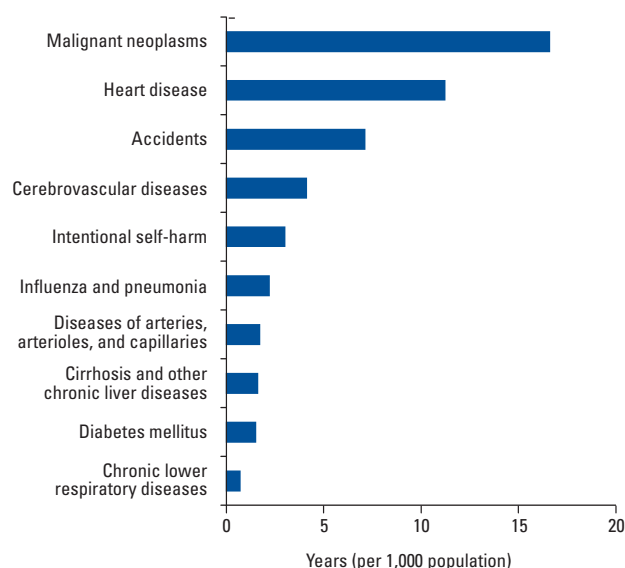
FIGURE 3. Age-adjusted mortality rates for leading causes of death, Cuba, 2001 and 2005.

Children 5–9 Years Old

The mortality rate for this age group in 2005 was 0.2 deaths per 1,000 population (0.3 for males and 0.1 for females). That year, together, the three leading causes of death, namely accidents (with a rate of 7.3 per 100,000 population), malignant neoplasms (5.4), and congenital malformations (0.7), accounted for 64.4% of all deaths of school-age children. The main communicable diseases affecting this population group were acute respiratory infections and acute diarrheal diseases.

Adolescents 10–19 Years Old

Adolescent health is an integral part of all health programs and interventions. In 2005, this age group accounted for roughly 15% of the total population and 73.8% of all adolescents lived in urban areas, with no major differences between the sexes or different age subgroups. The fertility rate for the adolescent population decreased from 48.3 to 41.1 per 1,000 females between 2001 and 2005. Adolescent deaths accounted for less than 1% of all

FIGURE 4. Years of potential life lost among the population aged 1–74, by leading causes, Cuba, 2005.

deaths in 2005. Accidents were the leading cause of death, followed by malignant neoplasms, intentional self-harm, assaults, and congenital malformations (Table 4).

Adults 20–59 Years Old

The size of the adult population was estimated at 6,495,506 as of 30 June 2005 (57.7% of the total population), of which 3,243,164 were women. Deaths among members of this age group accounted for 18.8% of all deaths in 2005. The mortality rate for all causes of death was 2.4 per 1,000 population (3.0 for

TABLE 3. Leading causes of death (number of deaths and rate per 10,000 population) among children aged 1–4 years, Cuba, 2001 and 2005.

Causes	2001		2005	
Accidents (V01–X59, Y85–Y86)	60	1.0	49	0.9
Congenital malformations, deformations, and chromosomal abnormalities (Q00–Q99)	45	0.8	38	0.7
Malignant neoplasms (C00–C97)	40	0.7	24	0.4
Influenza and pneumonia (J09–J18)	20	0.3	20	0.4
Bacterial meningitis (G00–G03)	—	0.1	10	0.2

Note: Causes of death were coded according to the WHO International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10).

Source: Sistema de Información Estadístico de Defunciones y Defunciones Perinatales.

TABLE 4. Leading causes of death (number of deaths and rate per 100,000 population) among adolescents aged 10–19 years, Cuba, 2001 and 2005.

Causes	2001		2005	
Accidents (V01–X59, Y85–Y86)	241	15.0	212	12.9
Malignant neoplasms (C00–C97)	90	5.6	71	4.3
Intentional self-harm (X60–X84, Y87.0)	65	4.0	52	3.2
Assault (X85–Y09, Y87.1)	43	2.7	47	2.9
Congenital malformations, deformations, and chromosomal abnormalities (Q00–Q99)	31	1.9	34	2.1

Note: Causes of death coded according to the WHO International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10).

Source: Sistema de Información Estadístico de Defunciones y Defunciones perinatales.

males and 1.9 for females). The five leading causes of death were malignant neoplasms (70.3 per 100,000 population), heart disease (45.4), accidents (22.6), cerebrovascular diseases (15.6), and intentional self-harm (12.3). The most common communicable diseases affecting this age group were acute respiratory infections and acute diarrheal diseases.

Women's and children's health, under the Maternal and Child Health Program, are a high public health priority. The average number of prenatal visits was 15 per birth, with 92.8% of first visits taking place prior to the 14th week of pregnancy. Nearly all women (99.9%) gave birth in health facilities, and most births were to women between the ages of 25 and 29, with a rate of 91.1 births per 1,000 women in this age group for 2005. Women completing their pre-university (upper secondary) education accounted for a larger share of births. The direct maternal mortality rate for 2005 was 37.3 per 100,000 live births.

Older Adults 60 Years Old and Older

Deaths of older adults have been on the rise in the last few years. The share of deaths involving adults aged 60 and older increased from 76.8% in 2001 to 79.2% in 2005 (52.3% males and 47.7% females). The five leading causes of death, in descending order, were heart disease (with a rate of 1,105.7 per 100,000 population in 2005); malignant neoplasms (820.3); cerebrovascular diseases (446.4); influenza and pneumonia (385.6); and diseases of the arteries, arterioles, and capillaries (176.1). The risk of dying from one of these causes decreased between 2001 and 2005, except in the case of malignant neoplasms, in which the risk rose by 4%. There was a pattern of higher male mortality associated with all causes of death except for cerebrovascular diseases, from which women ran a slightly higher risk of dying.

The Family

The family structure is diverse and complex, with multigenerational living arrangements and an increase in the number of reconstituted families with children from previous unions and of female-headed households. There have been changes in the family's traditional canons of formation, stability, and partner relationships associated with factors such as age, skin color, nationality, and religious and ideological affiliation, as well as in union formation and in decisions on divorce and parenthood. These have affected certain intra- and intergenerational relationship patterns in various ways. The economic crisis beginning in the 1990s, the deterioration in physical living and working conditions, the complex typology of family models, family survival strategies, the migration problem, changes in family relationship patterns, shifts in ethical and moral values in times of crisis, and the multiple roles the family is called upon to play simultaneously in response to social demands are all part of the challenges affecting the Cuban family.

A 2005 survey of 294 families in selected municipalities around the country found 51% of those interviewed in a family transition process, without their family traits posing any health risks. Of the households surveyed, 43% had family traits with a low or moderate and, in some cases, high criticality level, and 6% had major family health issues.

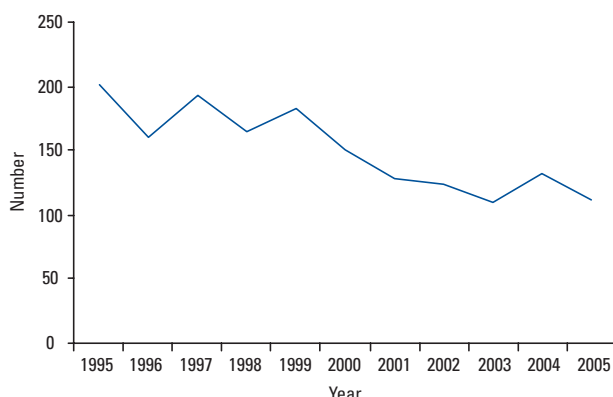
Workers

A total of 13,584 workplaces were subject to government health inspections in 2005. To prevent occupational diseases, workers exposed to occupational safety and health risks from lead, mercury, organophosphate and carbamate pesticides, silica sand, noise, and *Leptospira* are closely monitored through Watson-Schwartz tests of urine coproporphyrin III levels, urine mercury tests, checks of blood cholinesterase levels, chest X-rays, hearing tests, and other mechanisms. Workers exposed to *Leptospira* are immunized to prevent infection and, in general, proper personal safeguards are taken.

Occupational accidents have been on the decline over the past five years, and mortality rates from this cause have been steadily decreasing. There were 26.5% fewer work-related accidents in 2005 compared with 2000, as illustrated in Figure 5. The agricultural sector and the sugar, electric power, and construction industries accounted for the largest numbers of occupational accidents.

As part of the surveillance system for workers exposed to specific risks, 43 specialized consultations were made in 2005 involving 18,116 workers at high-risk for or with a presumptive diagnosis of an occupational disease. There were 310 diagnoses of occupational diseases, among which the most common diagnoses were chronic nodular laryngitis in primary and secondary school teachers, dermatosis caused by petroleum products, hyposcusia among workers in the metallurgical and mechanical industries, and chemical poisoning.

FIGURE 5. Occupational accidents, Cuba, 1995–2005.



Persons with Disabilities

The Government develops policies and carries out programs with nationwide coverage designed to promote equity and equal opportunities for persons with disabilities, particularly in the areas of health, education, sports, culture, employment, and social security. The National Health System has established an extensive network of comprehensive rehabilitation services, which includes all polyclinics and other primary health care units, hospitals, and highly specialized facilities. It also has a human resources training and development program in this area.

There is a special educational subsystem for children and adolescents with all types of disabilities, with 427 schools. Sports and physical fitness are an integral part of human development projects for persons with disabilities and, at the same time, afford recreational opportunities.

The Employment Program for Persons with Disabilities begun in 1995 promotes social mainstreaming and job placement for this population group, with the emphasis on functioning in a normal work environment. Sheltered employment is considered only in the cases of individuals with severe disabilities. Initially, the program focused on finding jobs for the blind and visually impaired, the deaf and hard of hearing, and persons with physical-motor impairments, but has gradually expanded to include persons with intellectual disabilities. As of the end of 2005, there were 28,650 persons with disabilities performing some type of work.

There is an extensive social services network for persons with disabilities requiring economic or social assistance (care, self-care, or other types of services) geared to improving their quality of life.

HEALTH CONDITIONS AND PROBLEMS

COMMUNICABLE DISEASES

Vector-borne Diseases

The increase in *Aedes aegypti* infestation levels since 1997 accelerated in early 2001, triggering a dengue outbreak in five of the

country's provinces, with 50% of the country-wide infestation concentrated in Havana City. The high household indices (0.9) in the capital contributed to the disease's transmission from a single imported case in the Playa district. By the end of 2001, dengue transmission had been brought under control in most parts of the city, but was still on the rise in other affected provinces. In 2001, senior government officials instituted an intensive strategy aimed at controlling the *A. aegypti* mosquito and breaking the chain of transmission with the participation of most government agencies, as well as the general public. When the campaign began, there were 3,143 dwellings testing positive for *A. aegypti* around the city, with a household index of 0.6. The infestation index was brought down to 0.09 in 42 days and to 0.01 in 77 days, which is equivalent to one positive household per 10,000. The last case developed symptoms on 22 February, and the chain of transmission was broken a month later. The epidemic produced 12,889 cases and three fatalities.

The increase in travelers from areas with endemic diseases previously unknown in Cuba is heightening current risk factors. There were reports of 17 imported cases of dengue between 2004 and 2005, but no reports of any indigenous cases. There were three outbreaks in 2005, with 216 cases in Havana City and Camagüey linked to travelers from dengue-endemic countries. All the outbreaks were brought under control. There is strict border surveillance in the face of the current dengue situation in the Americas. Thus far, efforts to prevent the disease from becoming endemic have been successful.

The last indigenous case of **malaria** was reported in 1967 and the country received its certification of malaria eradication in October 1973. There were 145 reported cases during the 2001–2005 period, 144 of which were imported and one introduced in Guantánamo province. The main vector was *Plasmodium falciparum*.

Vaccine-preventable Diseases

The National Immunization Program protects the public against 13 diseases and has successfully eliminated **polio** (in 1962), **diphtheria** (in 1979), **measles** (in 1993), **whooping cough** (in 1994), **rubella** (in 1995), and **neonatal tetanus** (in 1972). There were no reported cases of **tetanus** anywhere in the country in 2004 or 2005. Morbidity rates for meningoen­cephalitis caused by *Haemophilus influenzae* type b remain low. There were only two reported cases in 2005 (33 fewer than in 2000), due mainly to the inclusion of the Cuban-manufactured *H. influenzae* type b (Hib) vaccine in the official vaccination schedule in 1999.

The impact of the **meningococcus B and C** and **hepatitis B** vaccines is reflected in the continued decline in morbidity rates for these diseases. There were only 25 reported cases of meningoen­cephalitis associated with meningococcus B and 47 cases of hepatitis B in 2005, compared with 56 cases of meningoen­cephalitis from meningococcus B and 451 cases of hepatitis B in 2000. The world's first synthetic *H. influenzae* type b vaccine was introduced in Cuba in 2004, and the tetravalent DPT+HB vaccine was introduced in the first quarter of 2005. Both vaccines have

been incorporated into the official vaccination schedule for children under 2 years of age.

A strategy for the elimination of hepatitis B was initiated in 1992 based on the universal vaccination of newborns, vaccination of an under-20 cohort that was completed in 2000, and vaccination of risk groups. There is a perinatal hepatitis B prevention program in place with provisions for the screening of pregnant women for hepatitis B surface antigen (HBsAg) and separate vaccinations of infants born to HBsAg-positive women. By 2005, the incidence of acute hepatitis b had been reduced by 97.9% compared with figures for 1992. There have been no reported cases of acute hepatitis B in children under the age of 5 since 2000.

Intestinal Infectious Diseases

The mortality rate for intestinal infectious diseases fell from 6.4 to 2.9 per 100,000 population (54.7%) between 1995 and 2005. Health care visits for **acute diarrheal diseases** went from 93.0 per 1,000 population in 1995 to 77.8 in 2005. Surveillance for intestinal parasitosis is based on cross-sectional coproparasitological studies of children ages 1–4 attending day-care centers (*circulos infantiles*) in May and October of each year. These examinations are monitored by the nurse and physician attached to the center or by the family physician's office associated with the facility in question. A single sample test is taken from all asymptomatic children enrolled in these centers, who make up 14.7% of the total child population in this age group. In the last five years, the highest positivity rates were associated with protozoal infections (12.4% of all samples tested in 2004).

Chronic Communicable Diseases

Tuberculosis is considered a low-prevalence disease in Cuba. Its incidence has been declining by 3% to 5% annually since 2000, with figures of under 10 per 100,000 population. The incidence rate for tuberculosis in 2005 was 6.5 per 100,000, with the population aged 60 and older being the group most affected. The incidence of tuberculosis in the population under age 15 years is down to below 1 per 100,000 population. There have been no reported cases of tuberculous meningoencephalitis in children under the age of 4 since 1997.

Coinfection with tuberculosis and HIV is under control and accounts for only approximately 3% of all new cases. Thus, in 2005, only 27 HIV/AIDS patients contracted tuberculosis in the course of the disease. There are virtually no reported cases of multidrug resistant tuberculosis (0.3%), and the study of drug-resistant strains among new cases treated at the national reference laboratory for tuberculosis is closely monitored.

Leprosy was eliminated as a national public health problem in 1993, when its prevalence was brought down to 0.79 per 10,000 population. The prevalence rate in 2005 was 0.2. The disease has been successfully eliminated from all provinces. The number of new cases has leveled off in the last few years, putting the incidence rate in 2005 at 1.8 per 100,000 population. The incidence of leprosy among the population under 15 years of age was 0.4

per 100,000 in 2005, accounting for 3.8% of all new cases. In the last few years, the country has been working to strengthen the technical diagnostic capabilities of health personnel and step up surveillance in population groups exposed to the disease.

Acute Respiratory Infections

Most acute respiratory infections are mild and self-limiting, but constitute a national health problem in the sense that they are responsible for large numbers of health care visits each year (4,731,614 in 2005). The main circulating causative agent is the influenza A virus (H3N2) and, to a lesser extent, H1N1 and B viruses. The most severe complications from these types of infections are reported in adults aged 65 and older and in immunosuppressed individuals. The highest mortality rates for influenza and pneumonia are associated with the population aged 65 and older and, within this population, the over-80 age group. Since 1997, all of the population residing full-time or part-time in facilities for older adults and attending senior day-care centers have received seasonal flu shots every year. New risk groups are given the vaccine every year, which was administered to everyone over the age of 85 and to workers on poultry farms during the last two flu seasons (2004–2005).

HIV/AIDS and Other Sexually Transmitted Infections

As of the end of 2005, there were 6,967 reported HIV-seropositive cases nationwide; of these 2,806 had developed into AIDS, with 1,338 fatalities. The HIV/AIDS epidemic has been growing slowly. The number of reported AIDS cases has decreased, and the mortality rate has stabilized. As a result, the total number of persons infected with HIV/AIDS nationwide is leveling off but, apparently, not diminishing. The estimated prevalence rate in the population aged 15–49 is still under 0.1%. The prevalence rate in the 15–24-year-old population dropped from 0.07% in 2001 to 0.05% in 2005. Moreover, 99.4% of all persons diagnosed with HIV and AIDS were infected through sexual contact. There are very few cases of infection through mother-to-child transmission (0.3%) and by blood and blood products (0.3%). Males account for 80% of all reported cases, and the highest risk group (86%) was that of homosexual males. There are over 1.5 million voluntary HIV tests administered each year to members of different population groups. Screening of the blood supply since 1986 and the development of programs promoting voluntary blood donations have virtually eliminated HIV transmission through blood transfusions. Access to prenatal care and prevention programs for mother-to-child HIV transmission (including separate mother and child therapies, elective cesarean sections, and artificial breast-feeding, with clinical and laboratory monitoring of affected infants for the first 18 months following birth) have helped minimize transmission through this mode, keeping the total number of such cases down to 25 in a 20-year-long epidemic. Over 3 million pregnant women have been tested for HIV.

Syphilis and **gonorrhea** cases declined during the 2001–2005 period, while cases of infection by the human papillomavirus

were on the rise. There were no reported cases of late or congenital syphilis. Congenital syphilis has not been a public health problem since 1998, with an incidence rate of 16.9 per 10,000 population in 2005 (down 79.4% from 2000). The incidence of reported cases of gonorrhea in 2005 was 63.6 per 10,000 population, reflecting a 62.6% reduction in the risk of contracting the disease compared with figures for 2000.

Zoonoses

Human **rabies** reemerged in 1988, transmitted by a non-hematophagous bat. There were nine reported cases as of 2005, eight attributable to nonhematophagous bats and one to a wild cat. Most cases of animal rabies have involved dogs, cats, mongooses, and cattle, and the disease has also been diagnosed in nine other animal species, albeit on a smaller scale. Canine rabies is confined to a few suburban and rural areas and is nearly always associated with mongoose attacks, its main mode of transmission in land animals. Nonhematophagous bats are the species of major epidemiological importance in the transmission of human rabies.

There was a sharp surge in human **leptospirosis** in the first half of the 1990s to rates of over 10 per 10,000 population, with a pattern of both endemic and epidemic behavior, followed by a slow decline in morbidity and mortality rates. Figures for 2001–2005 were consistently under 5 per 10,000 population. Most cases of the disease still involve males and subjects between 15 and 44 years of age. The availability of a Cuban vaccine against leptospirosis and of doxycycline prophylaxis have enabled the country to institute an intervention strategy in high-risk areas for contracting the disease. The vaccine has been administered to more than three million people exposed to the infection since 1996. Other zoonoses of medical importance such as **brucellosis**, **toxoplasmosis**, and **fascioliasis** are associated with low morbidity rates, which is not the case for **teniasis**, which still carries a moderate morbidity rate.

NONCOMMUNICABLE DISEASES

Metabolic and Nutritional Diseases

According to data for 2004, 1.9% of children under 5 years of age had low weight-for-height (more than 2 SDs below the median) and 4% showed signs of some degree of **stunting** based on U.S. National Center for Health Statistics standards. **Iron deficiency** is one of Cuba's most serious micronutrient deficiency problems, primarily affecting children under age 2, women of child-bearing age, and pregnant women, in that order. A 2005 survey conducted in five provinces among children between the ages of 6 months and 4 years put the prevalence of **anemia** (hemoglobin < 110 g/L) at 32.5%. Most cases were mild. The prevalence rate in pregnant women in the third trimester of pregnancy was 24%. There are drug supplementation strategies promoting the use of iron salt tablets targeted at pregnant women, women of child-bearing age, and children up to 5 years of age. Wheat flour is

fortified with iron and folic acid and distributed in government-subsidized rations of 80 g of bread per person per day (providing approximately 26% of the daily recommended dose of iron). Pureed fruits for children under the age of 3 are fortified with iron lactate, and evaporated milk for children under age 1 is fortified with protected iron. According to studies of serum retinol levels, **vitamin A deficiency** in preschool- and school-age children is not a public health problem.

Median urinary iodine excretion in school-age children was 246 µg/L in 2005. Over 90% of all salt consumed by Cuban households is iodized. The International Council for Control of Iodine Deficiency Disorders determined that the country was in a position to achieve the sustained elimination of **iodine deficiency disorders**.

Obesity is an increasingly serious problem in all population groups and is on the rise. The Second National Survey of Risk Factors and Noncommunicable Disorders in the Cuban Population, based on a representative sample of 22,851 subjects and concluded in 2001, found 29.7% of males and 31.5% of females to be overweight (with a body mass index [BMI] of 25–29.9) and 7.9% of males and 15.4% of females suffering from obesity (BMI > 30). Looking at body fat distribution patterns, the study found that approximately 25% of the population had an upper-body pattern of obesity, indicating a risk of obesity-related chronic diseases. The share of obese children under 5 years of age was 13%.

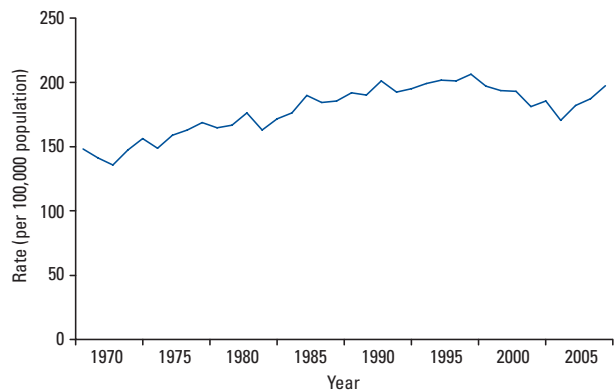
Prevalence rates for **diabetes mellitus** have risen in the last five years. As of the end of 2004, there were 342,371 patients (30.5 per 1,000 population) participating in an organized, ongoing, aggressive evaluation and treatment process utilizing an epidemiological and social clinical approach, an increase of 4.1% over the previous year. There was a steady decline in the risk of dying from this cause between 1998 and 2002, followed by a rise in mortality in 2003 and 2004, to 16.5 per 100,000 population.

Cardiovascular Diseases

Heart disease has been the leading cause of death for more than 40 years and the second leading source of years of potential life lost. The decline in mortality levels for this cause during the late 1990s into the beginning of the next decade was followed by a rise in mortality in 2004 and 2005, by which time the death rate stood at 197.4 per 100,000 population (a jump of 5.4% from 2004 and 6.4% from 2001) (Figure 6). Males had a higher risk of dying from heart disease than females, and the most deaths (86.5% of the total) involved adults aged 60 and older. The leading cause of death in 2005 was **ischemic cardiopathy**, which was responsible for 72.1% of all deaths from heart disease. Acute myocardial infarctions accounted for 45.3% of all deaths from ischemic cardiopathy, with an in-hospital case fatality rate of 17.6% in 2005.

There has been major progress in the detection of **hypertension** since 1999 thanks to active case investigation by family physicians and nurses, boosting the prevalence rate in patients under treatment to 194.6 per 1,000 population in 2005.

FIGURE 6. Mortality due to heart disease, Cuba, 1970–2005.



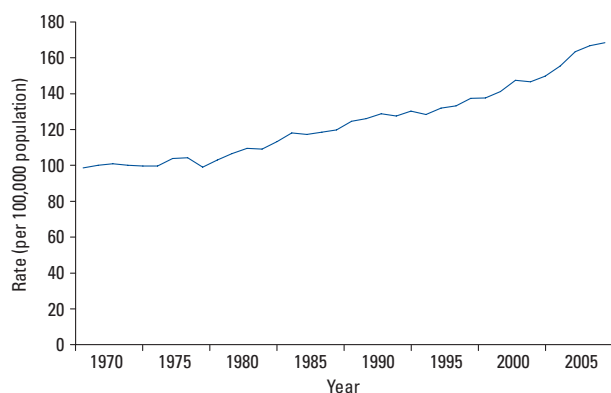
Cerebrovascular diseases are the third leading cause of death across all age groups, accounting for 10.2% of all deaths. They are the sixth leading cause of death in the population aged 25–34 and rank ninth among the leading causes of death in the 15–24-year-old age group. Age is the main nonmodifiable risk factor, and arterial hypertension is the leading modifiable risk factor. Cerebrovascular diseases are the third leading cause of death in women aged 35 and older and the seventh leading cause in the female population aged 15–24. The gender mortality gap began to reverse itself in 1992, with recent data indicating more deaths among females than among males. There is a shift in the pattern of these diseases toward younger age groups. Hemorrhagic forms of cerebrovascular disease are the leading cause of death among older adults. Crude death rates are consistently higher for females (21.9 per 100,000 population) than for males (11.0), due primarily to the higher morbidity prevalence in women (38.8 per 1,000) compared with men (22.2 per 1,000).

Malignant Neoplasms

Malignant neoplasms are the second leading cause of death and the number one cause of years of potential life lost. The crude death rate rose from 149.8 per 100,000 population to 168.4 (Figure 7) between 2001 and 2005. Male rates were higher than female rates, and roughly 75.2% of all deaths involved older adults aged 60 and older. Cancer incidence rates were 271.7 per 100,000 population for males and 253.4 for females. According to data for 2002, cancer of the lungs, skin, prostate, larynx, and colon accounted for approximately 63% of the incidence of cancer in males, while the leading cancer sites in females were the breast, skin, cervix, lungs, and colon. The highest mortality rates for malignant neoplasms in 2005 were associated with neoplasms of the trachea, bronchus, and lung (23.5%); prostate (11.8%); and colon (8.9%) in men and neoplasms of the breast in women, which accounted for 6.3% of all deaths. Over the last 10 years, deaths from lung cancer rose by less than 1% a year in males and 2.3% a year in females.

There were 2,478 deaths from cervical-uterine cancer between 2000 and 2005. As part of the National Early Detection Program

FIGURE 7. Mortality due to malignant neoplasms, Cuba, 1970–2005.



for this form of cancer, 682,232 women aged 25 and above were examined in 2005, for an examination rate of 179.0 per 1,000 women in this age group, with 82% of cancer cases detected in clinical stage 0. The mortality rate for 2005 was 7.3 per 100,000 women, down 69.6% from 2000.

OTHER HEALTH PROBLEMS OR ISSUES

Disasters

In 2005, the country was hit by tropical storm Arlene; Hurricanes Dennis, Katrina, Rita, and Wilma; and heavy rains in its central and eastern regions. Interventions by civil defense personnel significantly reduced the numbers of injured and dead from these disasters. Part of this success was attributable to the training of civil defense workers and the public-at-large, timely shipments of essential supplies and equipment for disease prevention, and the rapid deployment of health personnel, drugs, generators, food supplies, and health transport vehicles to areas facing possible isolation.

The national disaster response plan focuses on taking the necessary steps to ensure that there is no interruption in service in local facilities, as well as heightening other protective measures, particularly as regards evacuations of at-risk populations. The National Health System and Civil Defense System are integrated under current legislation and, as such, carry out coordinated efforts. Cuba also provides neutral aid and support to disaster-stricken countries as a form of international cooperation.

External Causes

The rate of accidental deaths decreased from 44.3 per 100,000 in 2000 to 39.1 in 2004. The rate of incidents of intentional self-harm dropped from 16.5 per 100,000 population to 13.3. Accidental falls as a result of the aging of the Cuban population pose the highest risk. The mortality rate for accidental falls was 15.6 per 100,000 population in 2004, with traffic accidents involving

motor vehicles ranking second, at a rate of 10.0 per 100,000 population. The risk of death from an accident is higher among males than females, with a male-female ratio of 1.5. The pattern is similar for intentional self-harm, with a male-female ratio of 3.1.

Mental Health

The suicidal behavior prevention and control program systematically conducts risk assessments based on epidemiological stratification in all parts of the country. The death rate from suicide dropped from 14.7 per 100,000 population in 2001 to 12.2 in 2005. The strengthening of community-based services for the treatment of patients suffering from schizophrenia has resulted in their successful social and occupational rehabilitation. The number of beds in long-term care units in psychiatric hospitals has been cut back. There is a new strategy for the treatment of alcohol dependency and related problems based on screening tests for the detection of alcohol use disorders.

Environmental Pollution

Exposure to chemicals is monitored under the National Occupational Safety and Health Program, which includes systematic surveillance of working conditions, environmental and biological monitoring, and specialized health care and training for exposed workers, with special emphasis on the productive sectors in general and agriculture in particular. Under the program, all workers exposed to chemicals are given preventive checkups. Timely job removals account for 70% of occupational safety measures, removing workers from exposure to harm and, thereby, preventing them from becoming ill. This measure has helped reduce the number of workers harmed by chemicals. There have been no reported deaths from occupational exposure to these health hazards.

The use of biopesticides for pest control purposes has reduced occupational exposure to farm chemicals. On-site working conditions are evaluated and special measures are taken to limit exposure risk. There is a National Pesticide Registry whose main functions include the performance of chemical, biological, and environmental pesticide assessments prior to authorizing their use in Cuba, the publication of an annual list of authorized pesticides in the *Gaceta Oficial*, and the revocation of pesticide licenses in the event of the establishment of any adverse health or environmental effects, in line with standards proposed by the Pan American Health Organization/World Health Organization (PAHO/WHO). The program monitors exposure to heavy metals and other chemical compounds and determines any necessary measures based on indicators established under current regulations. As of 2005, there were more than 23 instruments dealing with the handling, transport, storage, preparation, use, assessment, and inspection of farm chemicals, industrial chemicals, and hazardous wastes and corresponding safety and health measures, bans, violations, classification schemes, safety requirements, and occupational illnesses, among others, including laws, resolutions, and regulations.

Oral Health

Oral health is a key component of the national health system. According to data for 2005, 55% of 5- and 6-year-olds experienced adequate oral health. The decayed, missing, and filled teeth index at 12 years of age was 1.62%, and 76% of 18-year-olds still had all their teeth. There is an ongoing nationwide preventive oral health program. In 2005, 14,682,226 fluoride rinses were administered to children between 5 and 14 years of age, and 1,337,471 fluoride varnish treatments were administered to children under the age of 12. The rate of oral cancer (including cancer of the lips, oral cavity, and pharynx) stood at 5.2 per 100,000 population in 2005 and is the ninth leading cause of death from malignant neoplasms, by cancer site. The risk of dying from oral cancer in 2005 was 7.7 in males and 2.6 in females.

RESPONSE OF THE HEALTH SECTOR

Health Policies and Plans

The country is committed to achieving a sustained improvement in the health status of its population, as well as in the quality and efficiency of health services and the level of satisfaction of patients, family members, and workers, while providing free aid and assistance to patients from a number of other countries in the Region of the Americas and on other continents. In 2003, it began remodeling, expanding, and installing high-quality medical equipment in 52 of its largest, most advanced, most sophisticated hospitals and in 129 polyclinics representing over 20% and 25%, respectively, of all such facilities nationwide. New health care services were established for the treatment of patients with serious conditions, chronic illnesses, and other common problems in locations more accessible to the general public. In addition, 121 intensive therapy units and 452 rehabilitation units were created to guarantee adequate access to these essential services for residents of all 169 municipalities. These stepped-up investments in technology were paralleled by specialized training activities for professionals and technicians, as needed.

Legislation has been in place since 1983 setting out the underlying principles governing social relations in the area of public health to help ensure health promotion, disease prevention, health restoration, patient social rehabilitation, and social welfare. Progress in health legislation paved the way for the establishment of basic requirements and procedures for the registration of tobacco products with the Ministry of Public Health and the delineation of the functions of the Public Health Protection and Regulation Agency, the regulation of cross-border movements of samples of biological material, and the banning of imports and exports of products with potential human health effects. There are two compendiums of major current domestic legal texts in this area entitled *Legalidad y Sida en Cuba* (Legality and AIDS in Cuba) and *Aspectos Legales sobre Maternidad y Paternidad Responsables* (Legal Considerations for Responsible Parenthood).

Health Strategies and Programs

Health sector strategies are grounded in basic Cuban tenets of public health; namely, the social and governmental nature of medicine, free access to health care, a preventive health approach, the effective use of scientific and technical progress, community participation, and international cooperation. These strategies are designed to achieve equity in health and to strengthen the health system, improving management efficiency and the quality of public health care through active community participation. At the same time, they establish a system of differential care, giving priority to risk groups or life-threatening illnesses or illnesses affecting people's quality of life, delivered under different National Health System programs, such as maternal and child care and older adult health care programs and control programs for communicable and chronic noncommunicable diseases. In addition, new programs are being carried out for the delivery of specialized care at the primary health care level to improve its effectiveness and accessibility to the public.

There have been major changes in primary health care in the past few years, such as the shifting of specialized services previously delivered at the secondary and tertiary levels to the primary health care level, requiring a major investment in physical and financial resources and human resources training. The structure of Cuban society allows for the involvement of all segments of the population in resolving health problems in different regions of the country. The three cornerstones of social participation in the solution of health problems are the country's political/administrative structure, with the National Assembly of People's Power as an organ of government; the influence and timeliness of different approaches and strategies devised by the Ministry of Public Health; and the development and growth in the number of national and international nongovernmental organizations (NGOs) working in the health sector.

Organization of the Health System

The Ministry of Public Health is in charge of administering State and government health policy. The Public Health Protection and Regulation Agency establishes and enforces regulations governing pharmaceutical and diagnostic products, medical equipment, food products, cosmetics, and chemicals with potentially hazardous health effects through the State Drug Quality Control Center, the State Quality Control Center for Medical Equipment, the Food and Cosmetics Registration Department, and the Center for Pharmacoepidemiological Development. The Public Health Protection and Regulation Agency's External Health Service Monitoring Subdivision regulates good practices and oversees the accreditation and certification of different health organizations. Other components of the regulatory system include marketing regulations and permits, clinical trials, good practice compliance inspections for research, manufacturing, quality control, distribution, importing and exporting, and the licensing of corresponding

Health Policies for Older Adults

Low mortality rates and improvements in life expectancy have led to a steady increase in the size of the population 60 years old and older. In 2005, the age group older than 60 years old represented 15.4% of the total population. The Comprehensive Senior Health Care Program is charged with providing a full range of health care services for older adults and meeting their growing health needs through community-based care, institutional care, and hospital care. Community-based care includes disease prevention, health promotion, health care, and rehabilitation services delivered by the National Public Health System in conjunction with other interested agencies and organizations, the family, the community, and older adults themselves, all searching for local solutions to problems. To this end, there are interdisciplinary geriatric teams and counseling and recreational groups that provide older adults with an opportunity to socialize and prepare them to deal with day-to-day problems and to embrace healthy lifestyles. Senior day-care centers are community-based facilities run by a social worker working closely with the interdisciplinary geriatric teams, helping to improve the quality of life for older adults through physical exercise, meal-delivery programs to homes and institutions, telephone counseling hotlines, and assisted-living housing.

facilities, lot releases for selected products, import permits, and post-marketing inspections, including the monitoring of adverse drug reactions and studies of drug usage. The National Pharmacy Division is responsible for health inspections of narcotic drugs and psychotropic substances and inspections of pharmacy procedures. Public Health and Epidemiology Centers are in charge of general health inspections.

Public Health Services

The need to strengthen epidemiological surveillance and analysis systems at all levels of the national health structure, along with active case-finding systems and response capabilities to identify short-term changes and implement different intervention options in a speedy, timely, and efficient manner, became apparent in the early 1990s. The Ministry of Public Health established central-level Health Trend and Analysis Units in all provinces and municipalities to consolidate the information generated by the surveillance system. These units are viewed as an intelligent data analysis and decision-making system, capitalizing on a combination of theoretical and practical knowledge in the area of epidemiology and other public health areas, technological features associated with developments in information technology, and the possibilities afforded by the use of information to gain new insights into current health conditions and make prospective evaluations as the basis for decision-making. They conduct analyses of health situations and trends and studies of forecasting and epidemiological stratification, and have facilitated the establishment of more than 30 surveillance subsystems in the areas of maternal and child health, older adult health, and communicable, noncommunicable, and emerging diseases, among others. There

is also an epidemiological and entomological surveillance system for the monitoring of exotic and vector-borne diseases of medical importance and the implementation of control and elimination measures, tied to a surveillance system for febrile syndromes.

The nation has sufficient water resources to meet household, agricultural, and industrial needs. Groundwater resources account for 72% of the water supply, with the remainder furnished by surface water resources. A total of 2,737 communities had water supply systems in 2005 delivering 1,544.4 hm³ of water, 100.8 hm³ less than in 2004 due to water shortages at source points as a result of the drought, as well as to power failures and breakdowns in pumping equipment. Water quality indicators for 2005 were satisfactory, with a wastewater treatment rate of 97.9%, a continuous chlorination rate of 99.1%, and a bacteriological water potability index of 95.6% for water distribution systems.

Most urban households have hook-ups to sewerage systems or septic tanks, whereas latrines are common in rural areas. A total of 562 communities are equipped with sewer systems, which carried 571.1 hm³ of sewage in 2005, of which 37% was treated.

Spending in the water supply and sewerage sector rose faster than expected in 2005, with 86.4% of all such spending going to the water supply and sewerage program, with a large share allocated to water treatment plants producing drinking water for public consumption.

A study of the country's solid waste sector was conducted in 1997 with assistance from PAHO/WHO, leading to the formulation of a work strategy and development program for that sector. Eight years of institution-building in this sector have borne fruit, with the emphasis on human resources development. The State has been investing in technology for the satisfaction of residential solid waste collection and final disposal needs, while contin-

uing to use other waste collection and transportation alternatives such as animal traction wherever possible. It is continually expanding manual sanitary landfills as the definitive solution for final waste disposal in villages and towns with up to 20,000 inhabitants. Even with existing problems, solid waste services are improving. The hospital waste management, collection, and final disposal program remains in place.

The country has a national surveillance program for food contaminants which samples products posing a high epidemiological risk twice a month, monthly, and yearly for manufacturing and storage facilities and distribution and consumption centers. Technological development processes in certain industries have played an important role in the operation of the surveillance system and the institution of the HACCP (Hazard Analysis and Critical Control Points) approach. The system has 52 health surveillance laboratories for the sampling of food products. The sound, effective use of these laboratories has helped cut costs by 30%. Program design was based on an analysis of performance data for the previous 10-year period and major problems presented by food-borne diseases, as well as an evaluation of hygienic conditions in food centers and findings from sampling processes conducted by other agencies.

Compliance with good manufacturing and handling practices throughout the food chain was considered an important factor. Analysis quality was assured by the laboratory, with the Nutrition and Food Hygiene Institute serving as the reference center for establishing major problems or conducting investigations of interest to the Ministry of Public Health.

With respect to emerging and reemerging diseases, necessary measures have been taken to ensure the stepping up of epizootiological and epidemiological surveillance for avian flu. Health personnel have received training to increase their knowledge regarding response to the threat of a future global flu pandemic. The threat posed by the West Nile virus prompted the formulation of multisectoral, integrated surveillance, prevention, and control strategies for the timely identification of infected birds and the implementation of measures to prevent the appearance of the disease in humans and animals. In response to worldwide flu surveillance efforts in 2002, and in the face of the appearance of SARS (severe acute respiratory syndrome), a national multidisciplinary group developed an emergency plan as a basis for the mounting of training, diagnostic, and surveillance activities which prevented the disease's introduction in Cuba.

Individual Care Services

The hospital network consists of 248 hospitals providing preventive, curative, and rehabilitative services to the entire population. The country has worked arduously to improve quality in each of these facilities, strengthen hospital regulations, and develop hospital epidemiology departments as basic approaches to modernizing medical technology through the use of innovative,

sophisticated equipment ensuring high standards of quality, efficiency, and patient safety. All procedures have been computerized to improve performance efficiency, and there is systematic human resources training.

The integration of primary and hospital care has been crucial to the work of secondary level facilities and has had positive outcomes, both with respect to patient care and to teaching and research, addressing basic health problems in each local area.

Emergency services, urgent care, and critical care come under the Integrated Emergency Medical System forming a chain of survival with six links, in which the first link is on-site early detection and the last link is intensive care for critically ill or injured patients.

Polyclinics at the primary health care level are equipped with urgent care units. In 2004, a preliminary needs assessment encompassing remote areas or areas at large distances from high resolution-capacity hospitals prompted the establishment of municipal intensive care units (*áreas intensivas municipales*, or AIMS) in 121 municipalities around the country staffed with trained physicians and nursing personnel providing round-the-clock service in an endeavor to improve public access to emergency or urgent care services. As of the end of 2005, AIMS had treated a total of 51,978 patients, with a general survival rate of 97.6%. The survival rate for the top 10 illnesses and health problems treated by these units was 98.2%.

AIMS administered thrombolysis to 498 patients in 2004 and to 602 patients in 2005, or to 41.3% and 52.3%, respectively, of all thrombosis victims treated by such units. Mobile emergency services were restructured in 2005, with 121 municipalities equipped with new ambulances and all actively employed ambulance drivers receiving comprehensive paramedic training.

Over 70,000 patients aged 15 years and older were admitted to hospital-based intensive therapy units in 2005.

The National Health System includes 470 clinical laboratories installed in polyclinics (primary care facilities) and another 248 in secondary-level facilities with a level of sophistication capable of meeting current nationwide physician and patient demand. Specialized institutes and national health units around the country (at the tertiary level) have been equipped with 40 chemical analyzers capable of performing 300 tests an hour, 25 blood gas analyzers with ion-selective electrodes, and more than 25 hematology units capable of performing 32 determinations on 60 patients an hour.

Imaging departments in general and clinical-surgical hospitals and national health units and institutes have been equipped with high-tech equipment such as 64-slice CT scanners, nuclear MRI equipment, and three-dimensional echocardiograms.

The National Blood and Transfusion Medicine Program, with its Hematology and Immunology Institute, includes 27 provincial blood banks, 35 municipal blood banks, 121 permanent blood collection centers, 162 transfusion units, and a blood processing plant. There were 524,351 voluntary blood donations made in

2005. All donated blood is screened for syphilis, HIV-1 and HIV-2, hepatitis B surface antigen (HBsAg), and anti-HCV antibodies. The latter three diagnoses are made using a locally produced ultramicroanalysis system. In 2005, testing procedures were instituted for the detection of HCV-RNA in plasma pools used in the manufacturing of hematology products. The prevalence of hepatitis B and C in blood donors was 0.7% in 2005.

There were 17,943,732 patient visits to the country's network of 1,338 oral health services in 2005. Such services are available at 165 dental clinics, polyclinics, hospitals, and other public primary and secondary care facilities. In addition, tertiary multidisciplinary services are provided by clinical-surgical hospitals and the Network for Facial and Buccomaxillary-Facial Prostheses. A comprehensive general oral health care model has been developed for use at the primary health care level by specialists in comprehensive general oral health care and dental technicians working with family physicians and nurses. The introduction of new technology such as laser and implant technology has gone hand in hand with the promotion of different forms of natural and traditional medicine such as acupuncture, homeopathy, and herbal medicine. The country strengthened its oral health councils, dental health care for healthy children and adolescents ages 0–18, and JUVEDENTI, an oral/dental health promotion strategy in which dental health professionals spend time working in special adolescent dental services geared specifically to the requirements and needs of the 12–18-year-old population group. The goal is to provide preventive, curative, and rehabilitative services at the primary care level and, where secondary level care is required, through consults. The fluoride prevention and early oral cancer detection program has been stepped up. Clinical practice guides have been developed, and oral health services have been reorganized in line with changes in population dynamics; in particular, the aging of the Cuban population.

Family planning and reproductive risk management services have been strengthened and new facility-based services are being developed in response to established needs, with a strategic approach for the prevention of preconception reproductive risks and the expansion and stabilization of the preconception and prenatal care system (care beginning six months prior to a potential planned, wanted pregnancy) designed to reduce high-risk pregnancies and lower pregnancy risks. The main cornerstones of the growing family planning services network at the primary care level are community-based physicians and nurses and provider groups in polyclinics in 432 health districts, supported, in turn, by secondary and tertiary level facilities. There is universal access to these services based on an informed decision freely made by the woman or couple in question. Nationwide contraception coverage with modern methods of contraception, primarily third-generation IUDs, is 77.1%. All indirect indicators measuring the effectiveness of the family planning strategy are positive. Health care services for women in the 40–59 age group are delivered at the primary care level by a multidisciplinary

team based on medical-social diagnoses, including diagnoses of hidden morbidity, as well as couple, family, or work-related problems. Chronic health problems are treated at the appropriate level of care.

The country now has a National Cardiology and Cardiovascular Surgery Network which keeps records of all surgical procedures performed nationwide and delivers necessary care for the treatment and follow-up of conditions related to this specialty. A total of 14,632 patients, including 3,992 with acute myocardial infarctions, have been admitted to health care facilities through this network, which includes all hospitals nationwide and primary health care units and is successfully used in municipal intensive care units; more than 2,376 pacemakers have been implanted.

The Hemodynamics and Interventional Cardiology Section has performed 5,008 diagnostic procedures and 1,354 major surgeries with a medium to high level of sophistication, including highly complex repairs of congenital malformations and heart transplants, with patient longevity exceeding 10 years.

The tissue and organ transplant program is making satisfactory progress. Data for 2005 shows 138 kidney transplants, 17 liver transplants, 2 heart transplants, 2 lung transplants, 8 bone marrow transplants, 197 corneal transplants, and more than 500 bone grafts.

The nephrology program provides hemodialysis treatment to approximately 1,944 patients and has a total of 458 dialyzers and 50 water treatment plants, with a patient-dialyzer index of 4.3 and a mortality rate under 30% a year.

The national cancer program has state-of-the-art radiation therapy, cobalt therapy, brachytherapy, and superficial radiation therapy technology, localization equipment/simulators, a planning system, immobilization equipment, and computer equipment capable of meeting current needs. Cuban health services use a broad spectrum of cytostatics and have strengthened diagnostic procedures.

The Comprehensive Senior Health Care Program is in charge of providing comprehensive health care services for older adults and meeting their growing health needs through community-based, facility-based, and hospital-based care. Community-based care includes disease prevention, health promotion, medical care, and rehabilitation services delivered by the National Public Health System in conjunction with other interested agencies and organizations and the active involvement of the family, community, and patient in seeking local solutions to problems. To this end, there are interdisciplinary geriatric teams (436 as of 2005) and counseling and recreational groups (1,435) giving older adults a chance to socialize and preparing them to cope with day-to-day problems and embrace healthy lifestyles. There are also intersectoral social programs targeted specifically at older adults living alone or with no family support network in which the Ministry of Labor and Social Security and the Ministry of Public Health both play leading roles, designed to meet the economic and psychosocial needs of this segment of the population.

Senior day-care centers (*casas de abuelos*), community-based facilities run by a social worker working closely with interdisciplinary geriatric teams, and senior community centers (*círculos de abuelos*) helping to improve the quality of life for seniors through physical exercise, home-delivered and congregate meals programs, counseling services, telephone hotlines, and sheltered housing are examples of achievements in the area of older adult health care. In 2005, there were 201 senior day-care centers with 5,562 registered older adults (representing 0.3% of this population group) and 14,701 senior community centers (with an enrollment figure representing 43.1% of the older adult population). Facility-based care is delivered through the country's network of hospitals and institutions for the elderly. As of 2005, there were 143 homes for the elderly with a total of 11,764 beds and 350 physicians devoted to geriatric care (267 specialists). Other health personnel involved in caring for this segment of the population are also being given training to improve the standard of care. Older adult health care policies are designed to keep this population group engaged in the national development process, effectively protect its health, and provide a positive environment.

The Cuban Constitution and Family Code establish family rights and obligations with respect to health, parenthood and matrimony, the mutual responsibilities of parents and children, and the right to free access to curative and preventive health services. Comprehensive Family Health Care Program services are delivered at the primary health care level by the family physician's office health care team, supported by various specialists attached to the basic provider group and polyclinic for that area. The core health care team delivers family health promotion and disease prevention services and curative and recuperative care and conducts educational activities during home visits, at the physician's office, and through community counseling groups for parents, adolescents, and the elderly. Family data is systematically recorded by the family physician's office in Family Health Histories which, in addition to information on family members, also include data on the makeup of the family unit, its living conditions, functioning, major problems, and action plan, with one year of follow-up. The nationwide coverage of the comprehensive family health care program, the existence of high-level multidisciplinary teams in charge of program implementation, human resources training programs which integrate family health components, and the country's current political-administrative structure based on a regionalization model promoting intersectoral participation in family services all help bolster family health care.

The workers' health subsystem is part of the National Health System and, as such, is governed by the same principles of free health care, accessibility, universality, and community participation. All programs and services are planned and monitored from central Ministry of Public Health headquarters; by the Occupational Health Group attached to the National Environmental Health Unit, working closely with local offices; the Ministry of Labor and Social Security; and the unions. Environmental moni-

toring activities come under the jurisdiction of the Ministry of Public Health's Health and Epidemiology Division, with provincial and municipal offices conducting state health inspections. Primary health care services are delivered by specialists in comprehensive general medicine based at community physicians' offices, workplaces, and educational institutions dispensing free preventive, medical, and rehabilitative care to the public-at-large, including occupational health care for the working population. Specialized care is available at hospitals around the country from highly skilled personnel, including physicians specializing in occupational health, and at the National Occupational Health Institute.

A Government Group was formed in 1983 at the national government level to coordinate and head up a multisectoral effort to control the AIDS epidemic. Among the entities involved are the Ministry of Education, the Federation of Cuban Women, the Ministry of Tourism, the population living with HIV/AIDS, the Ministry of Culture, the Ministry of Trade, and the Ministry of Labor and Social Security. International agencies and organizations have been helping to implement the control plan through specific projects designed to strengthen interventions in furtherance of strategic objectives. Counseling services were expanded in 2004 and 2005, which helped improve the coverage of programs targeted at high-risk groups. The peer education method is being used at the national level in schools and communities and within the HIV-positive population. A network of AIDS prevention and control centers was set up in different provinces and municipalities to increase HIV/AIDS awareness among youth. The National Health System ensures access by HIV-positive individuals to all levels of care, with guaranteed access to antiretroviral therapy and treatment for opportunistic diseases. As of the end of 2005, 2,098 individuals were receiving antiretroviral therapy.

Health Promotion

The health promotion strategy is geared to reinforcing the notion that health interventions are not the sole responsibility of the health sector. The National Health System encourages community participation in problem-solving and engages and trains different social stakeholders to identify needed programs. These programs are underpinned and endorsed by government proposals, as part of a cross-sector, interdisciplinary approach designed to improve the quality of life for the general public. There are undergraduate and graduate-level course offerings in health promotion and health education including scientific disciplines designed to help ensure excellence in all health services. School programs geared to encouraging younger generations to embrace healthy lifestyles have helped the Cuban population develop a comprehensive general culture of personal and public health protection. The health-promoting schools model has triggered a national movement, with all educational establishments aspiring to qualify as health-promoting schools, with all ensuing benefits. There are great expectations for a number of national projects with predominantly

educational and behavioral components, such as programs for the prevention and control of tobacco addiction and cancer, sexual and reproductive health education, nutrition and oral health programs, and programs for the prevention and control of sexually transmitted infections and HIV/AIDS. The social communication media and other national structures are actively involved in the mapping out and attainment of individual, family, and community counseling goals promoting healthy lifestyles and self-care.

Provincial Health Promotion and Education Centers, municipal government structures, and people's councils, as the embodiment of community participation in problem-solving processes, help tailor programs to the features and capabilities of each region and ensure the efficient and effective use of available resources for the development of a health culture designed to promote the population's general welfare.

Human Resources

The National Health System has 70,594 physicians (62.7 per 10,000 population), including 33,769 family physicians providing health care coverage for 99.4% of the population. It also has 10,554 oral health specialists (9.4 per 10,000 population), 110,483 high-level technicians (25,022 with degrees in nursing), and 158,726 mid-level technicians (64,440 nursing technicians).

Since 1959, 87,690 physicians, 12,937 oral health specialists, 29,983 registered nurses, and 501 specialists in health technology have graduated from national study programs. The first 1,610 ELAM-CARIBE project physicians graduated in 2005. New training models in the areas of nursing and health technology helped add 15,142 basic technicians to the country's health services. There are polyclinic-based programs of study at the primary health care level in the fields of general medicine, oral health, nursing, health psychology, and health technology in all 169 municipalities as part of the "universalization" of education. To date, 2,242 National Health System units have been transformed into university centers. The first year of the program of study in general medicine was initially offered in 2004 at 75 university polyclinics in 42 municipalities around the country and immediately expanded to 113 polyclinics in 68 municipalities the following year. A six-task research project referred to as the University Polyclinic Project was designed as an evaluation tool for this process. Emerging training programs for nurses were started up in eight provinces, open to candidates at the 9th, 10th, and 11th grade levels, using health facilities as simulators.

The performance of interns (sixth year medical students) in their various rotations has been excellent.

Human resources training programs in the health sector include students from more than 80 countries. Training programs for the so-called "New Latin American Physician" have been started up in the provinces of Havana City (Cojimar), Cienfuegos, and Holguín.

The establishment of eight distance master's degree programs has made it possible for vast numbers of health professionals, not only from Cuba, but also from Venezuela and 13 other Integrated Health Program countries, to work toward graduate degrees. There are a total of 60 health science specialties (51 medical specialties, 5 oral health specialties, 3 nursing specialties, and 1 health psychology specialty). Training in basic biomedical science, public health and epidemiology, and biostatistics specialties is available to all health professionals. A total of 66,051 health professionals were trained as specialists over the period between 1962 and 2005. Graduates of the Latin American School of Medicine (ELAM) were given an opportunity to do their graduate work in the comprehensive general medicine specialty and, later, complete a second specialty. Thus far, 13,449 students in 14 different specialties have graduated from the *Haciendo Futuro* (Shaping the Future) program for the training of specialists to meet basic staffing needs for the operation of Integrated Diagnostic Centers in Venezuela and fill human resources shortages in Cuban health services. Right now, there are 574 Cubans holding doctoral degrees in the health sciences, with work already underway on a degree-training strategy to turn out another 25,000 doctoral recipients in the next few years.

A total of 700,000 health workers in all occupational categories graduated from the In-Service Training Program between December of 2002 and the end of 2005.

Health Supplies

There are ample supplies of locally manufactured drugs, including immunobiologicals and in vitro diagnostic products (diagnostics), and drug regulation activities are being constantly stepped up. Cuba has domestic regulations governing good manufacturing and quality control practices for these products in line with WHO norms, as well as for biologicals, radiopharmaceuticals, cytostatics, metered-dose inhalers, clinical laboratories, blood banks, and human clinical research. The State Drug Quality Control Center certifies compliance with these standards. There are health licensing systems in effect for all establishments manufacturing, distributing, importing, and exporting pharmaceutical and diagnostic products, under which corresponding licenses are issued based on inspections for compliance with recommended practices in each case and are subject to revocation based on post-marketing surveillance data.

The country participates in the WHO Certification Scheme on the Quality of Pharmaceutical Products Moving in International Commerce and requires and issues all corresponding certifications for marketing permits.

The regulatory process with respect to medical equipment begins with the manufacturer's registration and includes product evaluation and registration. This has led to better quality imports and has helped boost demand for domestic products as part of the major technological retrofitting effort by the National Health

System. Manufacturer compliance is monitored by means of audits and other procedures. There are ongoing quality programs, and the adoption at the country level of ISO 13485:2003 (an international system standard for medical devices) is currently under consideration.

Research and Technological Development in Health

The Health Science and Technology System consists of 32 science and technological innovation entities, 21 of which are recorded in the Ministry of Science, Technology, and Environment Registry as accredited research centers and institutes, four as scientific-technological service centers, and seven as scientific-technological development units. Health research is conducted by medical education centers at the higher education level (4 medical universities; 21 schools of medicine, 4 schools of dentistry, 4 nursing schools, and 4 schools of health technology; the National School of Public Health; the Latin American School of Medicine; 35 medical affiliates; 169 municipal university centers; and 273 university centers, including 113 university polyclinics in 68 municipalities). There are 11 “branch” scientific/technical programs at the country level. As of the end of 2005, there were 48 national, 580 branch, 216 provincial, and 1,448 health facility-based research and development and technological innovation projects. Each hospital and municipality has a scientific council in charge of approving projects prior to their submission to the appropriate authority.

The National Health System includes 574 scientific doctoral recipients, 1,413 registered researchers, and 11,502 medical professors. The average age of researchers is 39.

The country has 12 PAHO/WHO Collaborating Centers for health and housing, research and education on human reproduction, occupational health, nutrition and food safety, integrated diabetes care, viral diseases, dengue research and control, reference and research on tuberculosis and mycobacteria, medical malacology and biological vector and host control, child growth and development, development of the virtual health library, and development of genetic approaches to health promotion. It encourages health technology evaluation and impact assessments of new National Health System programs and services.

The Virtual Health Library and the Cuban scientific and technical information network known as Infomed are recognized throughout the Region of the Americas and around the world for their intensive and creative use of information and communication technology. The emphasis on the social use of these resources and on the development of local information flows helping to bring scientific knowledge to bear on the health sector is pivotal. The use of scientific and technical data has become an integral part of continuing professional education and training activities nationwide. All health districts have Virtual Health Library servers, and more and more training activities at all levels are being conducted via the Virtual University. Infomed is the

product of a joint effort by health institutions and health workers and is constantly expanding in line with the growing numbers of virtual communities of practice and knowledge established on Infomed Web sites. This process is still in the developmental stage, but is slowly crystallizing. A scientific article recently published in the *Journal of Medical Internet Research* refers to Infomed as “a model of interest for integrating health care information, research, education, and services delivery.”

Health Sector Expenditures and Financing

Total national public health spending in 2005 was up 24.2% from the previous year, or by over 507.2 million pesos, outstripping the average annual growth rate, which had been 9.6% up until 2000. A breakdown of expenditures showed wage costs up by 452.8 million pesos, accounting for 65.0% of total spending, along with spending on drugs and related supplies, which consumed 308.0 million pesos (4.0% more than the previous year). The 3,193,300,000 peso appropriation for this important sector in 2006, topping the 2005 appropriation by 23.0%, was designed to help continue to strengthen health care services in search of excellence. Personnel costs amounted to 255.6 million pesos, or 64.4% of total spending, with a 2,007,700,000 peso wage bill. The approved budget for drugs and related supplies came to 347.0 million pesos. Of the total budget, 1,309,200,000 pesos (41.0%) were allocated to primary health care, 85.5 million pesos (2.6%) to scientific and technological development, and 1,660,500,000 pesos (52.0%) to hospital care. The remainder, which came to 138.0 million pesos (4.4%), was allocated to items such as administration and other system support centers.

Technical Cooperation and External Financing

Cuba has continued strengthening its international relations in the area of health cooperation, particularly as regards aid and assistance to other countries (Table 5). A number of new cooperation plans and programs were implemented over the five-year period 2001–2005, such as *Barrio Adentro* (Inside the Barrio) in Venezuela and *Operación Milagro* (Operation Miracle), designed to cure visual impairments in the Cuban population, as well as in Venezuelan patients and those from other Latin American and

TABLE 5. Number of aid workers sent abroad, by year, Cuba, 2001–2005.

Year	Number of aid workers
2001	4,317
2002	6,190
2003	17,033
2004	26,014
2005	31,243
Total	84,797

TABLE 6. Breakdown of external funding for National Health Services, Cuba, 2005.

Agency	Commitment (US\$)
PAHO/WHO	771,000.00
UNFPA	308,000.00
UNICEF	826,922.00
UNDP/UNAIDS	20,000.00
UNDP/Government of Japan	284,837.00
UNDP/AIDS	2,879,081.81
WFP	258,000.00
Grants	21,963,943.00
Total	27,311,783.81

Caribbean nations. As of December 2005, a total of 172,306 operations had been performed on patients from several Latin American countries as part of the *Operación Milagro* project. The Henry Reeve Brigade was formed in 2005 in the wake of Hurricane Katrina's devastation of New Orleans, Louisiana, U.S.A., to provide emergency medical assistance following natural disasters and combat disease outbreaks, as an expression of solidarity by the Cuban people. The country has also continued to send medical teams on missions under the Integrated Health Program and other cooperation programs. Cuba has helped train health personnel at the Latin American School of Medicine, whose stu-

dent body currently includes youths from Africa, Latin America, the Middle East, and the United States.

Cuban physicians dispensing health care in other countries also serve as instructors, training local physicians to ensure continuity of care.

In addition to its technical cooperation resources, as indicated in Table 6, funding and grants from international organizations and NGOs came to a total of more than US\$ 27 million, which facilitated the implementation of numerous projects.

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