

GUATEMALA



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 Guatemala is bordered on the north and northwest by Mexico; on the east by Honduras, El Salvador, and Belize; and on the southwest by the Pacific Ocean. It covers an area of 108,889 square kilometers, divided into 22 departments and 331 municipios with 20,485 towns and villages for administrative purposes (1).

GENERAL CONTEXT AND HEALTH DETERMINANTS

Of the total population, 56.2% (6,397,903 persons) lives in poverty (with a daily income of less than US\$ 1.60), and 15.7% (1,786,682 persons) lives under conditions of extreme poverty (with a daily income of less than US\$ 0.70) (2). The incidence of poverty is much higher in rural areas (74.5% of the population) than in urban areas (27.1%). Poverty rates among indigenous peoples (77.3% of the population) are higher than for the non-indigenous population (41.0%). The human development index (HDI) was 0.663 in 2005, up from 0.640 in 2002 (3). The HDI in the nation's capital (0.795) is quite a bit higher than in the interior (0.457 in Sololá department, where 96.4% of the country's indigenous population lives) (3). The poorest regions also have the highest rates of malnutrition; 80% of children suffering from chronic malnutrition live below the poverty line (2). Poor women have a higher total fertility rate, or an average of two more children than non-poor women (with an average of four children) (2). The incidence of chronic malnutrition among indigenous peoples (69.5%) is nearly double the figure for the nonindigenous population (35.7%) (4). The allocation of arable land continues to be a major problem in all parts of the country, hitting indigenous groups particularly hard. In fact, half of all farmers nationwide are members of indigenous groups, who control a mere 24% of the land they farm (including both leased and personally owned land) (3).

Social, Political, and Economic Determinants

To achieve the first Millennium Development Goal (MDG 1), to eradicate extreme poverty and hunger by the year 2015, the country will need to turn around recent setbacks, with the share of national income going to the poorest fifth of the population slipping from 2.7% in 1989 down to 1.8% in 2004 (3). This is reflected, in part, in the share of the population living on less than a dollar a day, which went from 20.0% in 1989 to 21.5% in 2004.

There are 4,791,512 workforce members, of whom 20.8% are between 10 and 18 years of age, 31.2% are between the ages of 19

and 30, 33.9% are between 31 and 50, and 14.0% are over 50 years of age. The labor force participation rate for the nonindigenous population is 55.2%. Moreover, 71.3% of the working population is employed in the informal sector (5), 86.8% of them have no employment contract, and 59.6% work more than 40 hours a week. Only 18% of the working population is registered with the Guatemalan Social Security Institute (5). The agricultural sector generates the most employment (40.1%), followed by commerce (21.8%) and the manufacturing industry (15.5%). There are 108,050 unemployed, of whom 60.3% are male and 47.0% are between 19 and 30 years of age.

The country's economic reforms and macroeconomic stabilization policies are responsible for its poor economic performance, giving rise to short periods of economic growth followed by a slowdown in growth rates and a stagnating gross domestic product (GDP) per capita, which steadily declined between 1999 and 2003, rallying slightly in 2004 and 2005, with a moderate expansion in economic activity. GDP grew by 2.7% in 2004 and by even more (3.2%) in 2005, outstripping the rate of population growth in both years, at 2.5% (6). GDP per capita went from US\$ 1,823.40 to US\$ 2,204.70 between 2001 and 2004 (3).

Since 2002, family remittances have outstripped income from exports of traditional products (green coffee, bananas, sugar, and cardamom). The value of remittances was estimated at US\$ 2.998 billion in 2005 (3). Family remittances help 3.4 million individuals, or 774,000 recipient households (31.2% of all households nationwide) (3). The fiscal deficit went from -1.9 in 2001 to -1.0 in 2004 (7). Guatemala has low taxes, which represented roughly 10.1% of GDP in 2005. A 1.5% tax increase has been proposed to help meet commitments under the Peace Accords and MDGs. A breakdown of spending shows 2.4% of GDP going to education, science, and culture and 1.2% going to health (7). The government has established monitoring and auditing mechanisms for government agencies such as the Integrated Financial Administration and Auditing System, the Information System on Government Procurements and Contracts (Guatecompras), the National Public Investment System, the Government Targets System, the Integrated Accounting System, and the Integrated Municipal Financial Administration System as part of its battle against cor-

ruption. In 2005, against a backdrop of social and labor discord and unrest, the Guatemalan Congress ratified the Central America–Dominican Republic–United States Free Trade Agreement, looking to strengthen the small and medium enterprise sector. Physical infrastructure development, institutional infrastructure building through small farmer organizations, and the sharing of technology by small farmers should all be considered as strategies geared to preventing growth from benefiting a mere handful of large-scale exporters rather than promoting local market development as a whole (3).

The small share of income going to the poorest 20% of the population is a reflection of the vulnerability of the poorest segments of society. The ratio of the income of the top quintile of the population to that of the bottom quintile rose steadily between 1984 and 2004, from 19.3 to 34.2. The extreme inequity in income distribution is reflected in a Gini coefficient of 0.57 for the country as a whole. Guatemala has one of the world's highest inequality indexes. It is ranked 13th out of 111 countries evaluated by the United Nations Development Program (UNDP), with indexes ranging from 0.20 to 0.61 (3). The Peace Accords signed by the government of Guatemala and the Guatemalan National Revolutionary Unity movement call for an integrated approach to health care, in line with the MDGs. The country's health priorities are to control malnutrition as a way of combating extreme poverty and expand environmental sanitation services to ensure environmental sustainability. Another priority is to reduce maternal and child mortality by expanding and strengthening primary health care services targeted at these high-risk groups. These are all examples of common ground between the peace agreement and the MDGs. Other elements of the peace accords such as agreements on drugs, supplies, and equipment and on preventive health issues should also help further MDG 5 (combat HIV/AIDS, malaria, and other diseases).

The budding activism following the signature of the Peace Accords in 1996 was marked by: (1) a wavering but growing effort to organize and empower indigenous groups, strengthening the participation of the indigenous population; (2) the emergence of agencies and organizations (not necessarily indigenous) furnishing assistance, training, and information to disadvantaged groups and filing complaints and taking action on their behalf; and (3) an ignorance on the part of government and other social stakeholders of how to formulate a comprehensive plan and build a pluralistic State in a multiethnic nation (3).

According to projections based on the 2002 Population Census, the adult literacy rate is 69.1%, with the 15- to 24-year age group showing the most improvement in this area (1); their literacy rate jumped from 76% in 1994 to 82.2% in 2002. The rise in the literacy rate for rural women by nearly 9 percentage points between 1994 and 2002, or from 59.8% to 68.2%, and the even sharper rise in the literacy rate for the young indigenous population during the same period, by 11 percentage points, or from 60.4% to 71.5%, are especially noteworthy. Of the illiterate popu-

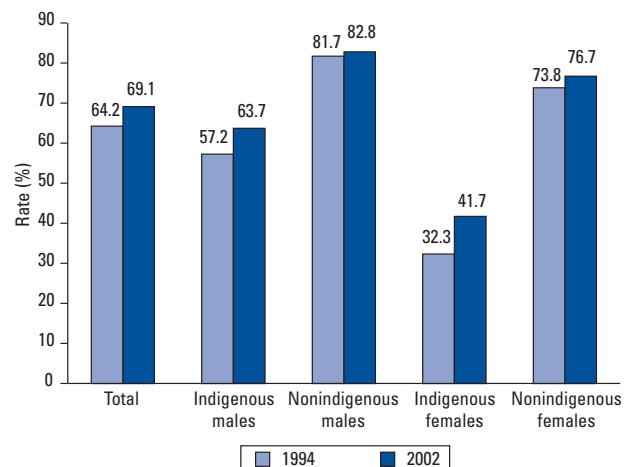
lation, 60% entered first grade but dropped out of school before learning to read and write (3); the remaining 40% never entered first grade. Two-thirds of all illiterates are female. As of 2002, there was still no change in traditional patterns of school enrollment, with males completing more years of school than females across all age groups and the nonindigenous population completing more grades than the indigenous population (8). Urban dwellers also had more years of schooling than residents of rural areas. Figure 1 compares adult (15 years and older) literacy rates for 1994 and 2002, broken down by gender and ethnic origin.

The average truancy rate among the population between 7 and 14 years of age was 28.9%, and 26% of the secondary-school-age population was enrolled in school. The average number of years of schooling completed by youths between the ages of 15 and 24 went from 4.5 in 1994 to 5.4 in 2002 (8). There were large disparities in figures for the indigenous population (2.7 years in 1994 versus 3.8 years in 2002) and the rest of the population (5.8 and 6.5 years, respectively). A breakdown by gender and ethnic origin shows nonindigenous males with the most education in 2002 (an average of 8.2 years) and indigenous females with the least education (an average of 4.4 years) (8).

The country has made progress in furtherance of the second MDG (achieve universal primary education), as reflected in the rise in the net primary school enrollment rate from 71.7% in 1989 to 92.3% in 2004. The share of pupils entering first grade who go on to complete sixth grade went from 43.7% in 1989 to 65.1% in 2004.

According to data on nutritional status, 23% of the population (the equivalent of 2.8 million people) is undernourished (consuming less than the minimum dietary energy requirement) (4). The monthly incomes of over 60% of Guatemalan households are too low to cover the cost of the basic food basket. The fortification of

FIGURE 1. Comparative adult (age 15 and older) literacy rates, by sex and ethnic origin, Guatemala, 1994 and 2002.



Source: Guatemala, Ministerio de Educación.

food products is the main strategy for reducing and controlling micronutrient deficiencies. Wheat is fortified with iron and folic acid to prevent anemia, salt is fortified with iodine to prevent hypothyroidism, and sugar is fortified with vitamin A to prevent blindness. Some progress has been made with respect to MDG 1 aimed at reducing the number of people suffering from hunger, as reflected in the drop in the percentage of underweight children less than 5 years of age from 34% to 23% between 1987 and 2002 (3).

Studies of air pollution and its health effects found several locations in Guatemala City with annual levels of total suspended particulates as high as 681 $\mu\text{g}/\text{m}^3$ (compared with the WHO guideline of 80 $\mu\text{g}/\text{m}^3$). Levels of particulates with diameters of less than 10 μm (PM_{10}) (breathable particulates) were as high as 192 $\mu\text{g}/\text{m}^3$ (versus the WHO guideline calling for an average annual level of 50 $\mu\text{g}/\text{m}^3$). Nitrogen dioxide levels reached 80 $\mu\text{g}/\text{m}^3$, with an average annual level of 57.43 $\mu\text{g}/\text{m}^3$ for the year 2000 (compared with the WHO guideline of 40 $\mu\text{g}/\text{m}^3$). The average annual ozone level in the year 2000 was 30.17 $\mu\text{g}/\text{m}^3$ (versus the WHO guideline calling for an average annual level of 60 $\mu\text{g}/\text{m}^3$). The average annual concentration of carbon monoxide in the city center was 2.83 ppm (versus the WHO guideline of 9 ppm over 8 hours).

The use of fuelwood has been cut back over the last 15 years as an environmental and air pollution prevention and control measure. However, measurements of carbon dioxide emissions per capita show a rise in emission levels (from 0.47 metric tons in 1990 to 0.73 metric tons in 2005). Approximately 75% of the rural population is exposed to indoor air pollution from smoke produced by biomass combustion (the burning of wood, straw, dung, coal, etc.) (3).

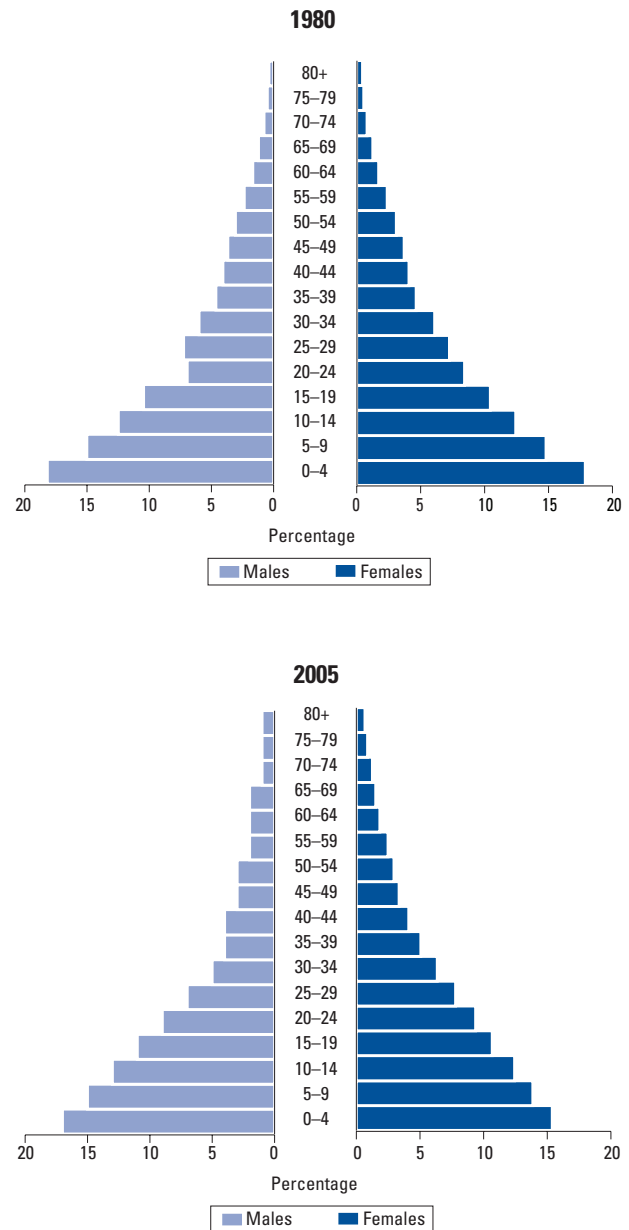
The country is struck by an average of 200 natural disasters per year. The most common phenomena with the largest impact are earthquakes, floods, and landslides. Other events include volcanic eruptions, severe cold spells accompanied by snow and hail, explosions, and forest fires. There are 1,733 high-risk human settlements with a total of 219,821 residents. The departments with the largest number of endangered villages and residents are Escuintla, Zacapa, Santa Rosa, and Petén.

Approximately 30% of the population lives in an earthquake zone. There are 641 villages with 84,000 residents located close to major faults. There were 37,698 reported earthquakes in Guatemala over the period between 1977 and 2003. Its 38 volcanoes and four tectonic faults have turned the country into a seismic zone with a high likelihood of multiple eruptions. An area of approximately 5,500 km^2 (representing 5.1% of the country's land area) is considered to have a high or very high risk of drought.

Demographics, Mortality, and Morbidity

In 1980, the country had a population of 7,013,435 inhabitants, of which 50.5% was male, 45.3% was under the age of 15, 40.1% was between 15 and 44, 10.8% was between 45 and 65, and 2.9% was 65 and older (Figure 2). By 2002, Guatemala's popula-

FIGURE 2. Population structure, by age and sex, Guatemala, 1980 and 2005.



tion had grown to 11,237,196 inhabitants, of which 2,541,581 (22.6%) lived in the capital (9). By 2005, it had 12,700,611 inhabitants (9) and an average population density of 103 inhabitants per km^2 , ranging from a high of 1,196 inhabitants per km^2 in the capital to a low of 10 inhabitants per km^2 in Petén department, with males making up 51.1% of the population (9).

A look at the population pyramid shows a high proportion (43%) of young people under the age of 15, with 15-to-44-year-olds representing 42% of the population, 45-to-65-year-olds rep-

postneonatal rate was 17 per 1,000 (4). The infant mortality rate came down from 48 per 1,000 in 1997 to its more recent levels, with the sharpest rates of decline in postneonatal mortality and very little improvement in neonatal mortality rates. Infant mortality rates are higher in rural areas (48 per 1,000 live births) than in urban areas (35 per 1,000) and higher for the indigenous population (49 per 1,000) than for the rest of the population (40 per 1,000). The highest infant mortality rates are associated with the southeastern (66 per 1,000), central (55 per 1,000), northeastern (53 per 1,000), and northern (51 per 1,000) regions of the country (4) and are closely correlated with rural living, poverty, and the share of indigenous peoples. Children under 1 year of age accounted for 18% of all deaths over the period 2001–2003 (10). The leading causes of death in this age group were conditions originating in the perinatal period (38.9%), pneumonia (26.9%), and diarrhea (11.8%). The infant mortality rate was 32 per 1,000 live births for both sexes, 35.3 per 1,000 for males, and 28.5 per 1,000 for females (10). According to data for 2002, 50% of live-born children accounted for 60% of all infant deaths, reflecting a 1.5-fold jump in inequality from the period prior to the survey.

Live-born children in Region V (Chimaltenango, Sacatepéquez, and Escuintla) face a 1.7 times greater risk of death in the first year of life than children born in Region I (the Metropolitan region). Thus, the risk of live-born children dying before reaching their first birthday in Region V is 24.54 per 1,000 live births more than the risk faced by children born in Region I. If all regions had the same infant mortality rate as the region with the lowest total rate (Region I, with a rate of 36.54 per 1,000 live births), the total infant mortality rate for all eight regions would have been lowered by close to 30%, preventing some 18,000 deaths among children under 1 year of age out of the approximately 61,000 deaths reported by the three surveys. The risk of children born in Region V (with the highest infant mortality rate) dying before reaching their first birthday is nearly twice that of children born in Region I (with the lowest infant mortality rate). Thus, there are 24.54 more deaths per 1,000 live births in Region V than in Region I (12).

Deaths of children between 1 and 4 years of age accounted for 7.4% of all deaths over the period 2001–2003 (10). The mortality rate for this age group was 59 per 1,000 live births (4). The leading causes of death in this age group were pneumonia, diarrhea, and malnutrition (10), and the main causes of morbidity were respiratory infections and diarrhea (11).

The net preprimary school enrollment rate for males and females in this age group is 45.2% (8). Significant progress has been made in furtherance of MDG 4 (reduce child mortality), as reflected in the decline in the child mortality rate from 121 per 1,000 live births in 1989 to 59 per 1,000 in 2004.

Children 5–9 Years Old

This age group made up 14.4% of the nationwide population in 2004. The leading causes of death were pneumonia, diarrhea,

and accidents (unspecified polytraumas) in the case of males, and pneumonia, diarrhea, and malnutrition in the case of females (10). The net school enrollment rate in 2004 was 94.7% for males and 90.1% for females (8). The estimated dropout rate for this age group was 7%.

Adolescents 10–14 and 15–19 Years Old

This age group made up 24% of the population in 2005. Of this figure, 31.3% had access to a secondary education and 17.5% had access to a comprehensive secondary education. The gender breakdown was 32.6% and 17% for males and 30% and 18.1% for females (8). Seven percent of the population was enrolled in a university (7.0% of males and 4.8% of females), compared with rates of only 1.6% for indigenous males and 0.8% for indigenous females (3).

The leading causes of morbidity were injuries and accidents, which accounted for 91.3% of total morbidity (66.3% of which involved males) (13). The number of deaths among 15- to 19-year-olds (797) was three times the figure for the 10- to 14-year age group (273) (10). The leading causes of death among 10- to 14-year-old and 15- to 19-year-old males were infections and gunshot wounds, respectively.

This age group accounted for 5,868 reports of abuse and assaults in 2002 and 2003, of which 40% involved physical abuse; 27% involved rape; 11% involved abandonment; 9% involved sexual abuse and indecent acts; 8% involved assaults, injuries, and threats; 3% involved neglect; 3% involved attempted rapes; and 0.2% involved incest.

In 2002, the median age of adolescent females and males in urban areas at the time of their first sexual experience was 18.8 and 16.4 years, respectively (4), compared with figures of 17.7 and 16.9, respectively, for rural areas and 17.3 and 17.9, respectively, for the indigenous population. Moreover, 1.8% of youths of both sexes reported being raped in their first sexual encounter. This figure jumps to 18% among youths who had their first sexual experience before the age of 13 (4). Fifteen percent of 15- to 19-year-old girls were already mothers, and only 7.2% had used any form of birth control. Among women under 29 years of age, 28.2% had interpregnancy intervals of less than 24 months (4). As of June of 2004, there were 270 reported cases of AIDS among youths between 10 and 19 years of age (representing 3.8% of all AIDS cases).

Approximately 4,000 youths between the ages of 13 and 15 were living on the street (14). The main reasons these youths gave for living on the street were abuse, abandonment, and poverty; 20% of street kids reported having frequent suicidal thoughts. Sexual exploitation is a common phenomenon among street kids.

Adults 20–59 Years Old

According to the findings of the 2002 National Maternal and Child Health Survey (ENSMI), 84% of pregnant women reported

having some type of prenatal checkup (4). The actual share of women receiving prenatal care varied according to their level of education (from 76% of women with no formal education, to 87% of women with a primary education, and 97% of women with a secondary or higher education). The percentage of pregnant women receiving at least one dose of tetanus toxoid in the course of their pregnancy was 64% nationwide (60% of indigenous women and 68% of nonindigenous women) (4).

Trained personnel attended 41.4% of all deliveries (with 37% of deliveries attended by physicians and 4.4% by nurses), and 47.5% of deliveries were attended by midwives. A breakdown by ethnic origin shows 16.4% of deliveries by indigenous women attended by trained personnel, compared with 52.0% of deliveries by nonindigenous women. On average, 11.4% of all deliveries nationwide, 18.8% of deliveries in urban areas, and 7.7% of deliveries in rural areas were by cesarean section (4). Among nonindigenous women, 15.8% of deliveries were by cesarean section, compared with 5.2% of deliveries by indigenous women. During the postpartum period, 20% of women nationwide, 12% of rural women, and 26% of urban women got postpartum care and 43% of newborns received follow-up care (4).

Of women living in free unions, 43.3% (23.8% of indigenous women and 52.8% of nonindigenous women) used some type of birth control method (34.4% used modern birth control methods and 8.8% used traditional methods). The most popular modern methods of birth control were female sterilization, hormone injections, the pill, condoms, IUDs, and male sterilization (4).

The year 2000 maternal mortality baseline put the maternal mortality rate at 153 per 100,000 live births, with an underregistration rate for maternal deaths of 44% nationwide (15). Maternal mortality rates came down by 30% over an 11-year period, from 219 (in 1989) to 153 per 100,000 live births (in 2000) (15). The highest maternal mortality rates were associated with the departments of Alta Verapaz (266.15 per 100,000 live births), Sololá (264.53), and Huehuetenango (245.83), all of which have a large rural, poor, indigenous population with limited access to health care. A breakdown by cause of death shows 53% of maternal mortality attributable to hemorrhaging during labor, 14% to septicemia, 12% to pregnancy-induced hypertension, 9.5% to abortions, and 11.5% to other causes. Of all maternal deaths, 66.5% involved women with no formal education. The risk of death for indigenous women was three times greater than for nonindigenous women and 1.38 times the national average. According to the findings of the same 2000 survey, the inequality in the regional distribution of maternal mortality is 2.3 times that of the pattern of infant mortality according to the at-risk population. As in the case of the dissimilarity index with respect to the distribution of infant mortality, 466 maternal deaths (or 23.6% of all deaths) would have to be redistributed among the different regions of the country in order to get the same maternal mortality rate (463.25 per 100,000 live births) in each region (12). Bearing in mind the reported maternal mortality rates in

each region, if all regions had the same maternal mortality rate as the region with the lowest rate (Region I, the Metropolitan region), the maternal mortality rate could have been lowered by 73.6%, preventing approximately 1,500 of the 2,000 reported maternal deaths, or roughly eight of every 10 maternal deaths. The largest number of preventable maternal deaths is associated with Region VI, the southwest, both in percentage terms and in absolute figures.

The risk of maternal death in Region VI (the southwest) was nearly seven times greater, or 722.76 per 100,000 live births more than in Region I (the Metropolitan region) (12). The progress made toward the attainment of MDG 5 (“improve maternal health”) is reflected in the reduction in the maternal mortality rate from 248 per 100,000 live births in 1989 to 153 per 100,000 live births in the year 2000.

Cervical cancer is the leading cause of death among women of reproductive age (16). In 2003, 67.6% of women reported having taken a Pap test at some point in their life (77.0% of urban women versus 58.1% of rural women, and 42.3% of indigenous women compared with 73.7% of nonindigenous women).

The general mortality rate for males between 25 and 44 years of age was 5.94 per 1,000. The leading causes of death were homicide, with a rate of 95 per 100,000; events of undetermined intent (93 per 100,000); mental and behavioral disorders due to psychoactive substance use (56.4 per 100,000); cirrhosis (55.2 per 100,000); influenza and pneumonia (41.3 per 100,000); and HIV/AIDS (23.1 per 100,000) (10).

Older Adults 60 Years Old and Older

The size of the population aged 60 and above has been steadily growing for the past several decades. In 2002, this age group made up 6.3% of the total population (1), 5% of the rural population, and 4% of the urban population. An estimated 6% of older adults live alone and have no family support network. They have limited access to health care and very little social security coverage, with only 12.2% receiving any pension or retirement benefits. The leading causes of death for males over the age of 65 were influenza and pneumonia, cerebrovascular diseases, malnutrition, nutritional anemias, ischemic heart diseases, and complications of heart failure. The five leading causes of death for women aged 65 and above were influenza and pneumonia, cerebrovascular diseases, malnutrition and chronic anemias, diabetes, and complications of heart failure.

The Family

There are 2,200,608 households in Guatemala, of which 23% are headed by women. Of all heads of household, 45% reported having successfully completed at least one year of primary school (4). A breakdown of the population by marital status shows 35% married, 19% living in free unions, 40% single, and 3.7% di-

vorced, separated, or widowed (4). Records for 2004 show 53,860 marriages and 1,888 divorces (17, 18).

Workers

There are an estimated 4,791,512 workforce members (10 years of age and older), of whom 63.7% are male. An estimated 69.1% of males and 75.3% of females are employed in the informal sector of the economy. The findings of the 2002 National Employment and Income Survey (ENEI) show 68.2% of male and 44.8% of female respondents in jobs with a work week of more than 40 hours (5). Only 19.2% of working males and 15.9% of working females were registered with the Guatemalan Social Security Institute (5). An estimated 34.1% of children between 7 and 14 years of age were working (53.9% as laborers, 38.2% as unpaid family workers, and 7.7% as self-employed workers).

The share of children between 7 and 9 years of age in the workforce is 2.7%. Child labor is a complex phenomenon in Guatemala, with numerous causes such as poverty, adult unemployment and underemployment, the lack of universal basic social services, and cultural acceptance of the concept of child labor (19). Examples of the types of jobs performed by children in this age group include firework-making and stone cutting.

Persons with Disabilities

There were an estimated 401,971 persons with some type of disability in 2005, for a rate of 37.4 per 1,000 population for both sexes, a male rate of 39.2 per 1,000 and a female rate of 35.6 per 1,000 (20). An estimated 65.9% of persons with disabilities are members of the nonindigenous population, and 52.8% of disabled males and 34.6% of disabled females are married. Moreover, 56.5% of disabled males reported knowing how to read, compared with only 42.6% of females. The most common types of disabilities are visual (27%), musculoskeletal (22.8%), auditory (18.1%), and mental (12.6%); 42.6% of disabled persons reported having never gotten any medical treatment for their disability, with most respondents giving a lack of money as the reason for not having been treated.

Ethnic Groups

Indigenous peoples make up 41.2% of the nationwide population, and the Maya account for 95.7% of the indigenous population. The departments with the largest proportions of indigenous peoples are Totonicapán (98%), Sololá (96%), Alta Verapaz (93%), and Quiché (89%) (1, 3).

There are discernible differences in the health status of the indigenous and nonindigenous populations. Infant mortality is higher among indigenous groups (49 per 1,000) than in the nonindigenous population (40 per 1,000), as is child mortality, with rates of 69 per 1,000 for the indigenous population compared

with 52 per 1,000 for the nonindigenous population (with virtually no change in this gap since 1995).

Most maternal deaths involve indigenous women as a result of their strained economic circumstances, higher fertility rates (with two to three more children than nonindigenous mothers), and poorer health care. The maternal mortality rate for indigenous women was three times that of nonindigenous women (211 per 100,000 live births versus 70 per 100,000 live births). Fewer indigenous women use contraceptives than nonindigenous women (23.8% versus 52.9%).

The share of the indigenous population with water service coverage varies according to the ethnic group in question (ranging from 62.0% to 77.8%). Likewise, the level of sanitation service coverage ranges from 64.9% to 79.2% (3).

Migrant Population

Every year, there is a significant volume of seasonal migration by farm workers, primarily from the northwest and parts of the east to farming areas for export crops (sugar cane and coffee). Of the 881,324 members of the country's migrant population in 2004, 18,894 received health care (21). The leading health problems affecting this population group are pesticide poisoning, vector-borne diseases, insect and snake bites, gastrointestinal diseases caused by the lack of a safe water supply and basic sanitation services, and poor food access.

HEALTH CONDITIONS AND PROBLEMS

COMMUNICABLE DISEASES

Vector-borne Diseases

Malaria is present mostly in the northern part of Guatemala. There were a total of 39,571 laboratory-diagnosed malaria cases in 2005, with an annual parasite index (API) of 4.94 per 1,000 population. A breakdown of these cases puts 53.3% in Alta Verapaz department, 25.85% in Petén department, and 5% in Ixcán (22, 23). Moreover, 17.1% of malaria cases involved children under 5 years of age, 32% involved children between 5 and 14 years of age, and 40% involved the population aged 15–49. There is a higher incidence of malaria among males, who accounted for 54% of all cases. The main causative agent was *Plasmodium vivax*, which accounted for 96% of all cases. The vectors present in malaria transmission areas were *Anopheles albimanus*, *A. pseudopuntipennis*, and *A. darlingi*. Case finding and treatment are community based. There were seven deaths from malaria in 2003 and a single death in 2004 (11, 21). The API for the country as a whole was 7.37 per 1,000 in 2002 and as high as 44.66 per 1,000 in high-risk areas. Of a total of 197,113 blood slides examined in 2002, 35,540 tested positive (18.03%) (23). The malaria morbidity and mortality index went from 0.4 in 1990 up to 3.1

per 1,000 in 2002 (nearly an eightfold jump). Given the relevance of this indicator in evaluating progress in furtherance of MDG 6 (combat HIV/AIDS, malaria, and other diseases), the country will need to redouble its efforts to attain this goal.

Dengue is present in 80% of the country, although 57% of all cases are concentrated in the Guatemala, Alta Verapaz, Escuintla, Zacapa, and Petén North health areas. There were a total of 828 laboratory-diagnosed cases of dengue in 2003, compared with 688 cases in 2005 (24). Most cases involved the population aged 15–30. There were four cases of hemorrhagic dengue and a single reported fatality in 2003. Males accounted for 52% of all cases. All four serotypes are in circulation in Guatemala. There are centralized serological diagnostic testing services based at the National Health Laboratory.

There are seven high-risk areas for infection with **Chagas' disease** in Guatemala (Huehuetenango, South Guatemala City, Santa Rosa, Escuintla, Sololá, Chimaltenango, and Suchitepéquez). The prevalence rate in children under 14 years of age is 5%. All blood used in transfusions is screened for Chagas' disease. In 2001, *Rhodnius prolixus* was found in 241 communities nationwide. By 2005, two rounds of spraying in 1,996 or 100% of all infested communities had effectively eliminated this vector. The house infestation index for *Triatoma dimidiata* was brought down to 2.7% in 2005. The seroprevalence rate for *Trypanosoma cruzi* among blood donors was 1.4% in 2004 and 0.011% in 2006 (25).

Onchocerciasis is present in nine of the country's health areas (Chiquimula, Zacapa, Jalapa, Jutiapa, El Progreso, Huehuetenango, Santa Rosa, Baja Verapaz, and Quiché). The main intervention strategy is treatment with Mectizan. There were 160,418 eligible recipients in 2003, or 320,836 treatments administered in 518 endemic communities (26). Guatemala had exceeded its 85% coverage target by 2002, reaching 91% of patients with the first round of treatment and 95% in round two. By 2003, the coverage rate for both rounds of treatment was as high as 96%.

Vaccine-preventable Diseases

The country's high and constantly improving vaccination coverage rates have helped lower the incidence of vaccine-preventable diseases. In fact, the last reported case of paralytic **poliomyelitis** was in 1990, and the last laboratory-confirmed case of **measles** was reported in 1997. **Diphtheria** has disappeared, and neonatal **tetanus** has not been a public health problem since the 1990s. The number of cases of **tuberculous meningitis** is also way down, and the number of cases of **pertussis** or whooping cough and related fatalities is lower than ever, with all outbreaks concentrated in a handful of municipios. These achievements have all helped further MDG 4, which is to reduce child mortality. Country-wide vaccination coverage rates for children under 1 year of age in 2005 were 2% for the DTPw-HB/Hib pentavalent combination vaccine (against diphtheria, pertussis, tetanus, hepatitis B, and *Haemophilus influenzae* type

b), 92% for the OPV (Sabin oral polio vaccine), 96% for the BCG (bacillus Calmette-Guérin) vaccine, and 93% for the MMR (triple viral vaccine against measles, rubella, and mumps) for children between 12 and 23 months of age. The country is compliant with most acute flaccid paralysis surveillance indicators and integrated measles and rubella surveillance indicators.

A retrospective study conducted in 2005 identified 45 cases of defects consistent with congenital **rubella** syndrome and five confirmed cases, projecting a total of 2,225 cases over the next 15 years. A vaccination drive aimed at administering the MR vaccine (the double viral vaccine against measles and rubella) to 7.4 million recipients was scheduled for early in 2007.

The pentavalent combination vaccine was introduced in 2005 during Vaccination Week in the Americas, increasing the number of antigens in the basic vaccination scheme from eight in 2001 to 10 in 2005. Introduction of the flu vaccine in 2007 and the rotavirus vaccine is also being considered. The 2003, 2004, and 2006 immunization drives conducted as part of Vaccination Week in the Americas focused on reaching inaccessible rural, indigenous, and poor urban communities and improving coverage in problem municipios. The challenges facing this program include raising fiscal revenues to ensure its sustainability, attracting funding to strengthen the cold chain, introducing new vaccines, and achieving and sustaining high coverage levels in most municipios.

Intestinal Infectious Diseases

Intestinal diseases, defined as "intestinal parasitosis" and "acute diarrheal disease," were the second and third leading causes of general morbidity (accounting for 17.2% of all illness) and of morbidity within the 1- to 4-year age group in 2003 (accounting for 22.8% of the total) (11). Acute diarrheal syndrome was ranked second, and intestinal parasitosis was ranked sixth among causes of morbidity in children under 1 year of age. A total of 408,973 cases were reported in 2003. The general morbidity rate from this cause was 3,383 per 100,000 population. There were 3,636 reported deaths from acute diarrheal disease in 2004, of which 51% involved males and 24% involved children under 1 year of age. The general mortality rate from diarrhea was 42.9 per 100,000 population.

Chronic Communicable Diseases

There were 3,727 new cases of all forms of **tuberculosis** diagnosed in 2005 (for a rate of 27.23 per 100,000 population), which is equivalent to only 23.7% of the expected number of cases based on World Health Organization (WHO) estimates, suggesting the need to improve case finding and detection (27). There were 2,420 laboratory-diagnosed cases of tuberculosis based on positive sputum smears, for a rate of 17.75 per 100,000 population, or 48% of the expected number of cases based on WHO estimates. The number of new cases of all forms of tuberculosis

(pulmonary tuberculosis with acid-fast bacilli or AFB-positive sputum smears, extrapulmonary tuberculosis, and pediatric tuberculosis) has leveled off in the last 14 years, at rates of from 19.80 (2001) to 27.33 (2005) per 100,000 population for all forms of tuberculosis and from 14.30 (2001) to 17.75 (2005) for AFB-positive tuberculosis (27). Case detection rates in health facilities are low (48%), cure rates are fair (75%), and suggested global and national targets are still unattainable (a 75% case detection rate and 85% cure rate). Laboratory networks are poorly organized. The increase in the number of cases of tuberculosis is partially attributable to tuberculosis-HIV/AIDS coinfection present in 25% to 30% of HIV-positive patients. The rate of primary multidrug resistance is 3% (27). There has been visible progress with respect to MDG 6 (combat HIV/AIDS, malaria, and other diseases), measured by the morbidity rate associated with tuberculosis, which came down from 32 to 24 per 100,000 population between 1990 and 2001.

Leprosy diagnoses are made in response to spontaneous demand in facilities not run by the Ministry of Health. There has been only one diagnosed case a year for the last four years.

Acute Respiratory Infections

Acute respiratory infections are the leading cause of morbidity and mortality in Guatemala. There were 1,306,255 cases of acute respiratory infection in 2003, for a rate of 1,059 per 10,000 population (107), of which 60% involved children under the age of 5. The general mortality rate for pneumonia was 9.19 per 10,000 population, with higher rates in rural areas and among children whose mothers have less education. The general mortality rate for acute respiratory infections was 95.4 per 100,000 population (10). Acute respiratory infections were the third leading cause of death in the adult population aged 15–44 and the top cause of death among adults aged 45 and above.

There was an outbreak of influenza in 2002 among schoolchildren in the capital, in which the influenza A H1N1 New Caledonia virus as well as influenza B/Brisbane/32/2002-like viruses were detected.

HIV/AIDS and Other Sexually Transmitted Infections

There were 8,685 reported cases of AIDS between January of 1984 and August of 2005 (for a rate of 79.4 per 100,000 population based on reported cases of the disease) (28), with 77% of all cases concentrated in the departments of Suchitepéquez (with a rate of 150.1 per 100,000 population), Guatemala (149.5), Izabal (136.8), Escuintla (128.2), Retalhuleu (127.1), and Quetzaltenango (109.7). The male-female ratio went from 8:1 in 1988 to 2:4 in 2005, dropping sharply beginning in the year 1997. The AIDS epidemic is spreading in the general population. The population aged 15–49 accounts for 83.2% of all cases, and 52.1% of all AIDS cases involve members of the 20- to 34-year age group. The most common route of transmission is through sexual intercourse, which accounts for 94.4% of AIDS cases, with 5% of AIDS cases involv-

ing mother-to-child transmission (28). There are no reports of any cases of AIDS transmission attributable to intravenous drug use. The main transmission route is through sexual intercourse and, according to studies, the highest prevalence rates for AIDS are associated with men who have sex with other men (MSM) and female sex workers (FSW), who have become bridge populations for its transmission to heterosexuals and women not employed in the sex industry, which has also boosted the number of cases of vertical transmission. The coverage rate for antiretroviral treatment was 68% among the adult population. There has been visible progress in furtherance of MDG 6 in terms of the indicator measuring the rate of contraceptive use, which jumped from 4.5% in 1987 to 57% in 2002.

Other sexually transmitted infections are treated in health facilities in response to spontaneous demand. According to one-off studies, the prevalence of syphilis is 13% among MSM and 10% among FSW. The prevalence rate for all other sexually transmitted infections among female sex workers is 21.9%. Efforts to expand the coverage of sexually transmitted infection syndrome management approaches at the local level have been unsuccessful.

Zoonoses

There were 20 cases of seropositive animals exhibiting no clinical symptoms of **West Nile virus** in 2004, in which it was impossible to isolate the virus. There is active and passive surveillance of all symptomatic cases through the epidemiological surveillance system for animal diseases attached to the Policy and Regulations Unit of the Ministry of Food, Agriculture and Livestock (MAGA) (29).

The incidence of **brucellosis** jumped from 10 to 49 cases between 2002 and 2005. The MAGA is working with animal health brigades and veterinary epidemiologists in all parts of the country. Milk monitoring activities in processing plants for dairy products based on the milk ring test yielded a 9% positivity rate for 808 sampled farms (29).

Sampling for **bovine tuberculosis** started in 2005 led to the detection of 12 cases of the disease, resulting in the restriction of 171 herds, with no herds declared free of the disease. The MAGA has its own monitoring and control program (29). There is ongoing surveillance for **leptospirosis**, including searches for cases with related symptomatology. There were no reported cases of the disease in Guatemala during the period between 2001 and 2005, although a number of seropositive animals were found, prompting the recommendation of preventive vaccinations for the equine population (29).

Though there have been no reported cases of **foot-and-mouth disease**, there is ongoing surveillance of all cases with similar symptomatology, since foot and mouth disease can be confused with vesicular stomatitis, which is present in Guatemala (29). With reports of low-pathogenicity H5N2 avian influenza present in Guatemala, all suspected cases are monitored under the Poultry Health Program (29).

Addressing Health Care Gaps among the Indigenous People

Indigenous peoples make up 41% of the population of Guatemala, and there are evident differences in the health status of the indigenous and nonindigenous population. Infant mortality is higher among indigenous people (49 per 1,000 live births) than in the nonindigenous population (40 per 1,000), as is child mortality, 69 per 1,000 among indigenous people and 52 per 1,000 in the nonindigenous population, with virtually no change in this gap since 1995. Most maternal deaths involve indigenous women as a result of their more precarious economic circumstances, higher fertility rates—two or three children more than nonindigenous mothers—, and more limited access to health care.

The Mayan population, the country's largest indigenous population, has access to community-based traditional and alternative health care services offered by a number of nongovernmental organizations. There is a popular, traditional and alternative medicine program within the Health Ministry with treatment regimens based on the use of medicinal plants. The Ministry's Coverage Extension Program designed to provide health care coverage for people without access to other health care services is targeted specifically at the 12 departments with the largest indigenous populations.

Although there are no records of any cases of **bovine spongiform encephalitis** in Guatemala, there is ongoing active surveillance for this disease. There have been reports of seropositive animals for Venezuelan equine encephalitis, with one reported case of the disease in 2004 and another in 2005. There is ongoing active surveillance for this disease, and preventive vaccinations for the equine population are recommended (29).

There were no reported cases of human **rabies** over the period between 2002 and 2004. There was one reported case in 2005 in a child from a periurban area of Guatemala City, caused by a dog bite. Most cases of animal rabies involve dogs and cattle. The number of cases leveled off between 2002 and 2004, with approximately 93 dogs and 6 head of cattle testing positive in laboratory tests. Canine vaccination coverage levels were consistently in the 62% to 70% range over the period between 2002 and 2005.

NONCOMMUNICABLE DISEASES

Metabolic and Nutritional Diseases

The percentage of children between 3 and 59 months of age with chronic **malnutrition** in 2002 was 49.3%, compared with rates of 46.4% and 57.9% in 1998 and 1987, respectively, with 21.2% of this age group suffering from severe chronic malnutrition. Chronic malnutrition is a more serious problem in indigenous (69.5%) than nonindigenous (35.7%) children (4) and up to three times more prevalent in children with uneducated mothers (64.8% of mothers of malnourished children had no formal education, and only 18.4% of mothers with a secondary or postsecondary education had children suffering from malnutrition) (4). Children from families with less than 14,000 square meters of land (1.4 hectares) were found to have a 3.2 times greater risk of malnutrition than children from families with more than 35,000 square meters (3.5 hectares) of land.

Moreover, 22.1% of pregnant women with children under 59 months of age were anemic. A geographic breakdown put the share of anemic mothers in urban areas at 18%, compared with 24.1% in rural areas. Only 14.4% of mothers with a secondary or postsecondary education were affected by anemia, compared with 21.8% of uneducated mothers.

The share of schoolchildren suffering from chronic malnutrition was as high as 48.8%. Studies of the diets of school-age children found only 16% of this group eating enough calories, 35% eating enough protein, and barely 2% getting enough iron. Among children under 3 years of age, 38% had blood levels of iron below 11 g/dl. The incidence of **anemia** is significantly higher in younger children. The share of children under 5 years of age with a vitamin A deficiency (blood-serum retinol concentrations of less than 20 µg/dl) was 15.8% (30). Moreover, 49% of first-grade pupils showed signs of **stunting** (31).

The body mass index (BMI) of 1.9% of the female population between 15 and 49 years of age is below 18.5. The Petén (4.1%), southeastern (3.8%), and central (3.1%) regions have the highest percentages of underweight women (4). As of 2002, the average height of Guatemalan women was 149.2 centimeters, and 25.4% of women fell short of the critical threshold value of 145 centimeters. Moreover, 47.5% of indigenous women measured less than 145 cm, compared with 15.2% of nonindigenous women. On average, women with a secondary and postsecondary education were 7 centimeters taller than women with no education. Iron deficiency anemia was present in 22.1% of pregnant women and 20.2% of nonpregnant women.

The rate of breast-feeding is inversely correlated with the age of the child. Only children up to five months of age are exclusively breast-fed. Breast-feeding is more widespread in rural areas (58.5%) and among indigenous peoples (63.3%), compared with urban dwellers (34.7%) and the nonindigenous population (40.4%). It is also more widespread in the northwestern and

southwestern regions (70.8% and 62.9%, respectively) and less common in the Metropolitan (36.2%) and northeastern regions (36.4%) (4).

Diabetes was the eighth leading cause of general mortality over the period from 2001 to 2003, with a rate of 19.9 per 100,000 population. It was the fifth leading cause of death in the female population, with a rate of 22 per 100,000. A 2002 study in a peri-urban area of Guatemala City (Villa Nueva) put the prevalence rate of diabetes at 8.4% for both sexes among the population over 40 years of age. Of the study population, 80% was **overweight**, 44% suffered from obesity, and 54% did not get enough physical exercise.

Cardiovascular Diseases

Cerebrovascular diseases and **ischemic heart diseases** were ranked seventh and ninth among the leading causes of general mortality for the period 2001 to 2003, with rates of 20.7, 19.9, and 18.8 per 100,000 population, respectively. Male mortality rates for ischemic heart disease and cerebrovascular diseases were 21.4 per 100,000 and 20.9 per 100,000, respectively. Cerebrovascular diseases were the sixth leading cause of death among the female population, with a rate of 20.6 per 100,000, and the female mortality rate for ischemic heart diseases was 16.4 per 100,000 (10). A breakdown by region shows large disparities in the geographic pattern of chronic diseases, which are more common in Regions I and III (the Metropolitan and the northeast) and less common in Regions VI and VII (the southwest and the northwest).

A 2002 study in a periurban area of Guatemala City (Villa Nueva) put the prevalence of arterial **hypertension** at 13%, with very little difference between the sexes or between different over-40 age groups.

Malignant Neoplasms

The National Cancer Registry (a non-population-based registry), which keeps records of all cancer cases treated by the National Cancer Institute, reported a total of 2,303 cases of cancer in 2003 (1,444 involving women and 559 involving men) (32). The most common cancer sites were the cervix (47.5%), breast (14.7%), and skin (7.3%) in women, and the prostate (13.1%), skin (12.3%), and stomach (10.0%) in men (32).

OTHER HEALTH PROBLEMS OR ISSUES

Disasters

There were 564 floods between 1996 and the year 2000, mostly on the Pacific slope. In October of 2005, tropical storm Stan claimed 1,514 lives, left another 2,723,000 homeless (33), and caused approximately US\$ 988.03 million in economic losses, of which 42.6% involved capital losses, with the remainder in the form of post-disaster losses in economic flows. The infrastructure (45%), productive (27%), and social (15%) sectors absorbed

most of the impact. The hardest hit departments were San Marcos and Retalhuleu (13).

Violence and Other External Causes

The Guatemalan people put a premium on public safety. There were 29,436 crimes reported in 2003 nationwide (including physical assaults and violations of laws), of which 85.9% involved males and 14.4% (4,237) were homicides (34), with 43.3% of all homicides committed in Guatemala City (34). There were also reports of assaults, crimes against property, sex crimes, and unlawful restraint. There has been a wave of murders of young women since 2001, which has prompted an investigation into gender-based homicides (Figure 4). There was a 56.8% jump in female homicides between 2002 and 2004.

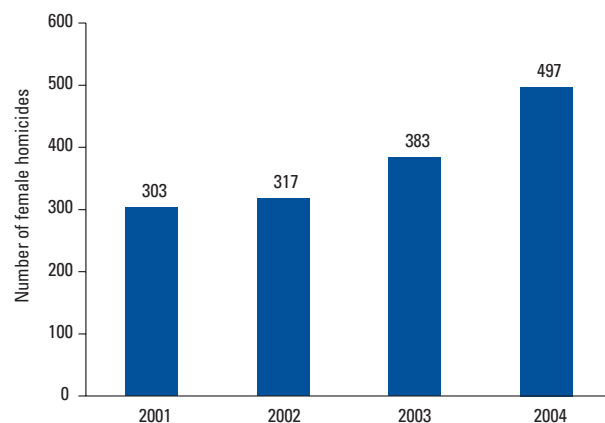
According to the report on crimes against women in Guatemala (35), of female crime victims, 17.5% were under the age of 13, 11.9% were between the ages of 14 and 17, 25.5% were between 18 and 25 years of age, 44.5% were from 26 to 59 years of age, and 5.8% were 60 and above.

Road safety statistics put the number of traffic accidents at 4,680 in 2004 and 5,127 in 2005. Traffic accidents claimed 692 lives and left 4,336 people injured in 2002, with 581 dead and 2,586 injured in 2004. There are approximately a million motor vehicles on the nation's roads, and this figure is growing at an annual rate of 30%.

Addictions

Fifty-two percent of youths between 12 and 19 years of age consumed alcohol, 42% smoked cigarettes, 18% took tranquilizers, 8% used stimulants, 4% smoked marihuana, 2% used inhalants, 2% used cocaine, 1% smoked crack, and 1% took ecstasy (36). Among youths consuming alcohol, 44% had at least one alcohol-related problem and 18% had gotten intoxicated. Fifteen

FIGURE 4. Number of complaints filed and homicide prosecutions by the Special Prosecutor's Office for Crimes Against Women, Guatemala, 2001–2004.



Source: Guatemala Instituto Nacional de Estadística. Crime statistics for 2003.

percent of all youths had problems involving the use of other types of drugs (36). The average age at the time of their first experience with alcohol, cigarettes, and inhalants was 12.5 to 13.5 and one or two years older at the time of their first experience with other types of drugs. There is a high correlation between alcohol consumption and the use of illicit drugs, with drinkers eight times more likely to use illegal drugs.

Environmental Pollution

The country visibly stepped up its imports of pesticides between the year 2000 and 2002, from 10,429.22 to 11,277.57 tons. There were 1,116 reported cases of pesticide poisoning in 2002, for a poisoning rate of 9.3 per 100,000 population, and 238 deaths, for a mortality rate of 1.98 per 100,000. The fatality rate from pesticide poisoning was 21.3% (37). Of the 1,043 reported cases of pesticide poisoning in 2004, the most common types of poisoning were from organophosphates and herbicides. Males accounted for 71% of all poisonings, with 2% involving children under the age of 5. Occupational poisonings accounted for 43.4% of all cases (21).

Oral Health

The decayed, missing, and filled teeth (DMFT) index for 12-year-olds was 4.9% for males and 5.5% for females in 2002. According to Dean's index, 2.7% of males exhibited mild dental fluorosis, 2.5% had moderate fluorosis, and 0.3% had severe fluorosis. The figures for females were 3.8%, 2.0%, and 0.4%, respectively.

RESPONSE OF THE HEALTH SECTOR

Health Policies and Plans

The Government Plan for 2004–2008 sets out basic lines of action and health policies. Current health policies are aimed at strengthening the oversight role of the Ministry of Public Health and Social Welfare, meeting public health needs, stepping up the deconcentration and decentralization process, ensuring timely procurements and stores of health supplies, streamlining the Ministry of Public Health and Social Welfare's administrative-financial management and planning system, strengthening human resource management and development for health, promoting environmental sanitation measures improving the quality of life of the Guatemalan people, and protecting the public from hazards associated with the consumption of and exposure to foods, drugs, and substances with adverse health effects (38).

The Guatemalan Social Security Institute's (IGSS) strategic plan for 2004–2008 is designed to make basic reforms in the IGSS geared to improving its competitiveness, efficiency, and institutional work quality while promoting ethics, stability, and growth. Its strategic objectives are to oversee the delivery of timely, efficient, high-quality services to meet the needs of corresponding

beneficiaries, strengthen its human resources, ensure transparent financial management, trim spending, and make timely pension and benefit payments. There is also a sixth internal objective aimed at improving its institutional image (39).

The third health policy alluded to above involves stepping up the deconcentration and decentralization of authority, responsibility, resources, and decision-making power to health areas and hospitals as established in the Basic Internal Regulations. These regulations are implemented by the Ministry of Health based on a new administrative-financial management and planning model defining the management authority of Health Area Offices. The Integrated Health Care System (SIAS) extended coverage by a basic health service package to 3.2 million rural residents who previously had no access to these health care services (40).

The findings of the evaluation of essential public health functions (EPHF) in 2002 and 2003 showed improvements in EPHF 1 (monitoring, evaluation, and analysis of the health situation), EPHF 2 (public health surveillance, research, and control of risks and threats to public health), and EPHF 11 (reducing the impact of emergencies and disasters on health).

The Health Code, Decree 90-97 organizing and regulating health-related activities, is the legal framework governing all operations in the health sector. There are also other legislative texts governing the health industry. Table 2 outlines the main pieces of legislation governing activities in the health sector (41).

Health Strategies and Programs

The major health strategies for the period 2004–2008 include strengthening the oversight role of the Ministry of Health and streamlining its management, improving the quality control system for spending, optimizing existing financial and human resources, human resource development, decentralization and deconcentration, public participation, implementing the current legal framework, intra- and extrasectoral coordination, extending service coverage to at-risk groups, technical and financial cooperation, and providing adequate supplies of drugs (38).

The country's 17 health priorities were set based on its vulnerability and risk profile and include maternal and neonatal mortality; malnutrition; communicable diseases, including respiratory infections, water-, food-, and vector-borne diseases, vaccine-preventable diseases, zoonoses, tuberculosis and sexually transmitted infections (HIV/AIDS); noncommunicable diseases (accidents and violence, chronic and degenerative diseases, addictions, pesticide poisoning, oral-dental health problems, and mental health problems); disasters; and demand response, all of which focus on the most vulnerable and highest risk population groups.

Organization of the Health System

The Ministry of Public Health and Social Welfare is the oversight agency for the health sector and one of its main service

TABLE 2. Major health legislation and provisions, Guatemala.

Type of legislation	Date passed	Objective
Social Development Act	October 2001	Establish a legal framework for the institution of legal proceedings and public policies for the promotion, planning, coordination, implementation, monitoring, and evaluation of State and government social, family, human, and environmental development programs, with the emphasis on special needs groups.
General Decentralization Act	April 2002	Fulfill the State's constitutional duty to systematically promote economic and political decentralization for effective national development.
Urban and Rural Development Councils Act	March 2002	Strengthen the development councils system as the main participation mechanism. Views the development councils system as the main mechanism for engaging the Mayan, Xinka, and Garifuna peoples and the nonindigenous population in public policy making as the basis for a democratic development planning process guided by principles of national, multiethnic, pluricultural, and multilingual unity geared to the country's diverse population.
Food and Nutritional Security Act	2005	Implement policy measures reducing abject poverty and strengthening food and nutritional security at the country level.
Signature of the Framework Agreement on Tobacco Control	November 2003, ratified in November of 2005	Protect present and future generations from the harmful effects of tobacco. First international public health treaty with the unanimous backing of 192 countries.
Patent and Trademark Act	2000, as subsequently amended	Protect intellectual creativity with business and industrial applications. Addresses the definition of a "new product" and upholds the five-year protection period for clinical trial data.
Implementing Regulations for the Transfusion Medicine Services and Blood Banks Act	2003	Facilitate the establishment of a Blood Bank Program, which later became the Transfusion Medicine and Blood Bank Program under Ministerial Order AM955-2006.
Ministerial Order Renewing the Primary Health Care Commitment	2004	Renew the commitment to achieve health for all by strengthening primary health care services under the Peace Accords.
Law for the Prevention, Punishment, and Eradication of Domestic Violence and Violence against Women	1996	Govern the implementation of necessary measures to protect the life, physical safety, security, and dignity of victims of domestic violence. Afford special protections for women, children, youths, the elderly, and the disabled, in keeping with their specific circumstances. The implementation of these protective measures is independent of specific penalties established under the Penal Code and Code of Criminal Procedure for felonies or misdemeanors.
HIV/AIDS Act	December 2000	Establish a legal framework for the implementation of necessary mechanisms for HIV/AIDS education, prevention, epidemiological surveillance, research, treatment, and follow-up and guarantee, promote, protect, and defend the human rights of persons with HIV and AIDS.

providers. Other stakeholders in the public health sector include the municipalities, the universities, the Ministries of Government and Defense, social funds, and the National Fund for Peace. The Guatemalan Social Security Institute (IGSS) serves members of the working population and their beneficiaries, retirees, and pension holders under Accident, Disability, Retirement, and Survivorship programs in 22 departments around the country and

Maternity and Common Disease programs in 19 departments (39). The private health sector consists of private diagnostic facilities, hospitals, and physicians' practices and clinics.

The Ministry of Public Health and Social Welfare serves approximately 70% of the population. The IGSS covers 18.4%, and the private sector serves a small segment of the population (approximately 12%).

The Ministry of Public Health and Social Welfare is broken down into 29 Health Area Offices. Health Area Offices and hospitals are in charge of budget implementation. Health care services are delivered through health provider networks with varying levels of sophistication and resolution capacity. The IGSS has a deconcentrated service network geared to its health programs.

There are private for-profit and nonprofit health care services. For-profit services are delivered through a hospital services network, 50% of which is concentrated in the department of Guatemala. The nonprofit sector consists of nongovernmental organizations.

According to estimates for 2004, women accounted for 18.3% of the IGSS insured population. There is very little private insurance coverage. Only comprehensive insurance providers offer health care services backed by a provider network. Certain physicians' groups and hospital centers have set up prepayment schemes (42).

As far as health care for the indigenous population is concerned, a number of nongovernmental organizations are providing community-based traditional and alternative health care services to the Mayan population. There is a popular, traditional, and alternative medicine program within the Health Ministry with treatment regimens based on the use of medicinal plants (43). The Ministry of Public Health and Social Welfare's Coverage Extension Program designed to provide health care coverage for people without access to other health care services is targeted at the 12 departments with the largest indigenous populations (4).

Public Health Services

Health service coverage has been expanded to deliver free health care to the country's most underprivileged population groups in the form of a package of 26 basic health services. The health care model is geared to the country's demographic features: multilingual, multiethnic, and pluricultural. In 2005, these services were offered in 184 municipios with 394 jurisdictions, each with approximately 10,000 residents, with indigenous peoples accounting for 60% of the population served. The basic geographic unit is a jurisdiction serviced by a basic health team consisting of physicians, a nurse, and community workers. Social Security offices in two departments (Escuintla and Suchitepéquez) have also implemented the coverage extension strategy expanding service coverage to the general population through health promotion, development, and preventive health programs.

The Ministry of Public Health and Social Welfare has programs for maternal and child health, communicable diseases, noncommunicable diseases, social problems (violence and addiction), and food security and nutrition in all health care facilities, according to their level of sophistication. Social security programs include disease-prevention activities relating to reproductive health, accidents, and common diseases, as well as counseling and educational activities for different groups of patients.

The Epidemiology Department attached to the Ministry of Public Health and Social Welfare has a nationwide network of epidemiologists based in hospitals and health areas (44). It also has laboratories at the secondary health care level in charge of performing basic clinical laboratory procedures. Tertiary level care is bolstered by chemical, hematological, and bacteriological technology. Epidemiological surveillance activities are backed by the National Reference Laboratory, whose duties include performing specialized diagnostic tests, setting standards, monitoring, and supervision.

According to information on access to a clean water supply and sanitation services, Guatemalan households have water service only 16.7 hours a day (only 13.1 hours a day in the Metropolitan region). As of 2002, 92.4% of Guatemalan households had a drinking water supply less than 15 minutes from their home (on foot), compared with 91.9% in 1995 (4). National Census data from 2002 (45) showed 75% of the population with access to an improved water supply (60% of the rural population and 90% of the urban population) and 47% with access to improved sanitation services (77% in urban areas and 47% in rural areas). Levels of bacteriological and physical/chemical pollution affecting raw water quality in most surface water sources are unacceptable. Groundwater resources and headwaters protected by local communities are of better quality. There is no oversight or regulatory agency for water supply and sanitation services. Each municipality is responsible for regulating and setting rates for these services under the provisions of the Municipal Code. Water supply and sanitation services are operated by both public and private service providers.

Solid waste management services are decentralized, with each municipality responsible for providing refuse collection service. Municipal or private solid waste collection services are used by 58.3% of urban households and 4.5% of rural households (1). The Ministry of Public Health and Social Welfare approved and issued Hospital Solid Waste Management Regulations in 2003.

Central America agreed to restrictions and bans on a list of 12 pesticides headed by Paraquat in the year 2000.

Food safety and control measures include regulations and standards compliance monitoring through a company registration system and national staff of technicians conducting inspections of major food manufacturers.

The National Food and Nutritional Security Council (CONASAN) headed up by the Vice President of Guatemala includes representatives of government agencies, the business sector, civil society, and the Food and Nutritional Security Program (PROSAN). It is a technical regulatory body responsible for implementing health measures designed to strengthen food and nutritional security in the public interest. The government has been pushing forward with a National Program for Combating Chronic Malnutrition targeted at pregnant and breast-feeding women and children under 3 years of age since 2005.

The National Disaster Relief Coordination Center (CONRED) is the agency in charge of coordinating, planning, setting up, and mounting all activities designed to mitigate the effects of natural, socionatural, or anthropogenic disasters and avoid new threats through disaster prevention, mitigation, and response efforts.

Individual Care Services

The Ministry of Public Health and Social Welfare delivers health care through a service network. The IGSS and the Ministries of Defense and of Governance also provide health care services. The Health Ministry has 1,301 health facilities around the country, and the IGSS has another 97 facilities (39, 46). The Ministry of Health also operates 1,244 hubs, 926 health posts, and 300 core units at the primary health care level. There are three integrated maternal and child health care centers (CAIMI), 32 type A health centers, 249 type B centers, 16 canton-level maternity centers, 3 satellite clinics, and 32 comprehensive care centers at the secondary level. The tertiary level consists of 43 hospitals, including 2 national referral hospitals and 7 specialty, 8 regional, 16 departmental, 5 district, and 5 contingency hospitals. In sum, there are 6,030 hospital beds in Health Ministry hospitals.

The IGSS has 145 health facilities, including 23 hospitals, 30 outpatient clinics, 59 comprehensive health care units, and another 33 health posts, polyclinics, satellite clinics, and comprehensive health care centers, with 50% of its services concentrated in 6 departments (39).

The country has clinical, reference, anatomical pathology, and imaging laboratories and blood banks based mainly in secondary and tertiary level facilities run by the Ministry of Public Health and Social Welfare, IGSS hospitals, and a private health care providers network duly accredited by the Health Ministry. The National Health Laboratory consists of the Unified Food and Drug Control Laboratories and Central Reference Laboratory. The National Transfusion Medicine and Blood Banks Program has legal backing for the framing of national policies aimed at ensuring a safe national blood supply.

The Mental Health Program has stepped up the deconcentration of services previously based at the National Mental Health Hospital and has been working to incorporate a mental health component as part of the integrated health care system (SIAS), with the emphasis on an integrated approach to the treatment of victims of the armed conflict and on services aimed at reducing levels of public psychosocial vulnerability during natural disasters.

Health Promotion

Health promotion strategies have been implemented at the municipal level since the year 2000 as part of so-called “municipios for development” initiatives, in keeping with ongoing social reforms. A total of 41 municipal health commissions have been formed and charged with implementing healthy schools and

adolescent-friendly health services strategies. The Health and Education Ministries crafted a joint healthy schools plan in 2004, establishing guidelines for the integration of multisectoral projects and programs (47). Four universities in Guatemala City are implementing the tobacco smoke-free environments strategy.

Health Supplies

There are 77 private, domestically funded laboratories and three multinational enterprises in Guatemala, 15 of which are the source for 60% of all government procurements, with all remaining supplies purchased from importers of generic and brand name products, mainly from the United States, Mexico, the European Union, Colombia, and Argentina (48). The Ministry of Health is in charge of drug monitoring and quality control activities, issuing marketing permits, licensing pharmaceutical firms, monitoring good manufacturing practices, and performing physical/chemical and/or microbiological analyses at the National Health Laboratory. According to the 2005 inspection report, 81% of laboratories meet established standards for good manufacturing practices.

All immunobiologicals are imported from drug companies licensed to supply drugs to the private market.

Clinical diagnostic reagents are procured in accordance with the provisions of the Government Contracting Act, which are marketed by duly licensed firms.

Most equipment is imported, and health equipment is subject to registration with the Registration and Inspection Department for Drugs and Related Products.

Human Resources

As of the end of 2005, the country had a total of 12,273 licensed physicians (49), of whom 71% were male and 29% female. There has been a gradual increase in the share of female physicians over the last 10 years. Of the country's 2,346 dentists, 60.5% were male and 39.5% female (50). There are no data for nursing personnel but, according to estimates based on information from the country's main national service delivery agencies (the Ministry of Public Health and Social Welfare and the IGSS), there are four physicians and six nursing aides for each professional nurse. The population-to-physician ratio was 9.7 per 10,000 in 2005, ranging from a high of 30.8 per 10,000 in urban areas to less than 2 per 100,000 in rural areas. Figures for dentists are similar, with a ratio of 1.9 per 10,000 population, ranging from a high of 6.6 per 10,000 in the department of Guatemala to less than 1 in 18 of the other 21 departments.

Training programs for health professionals are university based. Five of the country's 11 universities train physicians and surgeons in four programs offered in the capital and two in the interior. The health sector added 188 Cuban-trained Guatemalan physicians to its ranks in 2006. The only training programs in

dentistry are at the national university and two private universities in the capital. There are training programs for nursing personnel at three different academic levels turning out degreed nurses (with a *“licenciatura”* or bachelor’s degree), university technicians, or professional nurses and nursing aides. There are six national schools for nursing aides as well as private schools accredited by the Ministry of Health, including the IGSS. Two universities offer master’s degree programs in different public health specialties. There are technician training programs in different areas offered by schools operating under the aegis of the Ministry of Health and by private establishments. A total of 44 radiology technicians, 23 clinical laboratory technicians, 13 respiratory therapy technicians, 6 cytology technicians, and 49 rural health technicians were licensed in 2005. There are four university training programs for nutritionists, as well as a MANA (Master’s in Diet and Nutrition) program.

There are Continuing Education Committees in each health area with decentralized functions at different stages of development. In 2006, the IGSS mounted an effort to strengthen and solidify continuing education approaches for its own manpower training activities.

The two agencies with the most personnel are the Ministry of Public Health and Social Welfare and the IGSS. The Health Ministry has 21,592 employees in all categories, of which 85% are budgeted personnel. There are a total of 38,801 individuals involved in the delivery of community-based health care services, including 367 traveling physicians, 37 nursing aides, 461 institutional facilitators, 3,920 community facilitators, 24,248 volunteers, 261 educators, and 9,874 traditional birth attendants. The Social Security Institute has 12,333 employees, of which 88% are full-time budgeted personnel. The other 12% are short-term, temporary staff.

Research and Technological Development in Health

The Technical Secretariat (SENACYT) of the National Science and Technology Council (CONCYT) is the agency in charge of research in Guatemala and the umbrella organization for all agencies and organizations performing research.

There is no national information system on scientific output in Guatemala. According to the CONCYT, since 1996, health project funding has lagged behind other areas (agriculture and technology).

In 2005, the government kicked off its 10-year National Science and Technology Plan for 2005–2014 designed to improve scientific research conditions, refurbish laboratories around the country, and improve competitiveness, to be implemented through the National Science and Technology Council.

There is limited access to scientific literature in Guatemala. Professionals, scientists, and students use technical library resources. Though many users read and understand English, scientific publications in that language are not readily available. There

are very few specialized scientific publications in university libraries due to budget problems. In the last five years, PAHO/WHO has been working with various public and private agencies and organizations to expand the Virtual Health Library.

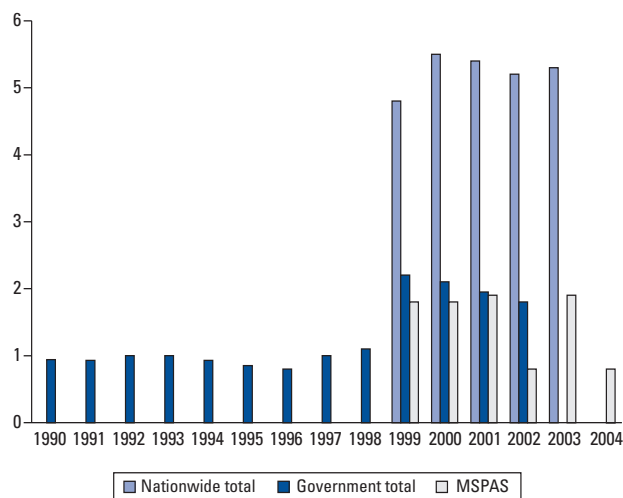
Health Sector Expenditures and Financing

Public health spending for 1999–2003 came to US\$ 2.2 million, accounting for 40% of total spending on health. A breakdown of total public expenditures shows 46.4% made by the government and 53.6% by the Social Security Institute. Total health care spending as a percentage of GDP for the period 1999–2003 (Figure 5) ranged from 4.7% to 5.5%, trending downwards (51). The pattern of Health Ministry funding for different levels of care has changed. The new trend is to bring spending for primary and secondary level health care in line with expenditures at the tertiary level (Figure 6).

Aggregate spending on drugs for the period 2000–2004 came to approximately US\$ 1.464 billion, with 38% of this figure coming from the public health sector and 62% from the private sector (39). There has been no change in the pattern of health spending in the last five years, with most outlays in the Metropolitan region, where there is significantly less poverty and a larger percentage of the population is covered by social security.

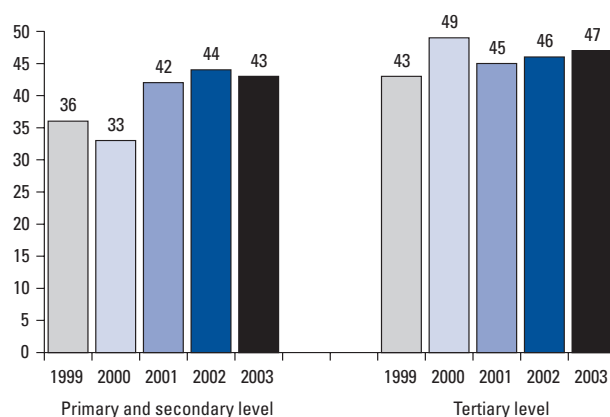
Private financing agents include households with out-of-pocket costs, private insurers, and nonprofit organizations serving households (nongovernmental organizations). Spending channeled through these agents for the period 1999–2003 came to US\$ 3.413 billion, with households accounting for 90% of all

FIGURE 5. Total health spending as a share of GDP, Guatemala, 1990–2004.



Source: Guatemala, Cuentas Nacionales de Salud, 1990–1995. Programa de las Naciones Unidas para el Desarrollo. Informe nacional de desarrollo humano, Guatemala, 1999–2003.

FIGURE 6. Allocation of Ministry of Public Health and Social Welfare resources by level of health care, Guatemala, 1999–2003.



Source: Guatemala, Ministerio de Salud y Asistencia Social.

such spending, followed by nongovernmental organizations, with a 5.7% share, and private insurers, with a 4.3% share. The largest expenditures are in the form of out-of-pocket spending, most of which (72.7%) goes for drugs, tests, and doctors' visits, according to the national living standards survey (ENCOVI).

There are four sources of health financing: households (contributing 65.2%), government (19%), business (10.5%), and international cooperation (2.9%). According to different sources, health financing grew by an average of 10.7% a year between 1999 and 2003. Funds flow in 2003 was 65% greater than in 1999 (51).

Public health financing grew by 4.7% a year in absolute terms. The share of private financing went from 70.5% to 76.7% between 1999 and 2003, with household or out-of-pocket spending accounting for 86% of this figure. External financing brought in US\$ 1.2 million over the period 1999–2003, of which 37% was allocated to the social sector and 17.4% to the health sector (US\$ 446.1 million and US\$ 209.8 million, respectively), according to the Planning and Programming Department attached to the Office of the President (SEGEPLAN).

Technical Cooperation and External Financing

Technical and financial cooperation resources for health came to US\$ 2.3 million for the last five-year period, of which 37% was in the form of nonreimbursable cooperation resources. Bilateral as well as multilateral cooperation in the health sector has been trending downward, with multilateral bank lending on the rise. Together, various countries and humanitarian organizations furnished a total of US\$ 34 million in direct technical and financial assistance in 2005 in response to the emergency created by Hurricane Stan, affecting 45% of the country, of which US\$ 12.550

million was contributed by Japan, the Republic of China (Taiwan), the Central American Bank for Economic Integration (CABEI), and the Organization of American States (OAS), to be administered directly by the government, and US\$ 21.074 million was contributed by various cooperation agencies, to be administered by different U.N. agencies, funds, and programs.

References

1. Guatemala, Universidad de San Carlos, Centro de Estudios Urbanos y Rurales. Mapa de división político-administrativa. Available at: <http://www.usac.edu.gt/~usacceur/mapas.htm>. Accessed July 2006.
2. Guatemala, Instituto Nacional de Estadística, Programa de Mejoramiento de las Encuestas de Condiciones de Vida. Encuesta Nacional de Condiciones de Vida 2000. Perfil de la Pobreza en Guatemala. Ciudad de Guatemala; 2002.
3. Programa de las Naciones Unidas para el Desarrollo. Diversidad étnico-cultural y desarrollo humano: la ciudadanía en un Estado plural. Informe Nacional de Desarrollo Humano: Guatemala 2005. Ciudad de Guatemala; 2005. (Documento oficial P964).
4. Guatemala, Ministerio de Salud y Asistencia Social; Instituto Nacional de Estadística. Encuesta Nacional de Salud Materno Infantil 2002: Mujeres. Ciudad de Guatemala; 2003.
5. Guatemala, Instituto Nacional de Estadística, Programa de Mejoramiento de las Encuestas de Condiciones de Vida. Encuesta Nacional de Empleo e Ingresos 2002. Ciudad de Guatemala; 2002.
6. Banco de Guatemala. Algunas variables macroeconómicas años 1950–2004. Available at: <http://www.banguat.gob.gt/inc/ver.asp?id=/indicadores/hist03&e=13980>. Accessed July 2006.
7. Guatemala, Ministerio de Finanzas Públicas. Estructura: análisis y estudios económicos y fiscales, 1997–2004. Available at: <http://www.minfin.gob.gt/>. Accessed July 2006.
8. Guatemala, Ministerio de Educación. La educación en Guatemala 2004: el desarrollo de educación en el siglo XXI. Informe nacional. Ciudad de Guatemala; 2004. Available at: <http://www.ibe.unesco.org/international/ICE47/English/Natreps/reports/guatemala.pdf>. Accessed July 2006.
9. Guatemala, Instituto Nacional de Estadística. Proyecciones de Población. Censo 2002. Ciudad de Guatemala; 2004.
10. Guatemala, Instituto Nacional de Estadística. Defunciones de porcentajes por causas definidas y tasas estimadas por 100.000 habitantes para las diez principales causas de defunción por país, por grandes grupos de edades y sexo: Período 2001–2003. Ciudad de Guatemala; 2004.
11. Guatemala, Ministerio de Salud Pública y Asistencia Social, Departamento de Epidemiología, Vigilancia y Control Epidemiológico. Memoria Anual de Vigilancia Epidemiológica.

- Indicadores Básicos de Análisis de Situación de Salud. Ciudad de Guatemala; 2003.
12. Organización Panamericana de Salud. Análisis de la mortalidad infantil de la mortalidad materna por regiones de Guatemala según resultados de las encuestas de mortalidad infantil y materna. Ciudad de Guatemala; 2006.
 13. Guatemala, Secretaría de Planificación y Programación de la Presidencia; Naciones Unidas. Efectos en Guatemala de las lluvias torrenciales y la tormenta tropical Stan 2005. Ciudad de Guatemala; 2006.
 14. González Izas M. La explotación sexual comercial de niñas, niños y adolescentes en Guatemala: ¿Un problema nuestro? Guatemala: UNICEF; 2006.
 15. Guatemala, Ministerio de Salud Pública y Asistencia Social. Informe final: línea basal de mortalidad materna para el año 2000. Ciudad de Guatemala; 2003.
 16. Guatemala, Ministerio de Salud Pública y Asistencia Social. Lineamientos Nacionales para la Prevención y Control del Cáncer del Cuello Uterino. Ciudad de Guatemala; 2003.
 17. Guatemala, Instituto Nacional de Estadística. Estadísticas vitales: divorcios por año de ocurrencia, según departamento de ocurrencia del divorcio. Período 1995–2004. Ciudad de Guatemala; 2005.
 18. Guatemala, Instituto Nacional de Estadística. Estadísticas vitales: matrimonios por año de ocurrencia según departamento donde se efectuó el matrimonio. Período 1995–2004. Ciudad de Guatemala; 2005.
 19. Organización Panamericana de la Salud. Perfil de la situación ambiental de las niñas de Guatemala, 2003. Available at: <http://www.ops.org.gt/ADS/PERFIL%20DE%20SITUACION%20AMBIENTAL%20NI%C3%91EZ-GUATEMALA%20Versi%C3%B3n%203%20ab%202003.pdf>. Accessed July 2006.
 20. Guatemala, Instituto Nacional de Estadística. Encuesta Nacional de Discapacidad 2005. Versión Interactiva. Ciudad de Guatemala; 2005.
 21. Guatemala, Ministerio de Salud Pública y Asistencia Social, Departamento de Epidemiología, Vigilancia y Control Epidemiológico. Memoria Anual de Vigilancia Epidemiológica. Indicadores Básicos de Análisis de Situación de Salud. Ciudad de Guatemala; 2004.
 22. Guatemala, Ministerio de Salud Pública y Asistencia Social, Programas de Enfermedades Transmitidas por Vectores. Informe de la situación de malaria 2002. Ciudad de Guatemala; 2003.
 23. Organización Panamericana de la Salud. Situación de malaria: datos generales de área y población 2005. Ciudad de Guatemala; 2006.
 24. Guatemala, Ministerio de Salud Pública y Asistencia Social, Departamento de Epidemiología, Vigilancia y Control Epidemiológico. Memoria Anual de Vigilancia Epidemiológica. Indicadores Básicos de Análisis de Situación de Salud. Ciudad de Guatemala; 2005.
 25. JICA/PAHO. (Japan International Cooperation Agency). Basic entomological and epidemiological information on Chagas disease control in Central America. 2006.
 26. Programa para la Eliminación de la Oncocercosis en las Américas. XIII Conferencia Interamericana sobre Oncocercosis 2003. Sesión 1: Cómo van nuestras coberturas de tratamiento. Guatemala; Ciudad de Guatemala; 2004.
 27. Organización Panamericana de la Salud. Análisis Situacional de la Tuberculosis en Guatemala, 2000–2005. Ciudad de Guatemala; 2006.
 28. Guatemala, Ministerio de Salud Pública y Asistencia Social, Programa Nacional Prevención y Control del VIH/SIDA. Análisis situacional del VIH/SIDA 2005. Ciudad de Guatemala; 2006.
 29. Guatemala, Ministerio de Agricultura, Ganadería y Alimentación, Departamento de Vigilancia Epidemiológica Zoonositaria. Informe sobre programas, acciones, observaciones, y número de casos de enfermedades de 2005. Ciudad de Guatemala; 2006.
 30. Guatemala, Ministerio de Salud Pública y Asistencia Social. Encuesta Nacional de Micronutrientes. Informe Ejecutivo, 1995. Ciudad de Guatemala, 1996.
 31. Guatemala, Ministerio de Educación. Censo Nacional de Talla en Escolares de Primer Grado, 2002. Ciudad de Guatemala; 2003.
 32. Guatemala, Instituto de Cancerología; Liga Nacional Contra el Cáncer. Informe de los casos de cáncer registrados en el Instituto de Cancerología durante el año 2003, por el registro de cáncer de Guatemala. Ciudad de Guatemala; 2005.
 33. Guatemala, Coordinadora Nacional para la Reducción de Desastres. Boletines informativos de inundaciones en Guatemala. Available at: http://www.conred.org/boletines/boletines_antiguos.php. Accessed July 2006.
 34. Guatemala, Instituto Nacional de Estadística. Hechos Delictivos, 2003. Cuadro 3: Total de homicidios cometidos, por tipo de arma utilizada o causa de muerte según departamento. Ciudad de Guatemala; 2005.
 35. Chile, Amnistía Internacional. Informe de crímenes contra mujeres en Guatemala. Santiago de Chile; 2005. Available at: <http://web.amnesty.org/report2006/>. Accessed July 2006.
 36. Guatemala, Secretaría Ejecutiva Comisión contra las Adicciones y Tráfico Ilícito de Drogas; Embajada de los Estados Unidos de América en Guatemala, Sección de Asuntos Narcóticos. Estudio nacional sobre la desregulación psicológica y su relación con el consumo de drogas en jóvenes adolescentes guatemaltecos: principales hallazgos. Ciudad de Guatemala; 2003.
 37. Guatemala, Plaguicidas en el Istmo Centroamericano. Vigilancia sanitaria de plaguicidas: experiencia de plaguicida en Centroamérica. 2003. Ciudad de Guatemala; 2004.

38. Guatemala, Ministerio de Salud Pública y Asistencia Social. Lineamientos estratégicos de la Agenda Nacional de Salud. Documento preliminar. Ciudad de Guatemala; 2006.
39. Guatemala, Instituto Guatemalteco de Seguro Social. Informe Anual de Labores 2004. Available at: <http://www.igssgt.org/downloads/Informe%20de%20Labores%202004%20-%20IMPROBADO.pdf>. Accessed July 2006.
40. Guatemala, Ministerio de Salud Pública y Asistencia Social, Unidad de Provisión de Servicios de Salud. Aplicación Censo Neto 2005.
41. Guatemala, Congreso de la República de Guatemala. [Various laws]. Available at: <http://www.congreso.gob.gt/>. Accessed July 2006.
42. Guatemala, Ministerio de Salud Pública y Asistencia Social, Dirección General del Sistema Integral de Atención en Salud. Protección Social en Salud: Guatemala. Informe Final 2002. Available at: <http://www.lachealthsys.org/documents/extension/infoguatemala.pdf>. Accessed July 2006.
43. Guatemala, Ministerio de Salud Pública y Asistencia Social, Programa de Medicina Popular Tradicional y Alternativa.
44. Guatemala, Congreso de la República; Ministerio de Salud Pública y Asistencia Social. Acuerdo Ministerial SP-M-946-2006. Available at: http://www.congreso.gob.gt/gt/mostrar_acuerdo.asp?id=16419. Accessed July 2006.
45. Guatemala, Instituto Nacional de Estadísticas. XI Censo Nacional de Población; VI Censo Nacional de Habitación. Ciudad de Guatemala; 2002.
46. Organización Panamericana de la Salud, División de Desarrollo de Sistemas de Servicios de Salud. Perfil del Sistema de Servicios de Salud en Guatemala. Available at: <http://www.lachsr.org/documents/perfildelsistemadesaluddeguatemala-ES.pdf>. Accessed July 2006.
47. Guatemala, Ministerio de Salud Pública y Asistencia Social; Ministerio de Educación. Plan Nacional de Escuelas Saludables de Guatemala, 2004. Ciudad de Guatemala; 2005.
48. Guatemala, Ministerio de Salud Pública y Asistencia Social, Departamento de Regulación y Control de Productos Farmacéuticos y Afines. Informe Anual de 2006. Ciudad de Guatemala; 2006.
49. Guatemala, Registro de Colegio de Médicos y Cirujanos de Guatemala 2006. Available at: www.colmedguatemala.org/noticias/item?item_id=18752. Accessed July 2006.
50. Guatemala, Registro de Colegio Estomatológico de Guatemala 2006. Available at: <http://www.cio.com.gt/colestgua.htm>. Accessed July 2006.
51. Guatemala, Ministerio de Salud Pública y Asistencia Social. Situación de la salud y sufrimiento. Tercer informe. Período 1999–2003. Ciudad de Guatemala; 2004.