INTRODUCTION

The Republic of Suriname, which gained its independence from the Netherlands in 1975, covers an area of 163,820 km\(^2\) along South America’s northeast coast. It is bordered by Guyana to the west, the French Department of French Guiana to the east, and Brazil to the south. Most of the population lives in the narrow coastal plain to the country’s north. Suriname’s interior is mainly tropical rainforest, occupying some 80% of the country’s territory; a savanna belt extends along the border with Brazil in the south.

Suriname is governed as a constitutional democracy based on its 1987 constitution. The legislative branch of government consists of a National Assembly, elected for a five-year term, which, in turn, elects the president, who heads the executive branch.

The country is divided into 10 administrative districts. There are two districts in the interior, and
The coastal area is divided into six rural districts and the two urban districts of Paramaribo (the capital city) and Wanica. The urban districts occupy 0.5% of the country’s territory and are home to 70% of the population.

The official language is Dutch, but some 15 other languages are spoken in the country. Suriname is a very diverse society that comprises more than eight different ethnic groups (1). The distribution of these ethnic groups as reported in the 2004 census is as follows: Hindustani (East Indian descent), 27.4%; Creole (mix of black and white races), 17.7%; Maroon (descendants of escaped African slaves), 14.7%; Javanese (Indonesian descent), 14.6%; mixed race, 12.5%; indigenous Amerindian, 3.7%; Chinese descent, 1.8%; white, 0.8%; “other,” 0.5%; and unknown, 6.6% (2).

The Suriname General Statistics Bureau estimated that the country’s population numbered 524,143 in mid-2009, with nearly equal distribution of males (50.5%) and females (49.5%). During the same year, the birth rate per 1,000 women aged 15–44 years was 80.68 and the death rate was 6.3 (2) resulting in an annual population growth rate of 1.3% (3). Figure 1 shows Suriname’s population structure, by age and sex, for 1990 and 2010.

In 2010, the Human Development Index (HDI) ranked Suriname 94 out of 182 countries (4), and in 2010, the World Bank classified Suriname as an upper-middle-income country (5).

The HDI has continually increased since 2005 (6), which may correspond to the gains in gross domestic product (GDP) during the same period. Between 2006 and 2009, the GDP per capita (in current US$) rose from 4,223 to 6,254, respectively (7). The impact of the global financial crisis on the country is unknown since as of 2011, the figures were not yet calculated.

The economy’s main drivers in 2009 were industry, mining, and trade. A large informal sector contributes to economic activity, most notably that of non-industrial gold mining in the interior. The International Monetary Fund (IMF) reported that Suriname’s external debt increased from 18% of GDP in 2008 to approximately 21.5% of GDP in 2010. The per capita income excluding the informal sector has increased from SRD 9,000 in 2006 to SRD 14,000 in 2009 (3). The exchange rate in 2010 was SR$ 2.75 = US$ 1.00.

**HEALTH DETERMINANTS AND INEQUALITIES**

Between 2004 and 2009, Suriname’s life expectancy at birth increased from 67.4 years to 68.7 years for men and from 72.8 years to 73.7 years for women (8). Inequities and inequalities regarding determinants of health and quality of life persist in the country, however.

When considering the country’s poverty from a human development perspective, essential preconditions...
for health are unequally distributed from region to region. Information available for the urban districts reveals, for example, that 59% of households in Paramaribo and Wanica were living below the poverty line in 2003 (9). Suriname has no official poverty line; poverty levels are estimated through income and consumption using a basic food package (BFP) based on nutritional requirements. As such, a person, family, or household is considered poor when they cannot provide for basic needs, with nutritional requirements being paramount. Among the most severely disadvantaged groups are children of Maroon descent who have migrated from the interior to urban districts (10).

Nationally, unemployment rates decreased from 12% in 2006 to 9% in 2009 (3), but a disproportionately high unemployment rate (16.7%) exists in the rural interior compared to the 8.4% rate in urban areas (1).

National averages mask social and health inequities across ethnicities, and the lack of disaggregated data makes it difficult to properly analyze these groups. The Maroon (15% of the population) and indigenous Amerindian groups (3.7% of the population) are the predominant ethnic groups residing in the two rural interior districts of Brokopondo and Sipaliwini, which has 12% of the population. It is widely accepted that the population of the interior bears a disproportional burden of poverty and associated risks compared to the population of the urban coastal areas (11).

Education in Suriname is compulsory for all children between 7 and 12 years old. Pre-primary education (for 3–5-year-olds) is strongly related to residence and household income. A 2006 study showed that preschool enrollment was 49.4% in urban communities, 29.5% in rural coastal areas, and 7.3% in the rural interior. Preschool attendance was 63.1% for children living in high-income households, compared to 17.4% in poor households (12).

In 2008, 92% of children 6 years of age attended the first grade of primary school. In the urban and rural coastal areas, 4% of children enrolled in primary school did not attend classes, and in the rural interior areas this figure exceeded 14% (20% of whom were girls, and 15% were boys). National primary school completion rates were 39.1% for boys and 53% for girls in 2008 (12). There are striking differences between the coastal and rural interior of Suriname in terms of access to school and quality of teaching. In the rural interior, 30% of primary school teachers are not qualified to teach; the proportion of teachers in the interior who have not completed primary school themselves ranges from 5% to as much as 91% in some communities (12).

Countrywide, 49% of all children in the 12–17-year-old age group were enrolled in secondary school in 2008–2009, but there were disparities by gender (44% of boys and 54% of girls enrolled) and residence (as low as 3% secondary school enrollment in Sipaliwini in the rural interior) (12). In 2008, the overall literacy rate for 15–24-year-olds was 93%, with little difference between sexes (5). The 2006 literacy rates for women (15–24 years old), disaggregated by urban, rural coastal, and rural interior, were 96.2%, 94.2%, and 45.0%, respectively (13). There were 4,478 persons (1,677 men and 2,801 women) enrolled in tertiary education during the 2006–2007 school year. This number increased to 7,160 (2,442 men and 4,718 women) during the 2009–2010 school year.

Gender inequalities exist throughout various aspects of society. Because data are not consistently disaggregated by sex to allow for gender analysis, the nation’s policies and programs do not systematically include a gender equality perspective in their development, implementation, or evaluation. Gender inequalities are documented in various health outcomes, such as life expectancy, prevalence of communicable and noncommunicable diseases, sexual and reproductive health, and gender-based violence. Lack of employment, basic services, and infrastructure in the interior have contributed to rural–urban migration, in particular among men. This has disrupted traditional family structures, led to a rapid worsening of poverty, and increased the exposure of women to domestic violence, HIV/AIDS, and sexually transmitted diseases (12).

In 2010, the net migration rate was –0.26 per 1,000 population, reflecting an excessive outmigration. The international borders that pass through the country’s rainforest do not have reliable controls, and there are unofficial reports of considerable
undocumented immigration from neighboring countries, particularly from Brazil. The outmigration of skilled professionals affects several sectors of the society, particularly health and education, and has resulted in a shortage of human resources and pressure on the provision of public services. Internal migration rates have remained fairly stable but circular migration continued to persist between urban and rural interior areas, particularly related to mining.

THE ENVIRONMENT AND HUMAN SECURITY

Access to Clean Water and Sanitation

In 2010, 93% of the population in Suriname had access to improved drinking water sources: 97.1% in urban areas, 97.9% in rural coastal areas, and 44.8% in the rural interior. Some 84% of the population had access to improved sanitation facilities, ranging from 90% in urban and coastal areas to 33% in the rural interior (14). In parts of the interior where intensive gold mining and associated uncontrolled mercury use occurs, water quality is compromised by the disposal of untreated mining sludge into the river systems.

Solid Waste

Due to the limited capacity of waste management services in Paramaribo and Wanica districts, only 70% of the estimated 70,000 tons of solid waste generated annually is collected, and no waste separation is ensured. In other districts less than 30% of the waste is collected and it is disposed of in open dump sites (15). Illegal dumping and open burning of household waste remain a persistent health hazard.

The Work Environment and Workers’ Health

During 2009, 18 deaths were attributed to occupational accidents, resulting in 1% of reported deaths (2). Very few occupational or work-related diseases are diagnosed or reported, so the true nature and magnitude of the problem is unclear. With relation to the agricultural sector, the import of pesticides per capita remains very high (16) and while imports of pesticides are regulated, there is very little control over their use. In the mining sector, especially small-scale gold mining, there is concern about the direct occupational and indirect environmental health impacts of mercury exposure. A decrease in the imported quantities of insecticides was observed between 2005 and 2007, from 180,611 tons to 137,553, respectively (16). Atmospheric mercury is considered to be a potential health and occupational hazard in the country; mercury is produced as a by-product of processing from small and medium-sized gold mining and burning of fossil fuels. Preliminary results from a number of tests indicate that levels of mercury in the air are higher than the levels deemed safe by the United Nations Environmental Program (17, 18). More testing is planned for the future.

Climate Change

Concerns about the impact of climate change on the country rest primarily with the vulnerability of the low-lying coastal region and changing rainfall patterns, both of which stand to affect the environment and the health of the population (19), especially considering that approximately 80% of the population lives in the coastal area. In May 2006, there was serious flooding in the country’s interior, with as much as 30,000 square kilometers under water at one point, including some 157 thatched-roof villages. Thousands were forced to abandon their homes and their livelihoods. The damage from the flooding was estimated as slightly over US$ 41 million. The lack of adequate urban planning in the face of the region’s vulnerability to flooding has also been identified as an issue of concern (20). Suriname is an active participant in international climate change initiatives and in 1997 ratified the Vienna Convention on the Protection of the Ozone Layer, the Montreal Protocol on Substances that Deplete the Ozone Layer, the United Nations Convention on Climate
Change, the Kyoto Protocol, and the United Nations Convention to Combat Desertification.

**Food and Nutritional Security**

The devaluation of the local currency by 20% in January 2011 resulted in increases in general price levels of 13.7%. Prices for both local and imported food have increased by approximately 17%. Inflation and the impact of global food shortages and climate change affect the ability of households to purchase food, increasing the population’s vulnerability to food and nutritional insecurity. This is particularly true of populations in the interior that are increasingly exposed to flooding, which destroys cropland and disrupts access to markets (21, 22).

**Food Safety**

The Bureau of Public Health and the Ministry of Agriculture, Animal Husbandry, and Fisheries train food handlers, regularly inspect food establishments, and provide training in the safe use of pesticides in order to strengthen food safety. Critical factors affecting food safety are low education levels and a decrease in risk management activities and capacities (23).

**Health Conditions and Trends**

**Health Problems of Specific Population Groups**

**Maternal and Reproductive Health**

Between 2000 and 2009 the maternal mortality ratio decreased from 153/100,000 live births to 122.5/100,000 live births (2, 24). The Millennium Development Goal (MDG) target for Suriname is 75/100,000 live births, as the baseline was determined from 226/100,000 live births for 1990 (25). The absolute number of maternal deaths is small, as the total number of live births does not exceed 10,000/year.

Data from 2006 indicated that the percentage of women using any method of contraception rises from 14.3% among those with no education, to 38.4% among women with primary education, and to 51.0% and 56.0% among women with secondary education and tertiary education, respectively (13). The total unmet need, which is highest among women with no education or only primary education, is 18.4% for the country but is 33.2% among women 15–49 years old living in the rural interior (12).

**Infants (up to 5 years old)**

Between 1995 and 2010 there was a downward trend in the number of cases of malnutrition and hospitalization in all age groups, but most notably in infants and young children (1–4 years old). In 2009, among children under 5 years, there were nine deaths that were classified as due to malnutrition and other nutritional deficiencies, for a crude death rate of 1.8 per 100,000. This rate has decreased from 3.2 in 2005. Obesity is increasing among children, with the highest percentages presented by those in coastal and urban areas. Data from 2006 showed that, in children under 5 years old, girls (3.3%) are more frequently overweight than boys (2.4%) (26). The infant mortality rate has remained stable with 20.2 deaths per 1,000 live births in 2000 and 20.3 in 2009. From 2000 to 2009 the main causes of death among infants aged 28 days to 1 year were congenital malformations and diseases originating in the perinatal period and infectious diseases (respiratory infections, sepsis, and gastrointestinal infections) (16, 26). In 2009, the mortality rate for children 1–5 years old was 23.3 per 1,000 live births.

**Children and Young Adults (10–24 years old)**

Among all deaths among children and young adults aged 10–24 years, the majority (68.8%) were caused by external causes followed by HIV/AIDS (9.7%). Teenage pregnancies accounted for 16.1% of all pregnancies for the period 2003–2007. The 2009 Suriname Global School Health Survey (GSHS) (27) of 1,698 students (13–15 years old) reports the main risk behaviors and related social determinants
including gender differences in behaviors. More boys self-reported that they were currently (30 days before the survey) smoking (12.5% vs. 8.6% for girls), drinking (35.6% vs. 30.0% for girls), and drinking excessively (21.0% vs. 9.0% for girls). More girls reported that they had tried smoking (80.9% vs. 76.3% for boys); the percentage who had tried alcohol was almost the same for girls (74.2%) and for boys (73.7%). According to the survey, boys showed a higher percentage of involvement in physical fights (30.4% vs. 12.3% for girls) and of sustaining unintentional injuries (37.1% vs. 23.6% for girls), while girls showed a higher rate of considering suicide (15.7% vs. 11.4% for boys) and actually attempting suicide (11.1% vs. 4.2% for boys).

The survey documents that 31.9% of boys in the 13–15 year age group reported engaging in sexual intercourse compared to 18.3% of girls, and 24.4% of the students reported they had already had sexual intercourse. In the latter group, 71.6% reported that they used a condom the last time they had intercourse (27).

**The Elderly (older than 60 years old)**

The proportion of the population over 60 years old is 8.8% in urban areas, 8.6% in rural coastal areas, and 7.7% in the rural interior (1). A focus group study conducted in 2004 (28) indicated the need to further explore the relationship between the provision of care and the health and well-being of the elderly population.

**Mortality**

During 2009, the leading causes of death attributed to communicable diseases were HIV/AIDS (3.5%), acute respiratory infections (2.9%), and sepsis (1.4%) (29). External causes (13.9%) and perinatal conditions (8.6%) were the second and fourth leading causes of death. Of the 3,035 registered deaths in Suriname in 2009, 60.5% were attributed to non-communicable diseases. Cardiovascular diseases were responsible for 26.9% of deaths, neoplasms for 11.6%, and diabetes for 5.7%.

In 2009, the cardiovascular mortality rate was 155.5 per 100,000 population (29). Urban populations registered higher death rates due to cardiovascular diseases (urban: 175.1 per 100,000; coastal: 186.1; interior: 84.4), and men had a higher cardiovascular mortality rate than women (164.4 per 100,000 and 146.5 per 100,000, respectively). Disaggregated by ethnic group, the highest cardiovascular mortality rates are among individuals of Creole (250.2 per 100,000), Hindustani (191.4), and Javanese descent (151.7). In 2009, the mortality rate from malignant neoplasms was 67.0 per 100,000 population; the most frequently recorded was neoplasm of the rectum (13.6%) followed by neoplasm of the lung (12.5%).

**Morbidity**

**Communicable Diseases**

**Vector-borne Diseases**

Dengue is concentrated mainly in the coastal areas and remains one of the most prominent vector-borne diseases in Suriname. Dramatic fluctuations in incidence over the years may be attributed to changing weather patterns and an increase in the area with favorable conditions for the *Aedes aegypti* mosquito. The number of confirmed cases of dengue hemorrhagic fever/dengue shock syndrome peaked during 2005 and 2009 with 84 causes and 113 cases, respectively (30). During 2009, there were 369 dengue-related hospitalizations and two deaths attributed to dengue (31).

Suriname has been successful in reducing transmission of malaria and the number of severe malaria cases and associated deaths through targeted strategies of distributing impregnated bednets, mobile case-finding, and treatment teams that spray houses (32). Suriname has achieved the malaria-related target of Millennium Development Goal 6. The coastal area is currently free of malaria but existing transmission is strongly related to mining activities in the rural interior, disproportionately affecting those associated with gold mining activities.
The National Malaria Board of Suriname was recognized in 2010 with the PAHO/WHO Malaria Champion in the Americas Award.

At present, there is a low incidence of Chagas’ disease reported. A 2005 pilot project to conduct universal screening for Chagas’ disease in donated blood yielded no positive results (500 samples). In 2011, a survey was again conducted to screen for Chagas’ disease in donated blood and 5 of 4,207 samples (0.12%) were found (34). Based on these results, the Ministry of Health plans to introduce 100% screening coverage for Chagas’ disease in blood donations.

Yellow fever has not been reported in Suriname for the past several decades. However, vaccination for yellow fever continues in the rural interior along the borders between French Guiana and Brazil (35).

**Vaccine-preventable Diseases**

Basic vaccinations for infants and children under 5 years old, schoolchildren, and pregnant women are routinely administered. Despite high public awareness on the benefits of vaccination, pockets of low vaccination coverage still exist, however, particularly in the rural interior and in some coastal communities. Coverage has increased gradually over the past years, reaching a national average in 2009 of 91.1% for the third dose of pentavalent vaccine (diphtheria, tetanus, whooping cough, hepatitis B, and *Haemophilus influenzae* type b vaccines) and live oral poliovirus (OPV), and 89.6% for measles, mumps, and rubella (MMR) vaccine. Seasonal influenza and influenza A(H1N1) vaccinations were added to the program in 2009 and 2010, respectively. Hepatitis B vaccination is provided to all health workers.

**Zoonoses**

For many years, the Ministry of Agriculture has reported zero cases of porcine fever, foot and mouth and anthrax. No cases of plague or human rabies were reported in the 2006–2010 period. In 2010, 291 patients were diagnosed with cutaneous leishmaniasis, 89% of whom were men (35, 36).

**Neglected Diseases and Other Infections Related to Poverty**

The reported incidence of neglected diseases remains very low in Suriname. In 2009, only 38 new cases of leprosy were detected (0.7 per 10,000) (35), meeting the target for elimination. Suriname is in the process of verifying the interruption of transmission of lymphatic filariasis (37). In 2009 and 2010, an overall prevalence of 8.7% for schistosomiasis and 2.1% for soil-transmitted helminths (STHs) was reported in a survey among children in sixth grade in 7 of 10 administrative districts. Schistosomiasis was found predominantly in the urban and coastal areas while STHs had the highest prevalence in Brokopondo, a district of the interior (38).

**HIV/AIDS and Other Sexually-transmitted Infections**

As of 2009, it was estimated that HIV prevalence was approximately 1.1% in the adult population (15–49-year age group). The crude HIV/AIDS death rate during 2009 was 20.2 (21.5 for men and 18.9 for women). In 2008, it was observed that more women than men were registered as HIV-positive. However, it is worth noting that women have higher rates of being tested as part of the strategy to prevent mother-to-child transmission of HIV. During the period of 2003–2008, the average HIV prevalence was 1.0% for women (36). The country has been successful in steadily increasing the antiretroviral treatment of HIV-positive pregnant women with antiretroviral medication (64.0% for 2006; 83.0% for 2008; 84.0% for 2009). Of the 601 HIV cases diagnosed in 2008, incidence was highest among individuals of Creole and Maroon descent—255 (42%) and 153 (25%) cases, respectively (36). In 2006, 130 persons died of HIV/AIDS and this decreased to 113 in 2008. Causes for the decrease were early diagnosis and the wider availability of antiretroviral drugs (ARV). In 2006, 45.0% of adults and children with advance HIV infection received ARV (39). Stigmatization of people living with HIV/AIDS is gaining more attention as a barrier to health as it influences the sustained compliance with and access to treatment.
The number of reported cases of genital ulcers, including syphilis and genital herpes, has varied from 122 cases in 2005, decreased to 90 cases in 2007, and increased to 148 cases in 2008. There was a decrease in reported cases of genital warts between 2006 (33 cases) and 2008 (3 cases) (36).

**Tuberculosis**

With the rise of the HIV epidemic, the number of tuberculosis cases increased from 82 (20 per 100,000 population) in 1990 to 125 in 2008 and to 177 cases (34 per 100,000) in 2009, with men tending to be overrepresented (40, 41).

**Emerging Diseases**

Although there is no cholera in the country at present, there is an increased risk due to frequent migration within the region with active cholera cases. The H1N1 pandemic had a relatively limited impact on Suriname, with 110 confirmed cases and 2 deaths related to H1N1 between April and December 2009 (42). As of 2010, the H1N1 vaccine remains available for all high-risk populations.

**Chronic, Noncommunicable Diseases**

**Cardiovascular Diseases**

Morbidity data for cardiovascular diseases correspond closely to mortality rates. In 2009, the percentage of deaths due to cardiovascular diseases was 26.9% (2, 29). Urban populations had higher death rates due to cardiovascular diseases (urban: 164.7; coastal: 175.0; and interior: 79.4). Higher cardiovascular rates were among Creole (250.2), Hindustani (191.4), and Javanese (151.7) populations, and men had a higher mortality rate than women (164.4 per 100,000 and 146.5 per 100,000, respectively).

The highest prevalence of myocardial infarction in ethnic groups is among Hindustani (60%), followed by Creoles (12%) and Javanese (12%). More men have experienced myocardial infarction (76%) than women (24%) (43).

**Malignant Neoplasms**

In 2009, mortality rates were higher in the coastal and urban areas compared to interior areas (80.4, 70.3, and 30.2, respectively), in Creoles (135.9) than Javanese (91.6) and Maroons (53.1), and in men (71.1) than women (62.7). However, cancers specific to women accounted for 20.3% of all cancer deaths, whereas cancers specific to men accounted for 9.4% of all cancer deaths (2).

**Diabetes**

Diabetes mortality rates remained comparable from 2007 (38.4 per 100,000 population) to 2009 (33.2) (29). Morbidity data indicate that diabetes and hypertension are the most common reasons for clinic visits. A study of 637 diabetes patients in 12 clinics reported earlier onset of diabetes for people of Hindustani descent (44 years), as compared to those of Creole descent (53 years) (44). Ethnic groups residing in urban areas have the highest rates of diabetes mortality (Hindustani, 58.5; Creole, 43.1; and Javanese, 28.8) (29).

Women are twice as likely as men to visit diabetes clinics (45), which may contribute to keeping their mortality and morbidity from the disease lower than those of men. During 2005–2008, men accounted for 60% of hospitalizations from diabetes-related amputations at the Academic Hospital in Paramaribo. Of all diabetes-related amputations between 2005 and 2008, 35% were in the 60–70 year age group and 30% in the 50–60-year age group; 50% of the patients were of Hindustani descent and 30% were of Creole descent. The majority of patients were from Paramaribo (40%) and Wanica (30%) (46).

**Chronic Respiratory Diseases**

The mortality rate due to chronic lower respiratory tract diseases is 6.9 per 100,000 (29). Although there are known factors that contribute to these types of diseases (e.g., air pollution, housing conditions, smoking, etc.), there are limited diagnostic capabilities that can establish links between exposure and disease incidence.
Hypertension

A 2006 study conducted by the Ministry of Social Affairs, Research and Planning (47) indicates that the main reasons for visits to a clinic among persons aged 60 years or older were diabetes (accounting for 13.2% of visits), and hypertension (accounting for 26.4% of visits).

Accidents and Violence

Registered emergency visits indicate that external causes of morbidity and mortality have increased since 2002. In 2009 22 traffic deaths per 100,000 population were reported, almost double the 12 traffic deaths per 100,000 reported in 2004 (48). The highest rate of road traffic fatalities was among riders of motorized two- or three-wheeled vehicles. The highest occurrence of traffic accidents was among young adults aged 20–24 years, followed by those 15–19 and 25–29 years old (49). Of the other registered injuries caused by external causes, the most common were unintentional falls, struck by/against objects (unintentional), and injuries related to being hit/struck/bitten by a person or animal.

The total number of registered homicides and aggravated assaults has increased since 2006. During 2009 there were 6,256 homicides and aggravated assaults and 643 sexual offenses registered, compared to 5,072 and 437 registered during 2006. Currently, no formal national registration system exists for domestic violence and its determinants in Suriname. The Multiple Indicator Cluster Survey indicated that 13.2% of the women surveyed believe that a husband or partner is justified in beating his wife or partner for any reason (13). The most prominent proportion of women with this belief was from the rural interior (34.9%). Women with no or only primary education (32.7% and 20.4% respectively) and those that comprised the poorest quintile of the population (26.7%) believed that men were justified in beating their wife or partner if she went out without telling him, neglected the children, argued with him, refused sex with him, or if the food was burnt (13).

Disasters

In May of 2006 and April of 2007 Suriname was confronted with severe flooding in the interior. This was the first time that the government of Suriname was faced with issues surrounding environmental disaster preparedness and disaster response. Manmade disasters are a concern in Suriname. The Nickerie and Wageningen areas suffered from a rotavirus outbreak resulting from high water levels in the rivers from improper drainage of manmade dikes.

Mental Disorders

The mental health services currently available are highly centralized and are primarily offered by psychiatrists at the Suriname Psychiatric Center (PCS). The most frequent diagnoses of admission to PCS are substance abuse (50%), mood disorders (20%), schizophrenia (12%), and personality disorders (11%) (50).

Mental health issues represent a significant public health challenge for Suriname, as the country faces an increased need for mental health services specifically related to interconnected risks, stress, and anxiety. An indication of the severity of this problem is the increase in the number of suicides since 2000 (67), which more than doubled by 2009 (138). By ethnic group, Hindustanis had the highest rate of suicide in 2008, at 66.2%, followed by Creoles at 11.5%; the figures were 72% and 10%, respectively, in 2009 (2). Suicide data, disaggregated by sex, show that more men (104 cases) commit suicide compared to women (34 cases). Many suicides were self-poisonings with pesticides (2).

Risk and Protection Factors

Smoking

In 2007, nearly a quarter of the population smoked cigarettes. Reported use was higher in men (38.4% of all men smoked) than in women (9.9% of all women). Smoking prevalence by age group was 8% among 12–18-year-olds, 28% among 35–44-year-olds,
and 27% among 45–65-year-olds (51, 52). In a 2009 survey of students aged 13–15 years old, 19% reported that they used tobacco. In this group, 47% were exposed to second-hand smoke at home and 53% were exposed outside of the home; 49% reported that at least one parent smoked (52). In 2011 a study conducted by the Healthy Caribbean Coalition on air quality and cigarette smoke observed that among the five participating countries, Suriname had the highest percentage of locations with smoking observed and the highest indoor air pollution ($\text{PM}_{2.5} = 257 \, \mu\text{g/m}^3$ according to the EPA Air Quality Index) where smoking was observed (53).

**Alcoholism**

The prevalence of alcohol use in 2007 was 32.7%. Alcohol use is reportedly higher among men (47.9% of all men) than women (19.7%). The highest proportion of alcohol use was in the 26–34 age group (36.8%), followed by the 35–64 age group (33.9%) (53). In a survey of students aged 13–15 years old, 73.8% reported they had had their first drink before 14, and 32.6% had consumed alcohol at least one or more times in the month prior to the survey (27).

**Illegal Drugs**

In a 2007 household survey on illegal drug use, 3.1% of the total population reported that they currently used marijuana, 2.8% reported that they used tranquilizers, 0.5% used stimulants, and 0.3% used cocaine. Men consistently reported the highest current use of marijuana, cocaine, and stimulants, while women reported the highest use of tranquilizers. The highest use of marijuana and tranquilizers was in the 19–25-year-old age group, and the 35–44-year age group reported the highest use of cocaine. Stimulants were used most frequently by youths in the 12–18-year age group, likely due to their availability. Nickerie, Coronie, and Saramacca districts had the highest reported prevalence of marijuana use, while cocaine use was more prevalent in Commewijne and Marowijne districts (51).

**Physical Activity**

Recent data indicate that inactivity is an issue of concern among younger segments of the population. In a 2009 survey of students aged 13–15 years old, 73% stated they participated in physical activity less than one hour per day and 41% spent three or more hours in sedentary activities (27).

**Obesity**

The highest percentage of overweight children under the age of 5 years was found in the districts of Nickerie, Coronie, and Saramacca (5.1%), followed by those in Wanica and Para (4.0%). Children under age 5 whose mothers had tertiary-level education (7.5%) or whose families belonged in the highest wealth index quintiles (4.8%) also showed a high percentage being overweight (13). In a survey of 1,698 students aged 13–15 years old, 26% were either overweight or obese; 81% of these students reported that they consumed one or more carbonated soft drinks per day during 2009 (27).

**HEALTH POLICIES, THE HEALTH SYSTEM, AND SOCIAL PROTECTION**

**Health Policies and Legislation**

Article 36 of the Constitution of the Republic of Suriname states that everyone has the right to health, and that it is the responsibility of the Government to promote health by improving living and working conditions and by providing information to safeguard health. Leadership and governance of the health sector are the responsibilities of the Ministry of Health, which, under the present administration, has renewed its efforts to advance public health. The Ministry actively promotes the inclusion of health considerations in all policies and advocates implementation of health policies across all sectors to maximize health gains.

The health care system is organized based on the principles and values of primary health care. There is broad consensus on the need to
strengthen disease prevention and health promotion and to consider social determinants as part of comprehensive primary health care. Effective vertical coordination (with secondary and tertiary care facilities and providers) as well as horizontal coordination (with other sectors at the local level) should be enhanced to ensure quality of care, capability, policy and actions to prevent disease, improvements in the determinants of health, and equity in health.

Existing legislation establishes the role of the Ministry of Social Affairs and Housing as a key funder of health services for the poor and that of the Ministry of Health as steward of the health system. It includes references to Government-provided health care for poor and near-poor populations.

The priorities established by the Ministry of Health for 2011–2018 focus on primary health care with an emphasis on prevention and control of noncommunicable and communicable diseases, improved vaccination coverage, and progress on the social determinants of health. The Ministry of Health is committed to implementing the International Health Regulations (2005) and the Framework Convention on Tobacco Control (2003).

**The Health System’s Performance**

Quality assurance programs to assess the health system’s response to the above-mentioned health challenges and determinants of health equity have not been established. The Academic Hospital is working toward standardizing clinical protocols. A system to monitor patient satisfaction with services has not been developed, although two of the five hospitals have installed complaint boxes to collect patient comments. Patient safety programs, including a hand-washing program that is being tested in four hospitals, are incipient.

Health coverage is available through several insurance schemes. The main four are the State Health Foundation, which covers all government employees and their dependents (21% of the population); programs administered by the Ministry of Social Affairs (24%); company medical plans (10%); and insurance companies (3%) (54).

Health equity continues to be a challenge in Suriname, although improvements in the availability, accessibility, and relevance of services are helping to alleviate inequities. The expansion of cancer services is a case in point. In the past, secondary and tertiary cancer services were unavailable in the country; patients mainly sought services in the Netherlands (using out-of-pocket payments or private insurance) or Colombia (under a special agreement between the two governments). In 2011, with a new facility providing palliative and therapeutic cancer care, the country has begun to strengthen early cancer detection at the primary care level and to increase the proportion of treatable/palliative care. The availability and relevance of these services will help improve health equity, respect human dignity, and enhance the quality of life.

**Health Expenditures and Financing**

The distribution of public and private health expenditure in 2006 was 42.6% by the public sector, 53.8% by the private sector, and 3.6% by nongovernmental organizations (NGOs), totaling US$ 163.5 million, or 8.5% of GDP. According to national health accounts, health expenditure per capita increased dramatically from US$ 180 in 2000 to US$ 324 in 2006 (37). Health expenditures in 2006 were focused on curative care while the primary care level received the lowest allocations: hospitals (35.0%), followed by private general practitioners (12.6%), pharmaceuticals (11.5%), medical specialists (9.2%), laboratory services (4.8%), dentists (3.9%), and Regional Health Services, which serves the poor and near-poor in the coastal region (3.3%) (19).

The main sources of funding for the health sector are the Ministry of Finance (37.5%), followed by private firms (34.1%) and out-of-pocket household expenditures (20.0%) (54). The remaining 8.4% came for a combination of other sources. The significant contribution of the private sector to health care raises concerns about a rise in
out-of-pocket household expenditure on health. The Government is developing a new health care insurance scheme in order to minimize inequalities in access to health care services (55). The Ministry of Finance collects taxes, allocates funds to the Ministry of Health, and manages contributions to the State Health Foundation.

**The Health Services**

The main challenges in providing services include covering the sparsely populated areas in the country’s interior and the fragmentation of the health care system; both have an impact on health equity including equitable access to care and preventive collective action. For the provision of direct care, there are three main subsystems—the Medical Mission, Regional Health Services, and the Ministry of Health (Bureau of Public Health). These subsystems have different modes of financing, membership, and approaches to delivery of health care. Each subsystem specializes in different population segments, depending on geographic location, employment, income level, ability to pay, and social status. The Medical Mission (MZ), which is funded by the Government, is charged with providing primary health care mainly to residents living in traditional settings along the major rivers of the rural interior. The Regional Health Services (RGD) is a state foundation that runs public primary care facilities staffed by general physicians and health practitioners in the coastal areas. Clients in these facilities are the poor and near-poor as well as enrollees in the State Health Foundation. Finally, many large corporations, public and private, operate private care clinics for their employees. The funding and range of services provided by these clinics vary considerably among firms.

The current installed capacity in the country encompasses 56 primary health clinics and health posts operated by the Medical Mission; 43 Regional Health Services facilities; 146 private clinics; 5 hospitals (2 private and 3 public); 1 psychiatric hospital; 40 dental units, including 26 located in the Regional Health Services clinics; 3 private medical laboratories; and laboratories in each hospital. Four hospitals are located in the capital of Paramaribo and one in Nickerie. The psychiatric hospital operates in Paramaribo.

Access to specialized care for those living in the interior remains limited, with interior residents in need of these services having to travel to Paramaribo. Emergency care is of particular concern, especially in cases of emergency obstetric care and specialized neonatal care. Emergency health care for people in remote villages implies costly air transport to Paramaribo, which is not available at night.

The Ministry of Health’s Bureau of Public Health is responsible for the development of disease prevention and control programs. These programs are delivered through the decentralized service delivery network of the Regional Health Services and Medical Mission and to a certain extent directly by the Bureau of Public Health. Water quality at hospitals and homes for the elderly is monitored by the Bureau of Public Health.

All hospitals have laboratories, which, along with the three private laboratories, carry out clinical analyses. The new Public Health Laboratory that opened in 2010 meets international quality and biorisk standards (level II+) with upgraded technological capacity.

The Ministry of Health, the Pharmaceutical Inspectorate, and the Bureau of Public Health are responsible for pharmaceutical policies, standard setting, inspection and monitoring, and program development. Ninety percent of all drugs are imported and 10% are manufactured domestically. All drugs must be approved by the Governmental Committee on Drug Registration, and the Pharmaceutical Inspectorate oversees inspection of pharmaceutical manufacturing and pharmacies. There are 3 licensed pharmaceutical manufacturers in Suriname and 26 licensed pharmaceutical importers, the largest being the government-owned Drug Supply Company Suriname (BGVS). The value of medicines imported by BGVS was estimated at US$5 million in 2007 (56). Medicines from the Essential Medicines List are provided to patients on a fixed co-payment basis.
KNOWLEDGE, TECHNOLOGY, INFORMATION, AND HUMAN RESOURCE MANAGEMENT

Scientific Production in Health

Current health legislation does not identify information and communication technology as a function or priority for the Ministry of Health. Without a clear mandate in this area, challenges will persist in the standardization of the information systems of different service providers and the functionality of electronic medical records. Information systems must be able to move past managing information on vertical disease programs and burden-of-health data toward collecting and disseminating data on comprehensive health delivery approaches, disease prevention, and population health. This will help to link health and environmental considerations, and enhance understanding of the underlying determinants of health and health equity.

Human Resources

There continue to be shortages in many categories of health care workers and challenges regarding the mix of specialists. The distribution of human resources between urban and rural areas is very uneven: in the coastal area, 64 general practitioners work for Regional Health Services in 43 primary care clinics, while 191 general practitioners work in 146 private clinics, located primarily in Paramaribo and Wanica. In the rural interior 6 general practitioners work for the Medical Mission supervising 56 health posts and centers. Hospitals employ 140 medical specialists. There were 895 registered nurses, 112 practical nurses, and 542 nursing assistants. Most of the registered nurses (roughly 82%) work in secondary care facilities located in the two main urban centers and the balance (18%) in primary care, teaching, nursing homes, and public health. The Medical Mission employs 1.4% of the nurses in its primary care program in the interior. The Medical Mission has historically used an alternative category of health worker called the health assistant, who, after a four-year training program, performs some tasks normally carried out by nurses and physicians. A total of 84 health assistants are employed at the 56 Medical Mission health facilities in the interior.

The loss of skilled labor due to outmigration has been significant, especially for health and education sectors. The Kingdom of the Netherlands remains the preferred destination. Another challenge is the distribution of human resources. The vast majority of medical specialists are located in the city of Paramaribo, and general physicians and nurses are scarce in rural areas and the country’s interior. A 2007 agreement with Cuba launched the Cuban medical brigade in Suriname. The Brigade works with both Medical Mission and Regional Health Services and has included health professionals such as internal medicine specialists; nurses; general practitioners; specialists in anesthesiology, pediatrics, pharmacology, and epidemiology; nurses specializing in extracorporeal dialysis; and one electro-medicine technician.

Suriname does not only face shortages in several categories of health care providers. Legislators have pointed out that the shortage of skilled legal experts in Suriname has become a pressing challenge. They are not only needed in the National Assembly to assist its members, but are needed at the ministerial level, including at the Ministry of Health.

Health Personnel Training

Most general physicians receive training at the Anton de Kom University in Paramaribo, which admits 30 medical students per year and graduates, on average, 20 physicians per year, most of whom elect careers in clinical medicine.

Registered nurses and nursing assistants are trained at the Central Training Institute for Nurses and Allied Professions (Foundation COVAB). Two hospitals have internal training courses for nurses. Midwives are trained at the midwifery school of the Ministry of Health. Currently the Bachelor of Science in Nursing is offered with specializations in hospital management, pediatrics, and public health.

The Institute of Graduate Studies and Research of the Anton de Kom University began a
Masters in Public Health program in 2007. A new distance-learning Master’s in Public Health course started in 2010 as a collaborative effort of the Faculty of Medical Sciences of the Anton de Kom University and the Tulane University School of Public Health and Tropical Medicine in the United States. The agreement between these two universities commits to cooperation in areas including the exchange of faculty members for research, lectures, and seminars; exchange of research scientists and graduate students for study and research; training scientists and public health professionals in basic and applied research; carrying out joint research activities; and exchange of information, such as library materials and research publications.

HEALTH AND INTERNATIONAL COOPERATION

Development agencies focusing on health include the Caribbean Community (CARICOM); the Global Fund to Fight AIDS, Tuberculosis, and Malaria; and the Inter-American Development Bank (IDB), as well as the governments of Brazil, France, the Netherlands, and the United States, among others.

During 2005–2012 slightly over US$ 18 million for five grants was received from the Global Fund, specifically for HIV/AIDS (US$ 9,110,099 for two grants of five- and seven-year durations), malaria (US$ 7,233,404 for two grants of five- and two-year durations), and tuberculosis (US$ 2,055,216 for one grant of a two year duration) (57).

The Government of France has shown significant interest in the country’s health care, especially given the cross-border movement of Surinamese seeking health care in neighboring French Guiana, an overseas department of France. The French Development Agency provided € 16.1 million for 2009–2014 to strengthen Suriname’s health care services, thus reducing the strain on French Guiana’s health care system. Most of this donor aid is a concessional loan of € 15 million for purchasing medical equipment, rehabilitating health centers and aid posts in the interior, and constructing a hospital in Albina and other health care facilities in the interior. The remaining € 1.1 million will go to support inter-country exchanges and enhance cooperation.

Agencies linked to the Dutch Ministry of Foreign Affairs also have been very active in Suriname and have been providing technical cooperation through twinning programs. These programs provide funding for projects that match experts from both Suriname and the Netherlands. Twinning partially funds the Cardiovascular Risk Management Study, a study implementing multiple interventions for chronic disease prevention and management. Since 2010 no twinning projects have been initiated and many projects are nearing completion. It is possible that future projects will be initiated. There are also private initiatives that have developed partnerships with local groups and organizations that foster relationships for support across borders.

Economic opportunities, particularly related to mining, have increased the movement of people between Brazil and Suriname, heightening concerns regarding migration, environmental degradation, and occupational health hazards related to mining. Consequently, the Brazilian Consulate’s approach towards health is focused on providing materials for reducing the burden of HIV/AIDS, linking malaria experts to develop health projects, reducing mother to child transmission of syphilis, and mitigating the spread of Chagas’ disease.

United States agencies involved in Suriname’s health sector are the Department of Defense, the Peace Corps, and the Department of State.

Three agencies from the Inter-American System are present in Suriname: the Organization of American States (OAS), the Inter-American Institute for Cooperation on Agriculture (IICA), and the IDB. The IDB has been very active in the health sector, signing a US$ 5 million loan agreement with the Government of Suriname during 2004 to implement health sector reform to strengthen infrastructure and human resources for health. These funds ended in 2010. Negotiations for a new loan are ongoing, though it is uncertain if a new loan from IDB for primary health care is forthcoming. Currently discussions are taking place regarding a conditional cash transfer.
Four UN Agencies are present in Suriname: PAHO/WHO, UNICEF, UNFPA, and UNDP. PAHO/WHO is the only agency with full representation and has the longest presence in the country. Suriname’s membership in CARICOM has broadened possibilities for exchanging expertise and has increased opportunities for development assistance for Suriname. Additionally the memberships with the Union of South American Nations and the Amazon Cooperation Treaty Organization have provided Suriname with the opportunity to expand cooperation with other countries of South America, particularly in areas that have a trans-border nature.

**SYNTHESIS AND PROSPECTS**

Historically and culturally Suriname is considered to be part of the Caribbean; the country shares many health issues with other Caribbean countries and territories. Geographically, however, Suriname has strong links to neighboring countries such as Brazil, Guyana, and French Guiana. Suriname and neighboring countries that are part of the Guyana Shield share key concerns such as the impact of migration and the vulnerability of special population groups with distinctive culture and language, such as those communities living in the rural interior.

Membership in CARICOM has increased the country’s opportunities to garner development aid and has broadened possibilities for exchanging expertise with participating countries. Suriname participates in the CARICOM health meetings and frequently uses the Caribbean Cooperation in Health (CCH III) as a guiding framework. Suriname is also a member of the Union of South American Nations (UNASUR), an intergovernmental union. The health component of UNASUR offers an opportunity for member countries to integrate health interventions. Suriname also is a
member of the Amazon Cooperation Treaty (ACTO), a legal instrument that recognizes the trans-boundary nature of the Amazon. ACTO reaffirms the Amazon countries’ sovereignty and encourages, institutionalizes, and guides regional cooperation among them for greater scientific and technological research, information exchange, natural resources use, preservation of cultural heritage, health care, and other border-related issues.

The country has significantly advanced in the struggle against communicable diseases, with many diseases being near or at elimination targets. PAHO recognized Suriname as a “Malaria Champion” in 2010, for example.

Communicable diseases continue to persist, while there is an increasing burden of noncommunicable diseases and related risk factors. There have been improvements in progressing towards the MDGs; however, progress in reaching the MDGs has been limited, and significant work will be required for the country to reach all MDGs.

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