INTRODUCTION

The island of Montserrat is tucked into the northern corner of the Leeward Islands, in the eastern Caribbean. It is located 43 km (27 miles) southwest of Antigua and 70 km (40 miles) northwest of Guadeloupe. Montserrat covers an area of 102 km² (39 mi²).

Montserrat became a British colony in 1632 and is an internally governed overseas territory of the United Kingdom, which retains responsibility for the territory’s external relations, defense, internal security, public services, and offshore finance. General elections are held every five years, as constitutionally mandated. Montserrat is a member of the Caribbean Community (CARICOM) and the Organization of Eastern Caribbean States (OECS).

Montserrat has a small, open economy with few natural resources. Its currency is the Eastern
The economy grew between 2006 and 2008, but declined in 2009 and 2010 due to the global economic crisis. Inflation remained under 5% over 2006–2010. In 2009, the government service sector was the largest contributor to gross domestic product, at 37.1%. The tourism sector experienced growth in 2010 due to an increase in the number of visitor stopovers, cruise ship passengers, and excursionists (1).

The island is composed almost exclusively of volcanic rock and is mostly mountainous with a small coastal plain. Montserrat’s Soufrière Hills Volcano began erupting in 1995, resulting in the destruction of the capital, Plymouth, and the evacuation of the southern and central parts of the island. Thousands moved to nearby Antigua, other parts of the Caribbean, or further afield. There was a major eruption in February 2010. A report on volcanic activity between 28 February and 31 October 2010 indicated that activity had been low and that “there was no evidence of lava extrusion during this time” (2). The continuing threat of the volcano has effectively limited the potential for economic growth, as it is difficult to maintain the population and economy at viable levels. The population resides in the northern part of the island, which is considered safe.

In 2006, Montserrat’s population was 5,028, with 2,619 males and 2,409 females. In 2007, the population fell to just over 4,800, partly owing to the migration of people in and around the unsafe zone. Despite the volcano, the population has grown by 5.6% since 2002, and in 2010 was estimated to be 5,118. The increase was due to an influx of migrants, primarily from the English-speaking CARICOM countries and the Dominican Republic. In 2010, 5.47% of the population was under age 5 years and 6.8% were age 65 and older. In 2010, overall life expectancy was 72.9 years—74.8 years for women and 70.9 years for men. Table 1 shows selected demographic indicators for 2006–2009 (3). Figure 1 shows Montserrat’s population structure for 1991 and 2011.

Cell phone subscribers decreased from 75 per 100 population in 2000 to 70.78 in 2010. Internet users increased from 25.91 per 100 population in 2006 to 35 in 2010. Landlines, however, decreased from 51.02 per 1,000 population in 2006 to 43.82 in 2010 (4).

Montserrat made progress in health during the reporting period. The Expanded Program on Immunization (EPI), for example, is one of the territory’s success stories: high immunization coverage rates have resulted in low morbidity and mortality due to vaccine-preventable diseases. Infant and maternal mortality rates also are low. Skilled health care personnel attended to pregnant women at prenatal clinics and performed deliveries. Thanks to collaboration with sectors other than health and with stakeholders, sanitation levels have improved throughout Montserrat.

The Ministry of Health was able to provide basic medical, surgical, and obstetric services to the population of Montserrat in less than optimal physical and environmental conditions, particularly during the height of the volcanic eruptions. Care

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1 US$–to–EC$ as of 1976 was $2.70.
continued to be provided at the secondary and tertiary levels. Capacity building continued. While staff numbers were low, efforts continued through formal training opportunities and in-service training to ensure that staff remained versed with current best practices. Health is considered to be an important pillar in Montserrat’s sustainable development.

The Government of Montserrat formulated its second sustainable development plan (for 2008–2020), which focuses on five strategic goals: economic management, human development, environmental management and disaster mitigation, governance, and population.

HEALTH DETERMINANTS AND INEQUALITIES

Poverty remains a significant problem for Montserrat. The 2011 Country Poverty Assessment Report (5) indicates that 36.0% of the population was poor and that poverty was greatest among those younger than 15 years (45.0%). The report further indicates that 25.0% of heads of households were poor (26.0% male heads of household and 20.0% female heads of household). Rehousing opportunities were offered to some 25 persons in 2009, but the territory continues to experience inadequate housing.

As of March 2006, the workforce consisted of 3,006 persons, with 1,640 men and 1,366 women employed. In 2001, the workforce numbered 2,029—1,154 men and 875 women. The unemployment rate was 13.7% in 2006 (11.6% among men and 16.3% among women), compared with 13.3% in 2001 (14.6% for men and 11.4% for women) (6). In 2010, public-sector wages were frozen (1).

Education spending, as a proportion of the total government budget, declined from 7.5% in 2006 to 6.8% in 2010 (7). Primary school enrollment was 99.3% in 2006 and 96.2% in 2007.

THE ENVIRONMENT AND HUMAN SECURITY

ACCESS TO CLEAN WATER AND SANITATION

In 2010, 100% of the population had access to improved sources of drinking water and sanitation facilities.
**Solid Waste**

Solid waste is disposed of safely in the territory; private contractors handle domestic solid-waste collection and disposal.

**Deforestation and Soil Degradation**

Volcanic activity has destroyed most of the territory’s southern mountains and forests. Where slopes have been cleared for cultivation in Montserrat, erosion is also a matter for concern.

**Air Pollution**

The environmental effects of the Soufrière Hills Volcano’s activity have been routinely monitored since eruptions began in 1995. Air quality monitoring, which is performed by the Montserrat Volcano Observatory, includes measuring the concentration of respirable dust and sulfur dioxide \((SO_2)\) levels. Air quality in the safe, northern portion, of the territory has consistently remained within acceptable limits (2).

**Road Safety**

Traffic accidents increased throughout the reporting period. Royal Montserrat Police Force data from 2010 indicate that 604 motor-vehicle accidents and one fatality were reported that year. The number of traffic accidents increased from 109 in 2006 to 146 in 2010.

**Disasters**

Montserrat is vulnerable to a number of natural hazards. While the major threat is volcanic activity, the territory is also subject to the winds and storm surges associated with hurricanes and to earthquakes. There also are environmental health issues related to falling ash; these also are monitored.

**Climate Change**

The Government of Montserrat is dealing with the potential effects of climate change, including changes in sea temperatures, rainfall patterns, and the intensity of hurricanes. The territory has taken the lead in the establishment of an OECS Climate Change Center, which will collect information and compile a database of climate change factors, features, and events relevant to the Eastern Caribbean region (8).

**Food and Nutritional Security**

In 2008, the Government prepared a national food and nutrition policy and plan, and conducted a food consumption survey in 2007, in conjunction with the Caribbean Food and Nutrition Institute. The report of the survey was not available as of the date of this writing.

**Food Safety**

There were no reported cases of avian flu or salmonellosis during the period 2006–2010.

**Health Conditions and Trends**

**Health Problems of Specific Population Groups**

**Maternal and Reproductive Health**

The country has successfully addressed Millennium Development Goal (MDG) 5 (improve maternal health). During 2006–2010, 344 women registered for prenatal care. All pregnant women received prenatal care and were delivered by a trained health professional. Obstetric cases were the third leading cause of hospital admissions (261) during the reporting period. All pregnant women were tested for HIV and other selected sexually transmitted infections (STIs) during 2007–2010, and only one
tested positive for HIV. Between 2006 and 2009, there were no maternal deaths, but there were five stillbirths.

**Infants and Children (under 5 years old)**

During 2006–2010, 281 children were born, 142 males and 139 females. There was one infant death reported in 2006 and one in 2007. Immunization coverage with DPT3 was 100% between 2008 and 2010. There were 21 low-birthweight babies born during the reporting period, ranging from 18.4% of all births in 2006 to 6.5% in 2010 (9).

According to estimates for 2010, children under age 5 accounted for 5.5% of the population. For the years 2006–2010, the three leading causes of death in children under 5 were: acute respiratory infections (601 cases), influenza (132 cases), and gastroenteritis (94 cases). In the Caribbean Food and Nutrition Institute’s (CFNI) 2010 survey of anthropometric data among children aged 0–5 years, 20.8% of boys and 17.4% girls were at risk for overweight; 8.3% boys and 7.2% girls were overweight; and 5.6% boys and 2.9% girls were obese.

**Children (5–9 years old)**

Children 5–9 years comprised 7.2% of the population in 2010. There were no child deaths in this age group reported during 2006–2010. Coverage with measles, mumps, and rubella (MMR) vaccine was 100% between 2007 and 2010.

**Adolescents (10–14 and 15–19 years)**

In 2010, children in the 10–14 years age group made up 14.4% of the population and those 15–19 years, 7%.

According to estimates of a 2007 joint CFNI and Montserrat Ministry of Health study of the island’s youth, 3.2% of the study population among 12–17-year-olds was found to be underweight; 13.6% were at risk for overweight; and 12.8% were overweight. Approximately 24% were found to have mild anemia; 4%, moderate anemia; and 0.4%, severe anemia.

Teenage pregnancies accounted for 35 births—12.5% of all births—during the reporting period. Of these, all but one were among the 16–19-year-olds. During the period under review there were no deaths in the adolescent population.

The Global School-based Student Health Survey (GSHS) was conducted in 2008 among school children aged 13–15 years old (10). The results showed that approximately one-third had had at least one alcoholic drink on one or more days during the month prior to the survey. Moreover, 28% indicated that they had been drunk one or more times during their lives. Some 16.4% (8.3% of boys and 23.9% of girls) had considered attempting suicide during the 12 months prior to the survey. Approximately one-fifth of students had been physically active for at least an hour every day during the week prior to the survey.

**Adults (20–64 years old)**

The population aged 20–44 years old represented 42.6% of the population and those aged 45–64 years old, approximately 16% of the population. Obstetrics delivery was the leading cause of hospital admissions among 15–24-year-olds. Other causes of hospital admission during the reporting period were urinary tract infections, influenza, gastroenteritis, and hypertension (9).

In 2006–2010 there were 25 diabetes-related hospital admissions among 25–44-year-olds and 91 among 45–64-year-olds. There were 32 admissions related to hypertension among 25–44-year-olds and 103 among 45–64-year-olds. The 25–44-year-old age group accounted for just over 50% of all admissions due to urinary tract infections.

**The Elderly (65 years old and older)**

The population 65 years old and older was estimated to account for 6.8% of the general population. During the period 2006–2010, there were 45 admissions for hypertension among those 65–74 years of age and 90 among those 75 years old and older. Over the same period, there were 42 diabetes-related hospital admissions among the
65–74-year-old age group and 167 among those age 75 and older.

The Family

Family planning and Pap test services were provided at the health centers.

Mortality

There were 222 deaths—128 male and 94 female—between 2006 and 2010. The general mortality rate was 7.8 deaths per 1,000 population in 2010. The leading causes of death for 2006–2010 are shown in Table 2. There were no deaths in the 1–14, 15–24, or 25–44 age groups. The leading causes of mortality in 2006–2010 were chronic, noncommunicable diseases: diabetes mellitus (46), ischemic heart disease (33), hypertensive disease (20), and cerebrovascular disease (17). Between 2006 and 2009, 153 deaths were certified by medical certificate and 28 through postmortem examination. It should be kept in mind, however, that these data do not include all deaths.

Between 2006 and 2010 there were 33 deaths due to ischemic heart disease, 7 due to cardiac arrest, 17 to cerebrovascular accident, 11 to congestive heart failure, and 8 due to other diseases of the circulatory system. During the period under review, there were 20 deaths due to hypertension (9 females and 11 males).

Communicable Diseases

Vector-borne Diseases

There were no cases of malaria during the period 2006–2010, and only two cases of dengue fever were diagnosed.

Vaccine-preventable Diseases

No cases of rubella or measles have occurred in Montserrat for the past 25 years. There were 89 cases of viral hepatitis B in the period 2006–2010.

Zoonoses

There were no reported cases of leptospirosis or human rabies during the period 2006–2010.

HIV/AIDS and Other Sexually-transmitted Infections

During the reporting period 10 persons (7 male and 3 female) tested positive for HIV, as compared to 16 in the 2001–2005 period. The annual incidence increased from 0.45 per 1,000 population in 2001 to 1.04 in 2005. Since then, incidence declined to 0.43 in 2006 and to 0.2 in 2010. As of year-end 2010, nine individuals living with HIV were in registered care. Three were receiving care off-island. One person died in the period 2006–2010 (11).

According to the Communicable Disease Surveillance Report (12), there were 43 confirmed cases of sexually-transmitted infections in 2010. The leading diagnoses were hepatitis B (16 cases), gonococcal infection (11), and 8 cases each of syphilis and trichomoniasis. The report also shows that Montserrat was successfully addressing MDG 6 (combat HIV/AIDS, malaria, and other diseases).

Tuberculosis

One case of tuberculosis was diagnosed in 2007, the sole case during the years under review.

### Table 2. Leading causes of death (cumulative), by rank, Montserrat, 2006–2010.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Cause of death</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Diabetes</td>
<td>46</td>
</tr>
<tr>
<td>2</td>
<td>Ischemic heart disease</td>
<td>33</td>
</tr>
<tr>
<td>3</td>
<td>Hypertensive disease</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>Cerebrovascular disease</td>
<td>17</td>
</tr>
<tr>
<td>5</td>
<td>Congestive heart failure</td>
<td>11</td>
</tr>
<tr>
<td>6</td>
<td>Cancer of the prostate</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Other diseases of the circulatory system</td>
<td>10</td>
</tr>
</tbody>
</table>

Source: Reference (3).
Emerging Diseases

All influenza cases in 2009 (27) were type A(H1N1).

Chronic, Noncommunicable Diseases

Malignant Neoplasms

In the period 2006–2010, there were 24 deaths due to malignant neoplasms. Of these, 5 were due to prostate cancer and five due to breast cancer.

Diabetes

During 2006–2010, diabetes was the leading cause of hospitalization—307 diabetes-related admissions (155 female and 152 male). During the same period, there were 11 diabetes-related amputations (9 female and 2 male). Diabetes, with 46 deaths, was the leading cause of mortality (28 female and 18 male).

Hypertension

Hypertension was the second leading cause of hospital admissions in 2006–2010. There were 276 admissions (131 males and 145 females).

Nutritional Diseases

Between 2009 and 2010, there were 36 anemia-related hospitalizations—21 in 2009 and 15 in 2010—affecting 29 women and 7 men. Ten cases occurred among the population 75 years old and older; nine each in the 45–64 years and 65–74 years age groups; seven in the 25–44 years age group; and one in the 15–24 years age group. No cases were recorded for the period 2006–2008.

Accidents and Violence

There were two homicides between 2006 and 2010. The Global School-based Student Health Survey (GSHS) found that approximately one-third of the students claimed to have been physically attacked at least once, and that 28.1% were bullied on one or more days during the 30 days prior to the survey.

Mental Disorders

The WHO Assessment Instrument for Mental Health Systems (13) was applied in 2009. Montserrat has a Mental Treatment Act (2006) and draft mental health plan (2002), but no mental health policy. There is no psychiatric hospital and mental health services are community-based. Two mental health nurses and a visiting consultant psychiatrist formed the core of the mental health service delivery system in Montserrat.

In 2007, 44 patients were treated at St. John’s Health Centre. Of the users, 36% (16) were female; 84% (37) had schizophrenia and other related disorders; 11% (5) had mood (affective) disorders; and 5% (2) had other mental illnesses. Five persons requiring hospitalization were treated at the Glendon Hospital.

Other Health Problems

Oral Health

A decayed, missing, and filled teeth (DMFT) survey was conducted among 6-year-olds in 2010. The corresponding examinations involved all primary schools (60 children). The mean DMFT was 2.37. Accordingly, 51.7% of the children had no caries. A previous survey conducted among 12-year-olds in 2007 revealed a DMFT of 1.9.

HEALTH POLICIES, THE HEALTH SYSTEM, AND SOCIAL PROTECTION

Health Policies

The theme for Montserrat’s 2008–2020 Sustainable Development Plan is “A Healthy and Wholesome Montserrat,” bringing health to a central position within the territory’s development. Those who evaluated the Plan became aware that the territory has a very effective primary health care system, but that the secondary and tertiary health care facilities and services are inadequate. Accordingly, one goal of the Plan is to ensure access to required secondary and
tertiary health care at affordable prices by 2020. The Strategic Plan for Health 2010–2014 identified the following strategic directions: enhancing primary health care; enhancing secondary health care; enhancing mental health services; and improving environmental health services.

**The Health System’s Stewardship Role**

Pursuant to the Public Health Act, the Minister of Health shall generally be responsible for promoting and preserving the health of the inhabitants of Montserrat. The Ministry of Health carries out the steering functions of policy formulation, regulation, standard setting, monitoring and evaluation, as well as health care delivery. The Ministry has reaffirmed Montserrat’s commitment to the primary health care approach.

**The Health System’s Performance**

An evaluation of the essential public health functions (EPHF) was carried out in 2010. The EPHF indicators receiving the highest scores were: EPHF 3, Support for health promotion activities, development of norms and interventions to promote healthy behaviors and environments (0.93); EPHF 2, Public health surveillance, research, and control of risks and threats to public health (0.85); and EPHF 11, Reducing the impact of disasters (0.75). EPHF indicators with the lowest scores were EPHF 9, Ensuring the quality of population-based and personal health services (0.39); EPHF 6, Strengthening of institutional capacity for regulation and enforcement in public health (0.38); and EPHF 4, Social participation in health (0.27).

There is no national health insurance program in Montserrat. The Social Security Board requires that all employed persons between the ages of 16 and 60 be covered. Benefits include pension, maternity, sickness, invalidity, and employment injury. Montserrat has reciprocal social security agreements with OECS and CARICOM member countries.

**Health Legislation**

The Mental Treatment Act and related legislation were revised in 2006. The Mental Treatment Act consolidates Montserrat’s mental health legislation: the Mental Treatment Act and the Mental Treatment Institutions and the Poor and Persons of Unsound Mind Act.

**Health Expenditures and Financing**

In 2006, the budget allocation for health was US$ 5.24 million (or EC$ 14.14 million), which increased to US$ 5.88 million (or EC$ 15.88 million) in 2007, and to US$ 5.96 million (or EC$ 16.10 million) in 2008 (14). Regarding Montserrat’s total budget, the corresponding percentages allocated for health spending were 15.7%, 16.8%, and 16.2%, respectively. The 2010 budget (15) assigned to the Ministry of Health—US$ 6,162,333 (or EC$ 16,638,300)—represented 20% of the total allocated to various ministries and departments (US$ 30,130,704, or EC$ 81,352,900).

Inhabitants of Montserrat generally are responsible for their health care. Certain categories are exempt from paying fees, including children, pregnant women, students, the indigent, and prisoners. Revenue collected by the Glendon Hospital increased from US$ 65,811 (or EC$ 177,690) in 2006 to US$ 117,253 (or EC$ 316,583) in 2009 (16).

**The Health Services**

Primary health care services were delivered through four clinics. The services offered include maternal and child health, mental health, school health, and home health care services. Secondary services are provided at the Glendon Hospital. A referral system between the community and hospital services is also in place.

Patients are referred overseas for access to tertiary care or specialized diagnostic tests. Between 2006 and 2010, a total of 58 persons were referred
overseas. Of these, 27 were for medical treatment and 20 for surgical procedures. Most of these patients received treatment in Antigua and Barbuda.

Montserrat is a participant in the Pharmaceutical Procurement Service (PPS) of the Organization of Eastern Caribbean States. The provision of medicine in the public sector is subsidized, and many in the population are exempt from payments.

**KNOWLEDGE, TECHNOLOGY, INFORMATION, AND HUMAN RESOURCE MANAGEMENT**

**SCIENTIFIC PRODUCTION IN HEALTH**

In Montserrat, there is no formal health research agenda and a variety of factors affect the generation of information in the health sector. The territory lacks a health information strategic plan for coordinating the production, analysis, dissemination, and use of data. Montserrat’s health surveillance system was audited in 2008 by the Caribbean Epidemiology Centre (CAREC) and was updated to provide timely data on diseases under surveillance. Research activities carried out during the period under review included a Global School-based Student Health Survey (2008), and a survey entitled “Knowledge, Attitude, Beliefs and Practices of the Graduating Class of Montserrat Secondary School regarding HIV” (in 2006 and 2007).

**HUMAN RESOURCES**

The human resource situation in Montserrat is a major problem for the health services. The shortage or lack of health professionals and/or the fact that there may only be one person with a specific skill pose serious problems for the sector. The small size of the population makes it difficult to ensure enough work to maintain skills or provide adequate staff to cover for workers when on leave. The territory has difficulties with respect to hiring and retaining health professionals and also relies on imported labor. Arrangements were made with visiting professionals to provide specialist services. In 2010, there were 6 physicians, 45 nurses and 1 dentist per 5,000 population.

**HEALTH PERSONNEL TRAINING**

In 2007, the Montserrat Community College established a nursing program with initial enrollment of nine students; these students did their clinical practice in Saint Kitts and Nevis. Other health professionals are all trained overseas as there were no other training facilities for health personnel in Montserrat. Continuing education of health personnel included formal training and in-service training opportunities.

**HEALTH AND INTERNATIONAL COOPERATION**

Montserrat has limited access to funding programs. The HIV Strategic Plan has raised funding-related issues. It indicated that though Montserrat is a CARICOM and OECS member country, it could not benefit directly from the grants awarded by the Global Fund to Fight AIDS, Tuberculosis and Malaria to the Pan Caribbean Partnership against HIV/AIDS (PANCAP) (US$ 12.66 million) and the OECS (US$ 10.17 million), since most of the external donor funding granted thus far at the regional level was limited to PANCAP CARIFORUM member countries. Support for the HIV/AIDS programs came from the Department for International Development (DFID) and through the Caribbean Epidemiology Centre, the Pan American Health Organization, and the United Nations Children’s Fund.

**SYNTHESIS AND PROSPECTS**

Despite the challenges of living with the volcano, Montserrat continued to make progress in health. The Plan for Sustainable Development and the Business Plan for Fiscal Year 2008 of the Ministry of
Health and Community Services identified some of the issues that needed to be addressed. These included:

1. **Improving the health status of the population.** Progress was made with respect to the communicable diseases. Focus is needed on chronic diseases, such as diabetes and hypertension, and instituting measures to deal with risk factors (i.e., tobacco use, lack of physical activity, and obesity).

2. **Demographic change.** Montserrat has an aging population. This fact has consequences for health care delivery, such as the cost of dealing with chronic diseases and the need for support systems.

3. **Sustainability of health services.** Several factors will lead to increasing health costs. These include the use of new technology, improvement of health facilities, and attracting and retaining health professionals. In addition, one of the stated goals is to improve access to secondary and specialized health care services.

4. **Promoting education on health matters among the population.** Strategies are needed to attract funding for the health sector and to improve efficiencies. Of great importance will be a shift of emphasis to health promotion and collaboration with others to bring about improved health for the people of Montserrat.

**REFERENCES**


