Annual Report 2011
Excellence in Public Health Surveillance
Vision Statement

CAREC, a public health information, service and consulting organisation, dedicated to being the best at providing information that people need to improve health and prevent disease in the Caribbean.

Mission Statement

To improve the health status of Caribbean people by advancing the capability of member countries in epidemiology, laboratory technology and related public health disciplines through technical cooperation, service, training, research and a well-trained, motivated staff.

Shared Values

• Improving customer service
• Managing for impact
• Empowerment and accountability
• Leadership and innovation
• Self-respect and respect for others

Member Countries

Anguilla, Antigua & Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, BES Islands (Bonaire, Saba & St. Eustatius), British Virgin Islands, Cayman Islands, Curacao, Dominica, Grenada, Guyana, Jamaica, Montserrat, St. Kitts & Nevis, St. Lucia, St. Maarten, St. Vincent & the Grenadines, Suriname, Trinidad & Tobago, Turks & Caicos Islands
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Evolving role of a regional institution

CAREC/PAHO/ Ministries of Health - Working Together
Excellence in Public Health Surveillance

DIRECTOR’S REPORT

PAHO’S SPECIALIZED CENTRE

DIRECTOR’S REPORT
INTRODUCTION

The Caribbean Epidemiology Centre (CAREC) is a unique institution in being a regional health body of the Caribbean Community while being managed by an international health agency, the Pan American Health Organization. These attributes have stamped their insignia on the Centre and contributed to not only the strength of the institution but its sustainability for the past 37 years.

The Multilateral Agreement for the operation of CAREC, states that the Centre is responsible for the overall promotion and coordination of the Caribbean regional public health surveillance systems of its member countries (23) and for building capacity in epidemiology, laboratory and related public health disciplines. Therefore the main mandate of the Centre is to provide public health technical cooperation, health monitoring, disease prevention with its emphasis on epidemiology, surveillance strengthening and laboratory services to its member states of the Caribbean.

CAREC continues to work assiduously to achieve its Mission: ‘To improve the health status of Caribbean people by advancing the capability of member countries in epidemiology, laboratory technology and related public health disciplines through technical cooperation, service, training, research and a well-trained motivated staff.’

The intergovernmental agreement which legally establishes the Caribbean Public Health Agency (CARPHA) was signed in July 2011 and this catalyzed the process of transition with the steering committee transferring its functional mandate to the Executive Board in September 2011. This dynamic period of transition presented its challenges of preparing for the change as well as maintaining its current services, expanding as appropriate and coping with the demands of member states.

The team at CAREC has been focusing on key strategies and related activities enabling the transition of the Centre, while sustaining its functionality and responsiveness as the Centre is incorporated into the Caribbean Public Health Agency (CARPHA). At the core of this process is the strengthening of surveillance systems for communicable, non-communicable diseases and conditions, as well as preparation and response to disasters, emergencies and special situations as it pertains to surveillance and outbreak investigations. The main role of the CAREC laboratory is to support surveillance activities and strengthen laboratories in countries with an emphasis on biosafety and security, quality management systems and technology transfer. Progress has been made toward the provision of a BSL-3 facility at CAREC through a visit and discussions held with the Ministry of Foreign Affairs and International Trade, Canada (DFAIT). The decision was made to obtain a modular laboratory. This BSL-3 facility will allow CAREC to restart the services of culture, isolation and characterization of multi-drug resistant strains of tuberculosis bacilli as well as the processing and culture of yellow fever virus and provide the capacity for handling Avian influenza and haemorrhagic fevers. The capacity of the CAREC’s laboratory was also strengthened with the donation by PAHO of Xpert MTB/RIF diagnostic equipment for tuberculosis investigation.

HEALTH SITUATION

The epidemiological transition from communicable diseases (CDs) to non-communicable diseases and conditions (NCDs) continues as NCDs are responsible for the first four causes of mortality in member countries, but CDs such as dengue infections, respiratory and diarrheal illnesses are still major causes of morbidity. Therefore the Centre has to adapt to remain relevant to the countries. The Port of Spain Declaration of 2007 has given great emphasis and directions to working NCDs and global focus and response were garnered from the United Nations Summit on NCDs held in September, 2011. This major activity (the global activity) influenced the activity of the Centre since provision of appropriate data was priority for member countries.

The routine NCD surveillance for annual minimum data set was initiated in the sub-region in 2010, with annual reporting continuing. Fifteen countries have already reported. The Minimum Data Set includes indicators on mortality for selected NCDs, prevalence and incidence and risk factors of selected conditions as well as social indicators. Technical cooperation continues for gathering evidence on the prevalence of risk factors for chronic diseases as a means of
guiding the implementation of policies and programmes and monitoring trends. Strategies to facilitate continuous risk factor surveillance are being piloted in countries and the outcome will continue to be used to strengthen programmes.

For the countries which have recently completed surveys (2007-2011), results show that the risk factors for chronic diseases are very prevalent in the Caribbean region. These include high levels of obesity (range: 55-74% in males; 62-83% in females), sedentary lifestyles (range 24-72%), and recent alcohol abuse (range: males 20-49%; females 8-21%) in the adult population. Levels of smoking (range: males 9-37%; females 1-10%) in the population and exposure to second hand smoke (range: males 16-30%; females 6-13%) particularly in the workplace (range (12-22%) are also of concern.

Accuracy and timeliness of data are essential for the mortality surveillance programme to be of great value to countries, therefore much effort has been placed in this area. Eight member countries submitted verified data up to 2009 and five up to 2008. Thirty-two years of mortality data were received from 15 (CMCs). These data were cleaned and validated through collaboration with countries, and 18 years of mortality data were submitted to PAHO Headquarters for inclusion into the PAHO regional database for the Americas. The mortality data from 19 countries were included in PAHO 2011 Basic Indicator Brochure.

Enhanced surveillance for communicable diseases such as respiratory illnesses, dengue fever, leptospirosis, tuberculosis and HIV/AIDS continued in all countries.

When compared to 2010, the prevalence of reported cases of fever and respiratory symptoms differed by less than 1% among those aged <5 years and by 8% among those aged > 5 years. Four countries recorded a marked increase in cases. Over fourteen hundred (1467) specimens were tested in 2011 and 496 (33.8%) were positive for at least one respiratory virus. Respiratory syncytial virus was the most frequently identified pathogen followed by Influenza A H1N1 pandemic strain and adenovirus.

The surveillance of vector borne diseases was strengthened with technical support through PAHO coordinated intersectoral workshops on integrated management strategy for dengue in Guyana and Trinidad and Tobago. The workshops included development of plans and implementation strategies. Over twenty-six thousands (26,892) cases of dengue were reported, of which 7,281 (26%) were laboratory confirmed. Fourteen member countries reported increase in activity during the year. Dengue serotypes 1 and 4 were identified in 9 countries and serotype 2 was identified in 4 countries. Four countries had co-circulation of dengue serotypes 1 and 4 while one country had co-circulation of serotypes 2 and 4 and another country had co-circulation of three serotypes, 1, 2 and 4. Forty-three dengue haemorrhagic fever (DHF)/dengue shock syndrome (DSS) cases were reported with one country reporting 50% of the cases.

All member countries in which malaria is endemic continue to experience decrease in cases with a total of 23,213 in 2010 to 20,332 in 2011.

Eleven countries reported 415 cases of leptospirosis which was an increase of 28.5% compared to 2010 and nine countries reported increase cases. The largest proportion of cases was from three countries. Most cases occurred in the 25-44 age groups and in males.

Availability of 2011 completed data for analysis for tuberculosis through the WHO system is delayed; therefore the available data being presented is 2010. The highest incidence rates (ranging from 34–94 new cases per 100,000 inhabitants) occur within the Central and South American member countries of CAREC. Four countries reported for 2010, between 10-20 new cases per 100,000 inhabitants, while the rest of the countries reported less than 10 new cases per 100,000 inhabitants. Overall about 27% of the new cases were found among people living with HIV.

HIV case-based surveillance is slated for implementation in all countries in order to strengthen HIV reporting and provide an in-depth follow-up of the HIV epidemic and programme impact. Six countries have implemented the case based system. Aggregated HIV data are reported to CAREC on an annual basis, but there is a noted delay in data submission from some countries.

Acute gastroenteritis (AGE), a major cause of morbidity, has the potential for outbreaks since the causative pathogens can be transmitted by infected persons, and contaminated water and food. There were 123,147 reported cases in 2011 compared to 155,859 in 2010. The cases were reported from all 23 member states. The 21% decrease in cases in 2011 compared to 2010 was observed in both age groups less than and greater than 5 years of age. The observed increase in cases in 2011 was in a similar time period as in 2010 and was greater in the group that was older than 5 years of age. Most of the primary investigation of specimens for causative agents of diarrhea is done within countries and serotyping and phage typing investigation are being
conducted at CAREC. Most (54%) of the AGE specimens that were investigated were for salmonella serotyping. Some of the pathogens isolated were Salmonella, Shigella, Norovirus, rotavirus, Vibrio cholera Non 01, and Aeromonas hydrophilia. Identification of pathogens in AGE cases has been strengthened through capacity building as well as by the implementation of the Burden of Illness Studies. Rotavirus diarrhea which tends to occur in children less than 5 years of age was reported more as a definitive diagnosis than previous years and is due to more countries being able to do this testing.

There was strengthening of national integrated food borne disease surveillance in seven countries; and of laboratory surveillance and diagnoses for acute gastroenteritis through the conduct of burden of illness studies (BOI).

TECHNICAL COOPERATION

Capacity building for disease surveillance and laboratory technology was done through technical cooperation to member countries and impacted on strengthening of the surveillance system, with crucial laboratory service support, data analysis and information dissemination, advocacy and outbreak investigation and support and technical updates.

Direct Technical Cooperation, Capacity Building and Surveillance and Response

Capacity building and technical support for conducting non-communicable disease risk factor surveys were provided to seven countries and two additional countries were supported with the analysis and report writing of data collected from risk factor surveys. An automated system for coding medical causes of death and selecting underlying causes of death was successfully implemented in two member countries, resulting in a total of 11 countries using this system.

The International Health Regulations (2005) (IHR) came into force on 15 June, 2007 and provides a legal framework for global health security. In compliance with IHR all member states have conducted their national assessments and developed plans of action for attaining core capacity for the implementation of IHR. Though not mandated under IHR, five of nine English and Dutch territories have also completed these activities. The purpose of these evaluations and audits was to assess whether issues of public health significance were being monitored efficiently and effectively.

CAREC hosted the Eleventh Meeting of Caribbean National Epidemiologists and Laboratory Directors in Trinidad and Tobago. Participants included National Epidemiologists, Laboratory Directors and Non-communicable Disease Focal Persons from CAREC member countries, representatives from the Pan American Health Organization (PAHO) offices in the Caribbean and Washington, the CARICOM Secretariat, regional universities and colleges, Institute de Veille Sanitaire – CIRE Antilles Guyane and the US Centers for Disease Control and Prevention. The objectives of the meeting were to: update on sub-regional technical cooperation, discuss current public health events and emergencies and provide a forum to share experiences.

The 2nd Meeting of the Caribbean Regional Health Emergency Health Response Team (RHERT) was held with participation of public health staff from 17 CAREC member countries. The meeting included sessions on post-disaster assessments, outbreak management and emergency response management strategies.

Sub-regional workshops were hosted in the areas of enhanced respiratory illness surveillance, analysis of burden of illness survey and identification of V.cholerae and gastroenteritis pathogens; The objective of the training was to strengthen capacity for data analysis in the region, focusing on surveillance data from the laboratory and identification of selected pathogens. There was collaboration with two regional universities to deliver surveillance and epidemiology lectures.

Advocacy, Plans, Policies and Norms

Advocacy is regarded as an important and effective tool for disseminating information and stimulating change. Achievements, experiences and lessons learned were shared at national, regional and international meetings, workshops and conferences.

During September 2011, the Centre participated in the PAHO Second Regional Meeting on the Implementation of the International Health Regulations (IHR) in the Americas, held in Mexico. This Meeting was organized to discuss the status of the Sub-region re the implementation of the IHR. Lessons learned and initiatives shared were beneficial to all. At the 20th Meeting of the Caribbean Caucus of Ministers responsible for Health in Washington DC, USA, (September 2011); the Status of Implementation of International Health Regulations in the English and Dutch Speaking Caribbean were also presented. This allowed for advocacy at the highest level and resulted in the development of a Cabinet Brief that
Excellence in Public Health Surveillance was used by countries to inform Government officials and other stakeholders.

Special focus was placed on the implementation of case-based surveillance in countries and at the 2011 Caribbean HIV conference in Bahamas, HIV Patient Monitoring in the OECS countries and Barbados, progress and outcome was shared with the participants.

Collaborative planning and sharing of technical information was done at the 9th Annual PulseNet Latin America and the Caribbean (PNLAC) Meeting held in Chile. October 2011. Foodborne Diseases (FBD) Surveillance in the Caribbean and Status of implementing Pulse Field Gel Electrophoresis FBD surveillance tool was shared and the needs of the Caribbean for improving foodborne disease surveillance were further discussed.

The 28th Caribbean EPI Managers’ Meeting was held at the Accra Beach Hotel and Spa in Christ Church, Barbados on February 27 to March 02, 2012. Over one hundred and twenty-seven participants attended. They represented 24 island states and territories as well as French Guiana, Guadeloupe, Haiti, Martinique, The Netherlands, Canada, USA, and international agencies such as the U.S. Centers for Disease Control and Prevention (CDC), the Public Health Agency of Canada (PHAC) and UNICEF. There were also representatives from the Ministries of Health, the Pan American Health Organization, Headquarters (PAHO), CAREC and PAHO Office in Suriname.

The purposes of the meeting were: to share experiences and lessons learned at the regional, sub-regional, and national levels in order to enrich collective understanding, build on the successes, refine strategies, and define solutions for deficits detected; provide scientific, technical, and programmatic updates; review current plans and outcomes and to develop new plans for the future and discuss and decide on timelines for the completion of country reports for the documentation and verification for the elimination of measles, rubella and congenital rubella syndrome (CRS).

Documentation and verification of measles, rubella, and CRS elimination in countries was a priority for the immunization programme in all member countries. All countries submitted a draft report on the documentation and verification process to the Sub-regional Commission. The Secretariat (CAREC’s immunization team), in collaboration with the Commission and teams (which at times included members of the Commission) supported and validated elimination in nine countries. Dominica was the recipient of the 2011 Surveillance Award with the second and third places going to Antigua and Barbuda and St. Maarten, respectively. The Henry C. Smith Immunization Award (an award in honour of Mr. Henry C. Smith, who was the first PAHO-EPI technical officer for the Caribbean sub-region) was presented to Jamaica. These countries should be commended for their efforts and achievements. They are excellent examples of what could be achieved through focused technical cooperation.

RESEARCH

Risk factor surveys are being conducted in CAREC member countries (CMCs) as a means of implementing on-going risk factor surveillance for the prevention and control of chronic diseases with the STEPS methodology being used. Eight English and Dutch speaking Caribbean countries (Aruba, Bahamas, Barbados, British Virgin Islands, Dominica, Grenada, St. Kitts and Trinidad and Tobago) have to date conducted risk factor surveys using the STEPS methodology with the support of CAREC, PAHO and the World Health Organization (WHO).

For 2008-2012, CAREC, in collaboration with the PAHO Food Safety Unit and member countries, has been conducting a Caribbean Burden of Illness (BOI) study that is being done to better understand the epidemiology of food bone diseases (FBD). It complements a larger study being implemented by the World Health Organization (WHO) to determine the global burden of FBD. Collaborators include the International Development Research Centre, Public Health Agency of Canada, Laval University, St George’s University and the University of the West Indies (UWI). As of December 2011, BOI studies have been completed in seven countries and initiated in two others. The main summary data from six countries with analyses of their population and laboratory surveys include: monthly prevalence estimates of diarrhoea in the community to be between 4.03-10.7%, the highest prevalence being among children aged less than 5 years of age; incidence/episodes of diarrhoea per year ranges from 0.52 to 1.4 episodes per year; duration of diarrhoea being 2.1-20 days; loss of productive days due to diarrhoea between 1-20 days; 4.3-65% reported taking oral rehydration fluids; 35-60% reported taking non–prescribed medications; 2-41% reported taking antibiotics; 21-58% reporting hand washing before and after toilet use.

Three papers were accepted and presented at the 2011 CHRC scientific conference and four papers were submitted for the 2012 CHRC conference. Four
articles were submitted to peer-reviewed journals.

Dissemination of Technical Information
The technical information of the Centre was disseminated through regular bulletins, which includes Surveillance reports, weekly respiratory illness surveillance bulletin, scientific publications and regional and international updates.

MANAGEMENT OF THE CENTRE
The effective management of the Centre is crucial for efficient, timely and relevant response to the needs of member countries. Technical input into the process of transitioning CAREC to CARPHA, thereby influencing the design of the new institution is necessary to prepare the Centre, its personnel and its processes for the transition. The countries have honoured their commitments and have paid the increased quota and all departments are working towards achieving their set objectives.

The 36th CAREC Directing Council was held in July 2011, chaired by Prof. E. Nigel Harris, Vice Chancellor, University of the West Indies (UWI), Mona, Jamaica. The council members in attendance were: Dr. Socorro Gross-Galiano, Assistant Director, Pan American Health Organization (PAHO), Dr. Rhonda Sealey-Thomas, Chief Medical Officer, Antigua and Barbuda; The Hon. Pablo Marin, Minister of Health, Belize, Hon. Julius Timothy, Minister of Public Health, Dominica, Dr. Eva Lewis-Fuller, Chief Medical Officer, Jamaica, Dr. Sirving Keli, Director of Health, Curacao, Dr. Anton Cumberbatch, Chief Medical Officer, Trinidad and Tobago. Dr. Rudolph Cummings, Programme Manager, Health Sector Development, CARICOM Secretariat and Dr. Donald Simeon, Director, Caribbean Health Research Council also participated in the meeting.

In the opening remarks, there was special welcome for the Director of Health of Curacao who was representing the country in its separate capacity as newly autonomous country of the Kingdom of the Netherlands. It was further stated that CAREC is an organization in transition and in the future the expectation is that not only the Dutch but also the French speaking countries will be a part of the agency, (CARPHA) for the Caribbean is more than English speaking countries. CAREC is the guardian of health for the Caribbean people and it is always challenging when an institution is in evolution. The Director of CAREC in her presentation of the report, acknowledged the excellent support given by the staff and other collaborating agencies. The comprehensive report highlighted major changes since the last Council meeting as well as achievements and challenges. Focus and priorities for 2011-2012 were presented. Some of the achievements and challenges presented were: filling of key vacant posts, transfer of technology (mainly selected laboratory services). Automated Xpert MTB/RIF equipment is being procured for tuberculosis investigation. Other information presented were capacity building activities implemented for the strengthening of communicable and non-communicable diseases in the CMCs. Resolutions were formulated to address the issues that emanated from presentations and discussions as well as the need to strengthen CAREC for transition to CARPHA.

In response to a resolution by CAREC’s 36th Directing Council, realignment of Human Resources and consolidation of work activities were conducted in 2011. This resulted in reduction of posts, a more efficient and effective administrative structure and a financially viable organization, with an operational budget within the limit of the quota contributions.

CAREC has been focusing on maintaining its current services, expanding as appropriate and preparing for transition. In strengthening its present capacity, the position of laboratory director was filled in September 2011. In preparation for transition, a committee was formed which developed and initiated implementation of a transition plan re technical, laboratory and administrative products and services which would be transferred to CARPHA in an efficient and organized way. This would ensure that the service to member countries would not be interrupted.

In strengthening the safety and security aspect of the Centre two high quality cameras were installed as well as improvement of the Intrusion Alarm Security System to assist the onsite officers in the surveillance of the main access and egress areas of the compound. The Security Standard Operating Procedure was also implemented.

In order to provide greater process clarity the SharePoint File Cabinet was reorganized and standardized in 2011, with the creation of new document libraries. This will aid in the management and access of information created within the organization and assist in easily identifying information that would be transferred to CARPHA. In addition to the document libraries a standard operating procedure will be created to help in the management of the files and guide users of the structure. The operation of the library and museum continues to be an integral part of the Centre, with focus being on the need to ready the collections for transfer into CARPHA. The documentation of the history of CAREC has started with proposed
Excellence in Public Health Surveillance

Completion date being twelve months post starting date.

CAREC Business Continuity Plan (BCP)
A new model for the Business Continuity Plan was approved in June 2011 by PAHO Washington. This model was selected as the standard that the English speaking PAHO country offices in the Caribbean would adopt. CAREC took the lead role in providing support to the other Caribbean offices to facilitate the completion of their BCP with the major achievement being 100% completion of plans in the region.

Financial Resource Management
At the start of 2011, Quota Contributions outstanding were USD 6,173,140 of which arrears totaled USD3,559,285 and contributions (2011) was USD 2,613,855. During the year, USD2,824,070 was collected which included USD776,082 representing 21.80% of the arrears and USD2,047,988 representing 78.35% of the 2011 assessment. The percentage collected in 2011 increased slightly to 45.75% as compared to 44.81% in 2010. At the end of 2011, outstanding Quota Contributions amounted to USD3,349,070.

Staff Awards Ceremony 2011
Special recognition was given to eleven employees, of which six received awards of ‘long’ service to CAREC for 10, 15, and 20 years. Three received recognition for academic achievement and a PAHO award for exceptional leadership and contribution to the Organization was presented to Ms. Catherine Eastman, General Services Coordinator. Two members of staff, Ms. Judy Dyer-Braveboy and Mr. Edwin Thompson, who had given combined years of service of over 50 years, were honored during the annual awards ceremony. The management and staff of CAREC congratulated all awardees.

Conclusion
CAREC is slated to be transitioned to CARPHA, together with four other Caribbean regional health institutions and all effort is being expended to ensure that CAREC is ready for this activity. CAREC continues to work with its stakeholders towards achieving the goals of the public health agendas including that of the Caribbean Cooperation in Health (CCH3) and the Port of Spain Declaration for non-communicable diseases (NCDs). The collaboration with country offices and other non-PAHO regional health institution and international agencies have continued to prove beneficial to us and the countries in ensuring that programmes are successfully executed. The leadership and commitment of the health professionals of the countries, Governments and their populations have worked to ensure that health status have improved and health preservation programmes have positive impact. CAREC strives to continuously improve and redefine itself to be relevant to the sub-region and its people.

The management and staff have risen to the challenges with providing necessary public health technical leadership, policy guidance, administrative oversight and required coordination.
CAREC ASSISTS WITH INTERNATIONAL HEALTH REGULATIONS

CAREC conducts surveys on NCD risk factors and burden of food borne disease illnesses
INCREASING SURVEILLANCE EMPHASIS ON NON-COMMUNICABLE DISEASES

EPIDEMIOLOGICAL OVERVIEW FOR CAREC MEMBER COUNTRIES
Epidemiological Overview for CAREC Member Countries

Figure 1: Crude mortality rates per 100,000 population for selected leading causes of death in CAREC Member Countries over the period 2001-2007

Mortality Overview

Introduction
This mortality data review describes deaths occurring during the period 2001-2007 for all CAREC Member Countries excluding Anguilla, Belize, the British Virgin Islands, the Cayman Islands, Jamaica, the BES Islands, Curacao, St. Maarten and St. Lucia, for whom data were not available for the entire time period. A more in-depth description of deaths is provided for 2006 for all CAREC Member Countries, except the BES Islands, Curacao and St. Maarten.

The underlying cause of death, as defined by the World Health Organization (WHO) is the disease or injury that initiated the train of morbid events resulting in death, or the circumstances or violence that produced the fatal injury. In this mortality overview the underlying cause of death is used for tabulation and has been grouped into categories as outlined in Volume 1 of the International Statistical Classification of Diseases and Related Health Problems, tenth revision (ICD-10).

Mortality Review
A trend analysis of leading causes of death grouped into broad categories over the period 2001 to 2007 revealed that underlying causes of death have remained fairly consistent (Figure 1). Chronic non-communicable diseases (heart diseases, neoplasms, diabetes mellitus and cerebrovascular diseases) were the top four leading causes of death across all 7 years. External causesootnote{External causes of death include all environmental events and circumstances that cause injury, poisoning and other adverse effects. This includes transport accidents, other external causes of accidental injury (such as falls or exposure to forces of nature), intentional self-harm, assault, legal interventions and operations of war and complications of medical and surgical care.} of death were the fifth leading cause of death, with hypertensive diseases and HIV being the sixth and seventh leading causes of death respectively from 2003 to 2007. In 2001 and 2002,
TABLE 1: Leading Causes of Death\(^1\) in CAREC Member Countries\(^2\) in 2006

<table>
<thead>
<tr>
<th>Underlying Cause of Death</th>
<th>All</th>
<th>Male(^3)</th>
<th>Female(^3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rank</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>1</td>
<td>4,468</td>
<td>11.1%</td>
</tr>
<tr>
<td>Cerebrovascular diseases</td>
<td>2</td>
<td>4,424</td>
<td>10.9%</td>
</tr>
<tr>
<td>Ischemic heart diseases</td>
<td>3</td>
<td>4,355</td>
<td>10.8%</td>
</tr>
<tr>
<td>Hypertensive disease</td>
<td>4</td>
<td>2,259</td>
<td>5.6%</td>
</tr>
<tr>
<td>Other forms of heart disease</td>
<td>5</td>
<td>1,915</td>
<td>4.7%</td>
</tr>
<tr>
<td>Malignant neoplasms - digestive organs</td>
<td>6</td>
<td>1,706</td>
<td>4.2%</td>
</tr>
<tr>
<td>Human Immunodeficiency Virus (HIV)</td>
<td>7</td>
<td>1,467</td>
<td>3.6%</td>
</tr>
<tr>
<td>Malignant neoplasms - male genital organs</td>
<td>8</td>
<td>1,222</td>
<td>3.0%</td>
</tr>
<tr>
<td>Influenza and pneumonia</td>
<td>9</td>
<td>981</td>
<td>2.4%</td>
</tr>
<tr>
<td>Malignant neoplasms - respiratory/intra thoracic organs</td>
<td>10</td>
<td>830</td>
<td>2.1%</td>
</tr>
<tr>
<td>Chronic lower respiratory diseases</td>
<td>11</td>
<td>822</td>
<td>2.0%</td>
</tr>
<tr>
<td>Malignant neoplasms - female genital organs</td>
<td>12</td>
<td>678</td>
<td>1.7%</td>
</tr>
<tr>
<td>Diseases of liver</td>
<td>13</td>
<td>676</td>
<td>1.5%</td>
</tr>
<tr>
<td>Respiratory/cardiovascular disorders - per inatal period</td>
<td>14</td>
<td>625</td>
<td>1.5%</td>
</tr>
<tr>
<td>Malignant neoplasms of breast</td>
<td>15</td>
<td>618</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

Notes:
1. Underlying cause of death classified using ICD-10 Volume 1 Block Classification.
2. Includes data for all CAREC Member Countries except the Netherlands Antilles.
3. The 13th ranked leading cause of death for Males in 2006 was Assault (homicide).
4. For Females in 2006, the 11th ranked leading cause of death was Other bacterial diseases, the 13th ranked was General symptoms and signs and the 14th ranked was Malignant neoplasm (primary)-lymphoid/haematopoietic.
5. Sub-regional population based on 2006 population data where available; if 2006 population data were not available the most recent year of data prior to 2006 was used as proxy.

The fifth leading cause of death was HIV and the sixth was hypertensive diseases.

The ranking order, number of deaths, percentage of total deaths and crude mortality rate per 100,000 population for deaths occurring in 2006 by gender is presented in Table 1. Diabetes, cerebrovascular diseases and ischemic heart diseases are the three top ranking causes of death overall and for both males and females. Overall, these three conditions accounted for 33.8% of deaths in 2006, with a crude mortality rate of 188.3 per 100,000 population. The fourth leading cause of death for females was hypertensive diseases, while for males it was malignant neoplasms of the male genital organs.

Figure 2 presents the leading causes of death, broken down by age group, for persons less than 65 years of age in 2006. Figures 2(a-c) illustrates the leading causes of death in each age group in 2006. In the 45-64 year age group, chronic diseases such as diabetes mellitus, ischemic heart disease and cerebrovascular diseases were the leading causes of death with little variability between males and females (Figure 2c). In the 25-44 year old age group Human Immunodeficiency Disease (HIV) was the leading cause of death, followed by assault or homicide as the second leading cause of death and other land transport accidents was the third leading cause of death. HIV, assault and land transport accidents affected males in this age group disproportionately more than females (Figure 2b). The top three leading causes of death for 15-24 year olds were assault, land transport accidents and HIV, with males being far more affected by assault and land transport accidents than females. Interestingly, and of concern, the fourth leading cause of death in this age group is intentional self-harm; and again, more males than females were affected (Figure 2b). In the 5-14 year age group the leading cause of death was land transport accidents followed by cerebral palsy and...
other paralytic syndromes, malignant neoplasms of the lymphoid, haematopoietic and related tissue, HIV and chronic lower respiratory diseases. Again, land transport accidents disproportionately affected males in this age group, compared to females (Figure 2a). Respiratory and cardiovascular disorders in the perinatal period were the leading cause of death among persons less than 5 years of age. This was followed by infections specific to the perinatal period, congenital malformations of the circulatory system, other disorders originating in the perinatal period and influenza and pneumonia. In this age grouping, there is little difference between leading causes of death among males and females (Figure 2a).
OVERVIEW OF RISK FACTORS FOR NON-COMMUNICABLE DISEASES

Introduction
Non-communicable diseases (NCD) are the leading cause of death globally², and also in the Americas Region³. In response to the growing need for country-level trends regarding this group of diseases and their risk factors, the World Health Organization (WHO) developed a STEPwise approach to chronic diseases risk factors surveillance (STEPS) as part of a global surveillance strategy. The main purpose is to provide an entry point for low and middle income countries to get started on chronic disease surveillance activities. It uses a standard survey instrument and methodology that can be adapted to different country resource settings. The survey, carried out on a regular and continuing basis, allows countries to monitor trends and make comparisons between countries.

In 2006 the STEPS methodology was accepted for use in implementing surveillance of risk factors for chronic diseases in the English-speaking Caribbean. The standardized methodology enables collection of data on demographics as well as behavioural, biological and biochemical risk factors from a random sample of the population. Interviews are conducted at the household level. Electronic Data collection (eSTEPS) with use of Personal Digital Assistants (PDAs) has been introduced in the English-speaking Caribbean enabling survey results to be available in a much shorter time frame.

To date eight English-speaking Caribbean countries (Aruba, Bahamas, Barbados, British Virgin Islands, Dominica, Grenada, St. Kitts and Trinidad and Tobago) have conducted risk factor surveys using the STEPS methodology with the support of CAREC, PAHO and WHO. The main results of this survey done in the eight countries are presented to highlight the epidemiological profile in terms of the risk factors for chronic disease in the Caribbean.

Methods
Using the STEPS methodology, data were collected from a random sample of a target population at the household level in each country. STEPS 1 and 2, which evaluated behavioural and biological measurements were done on the entire survey sample with STEP 3 (biochemical measurements) being done on a sub-sample.

Epi Info software was used for data analysis. Survey Fact Sheets were generated, which contain a summary of the survey’s main results. This overview of risk factors is based on the information contained in the Fact Sheets from STEPS surveys prepared by the 8 countries which have completed risk factor surveys using this methodology between the years 2006 to 2011 and analysed the data.

Sample Size and Data Collection
The sample size and the age group interviewed varied among the countries as shown in Table 2. The response rate also varied with the highest response rates being achieved in Aruba (97%) and Trinidad and Tobago (90.2%).

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>Targeted Age Range</th>
<th>Final Sample</th>
<th>Survey Response Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dominica</td>
<td>2008</td>
<td>15-64</td>
<td>1059</td>
<td>48%</td>
</tr>
<tr>
<td>Trinidad &amp; Tobago*</td>
<td>2011</td>
<td>27-64</td>
<td>2724</td>
<td>90%</td>
</tr>
<tr>
<td>Aruba</td>
<td>2006</td>
<td>25-64</td>
<td>1565</td>
<td>97%</td>
</tr>
<tr>
<td>Bahamas</td>
<td>2005</td>
<td>25-64</td>
<td>1582</td>
<td>90%</td>
</tr>
<tr>
<td>BVI</td>
<td>2009</td>
<td>25-64</td>
<td>1105</td>
<td>67.8%</td>
</tr>
<tr>
<td>Grenada</td>
<td>2011</td>
<td>25-64</td>
<td>1129</td>
<td>67.8%</td>
</tr>
<tr>
<td>St. Kitts</td>
<td>2008</td>
<td>25+</td>
<td>1443</td>
<td>66.3%</td>
</tr>
<tr>
<td>Barbados</td>
<td>2007</td>
<td>25+</td>
<td>1282</td>
<td>66%</td>
</tr>
</tbody>
</table>

*Survey results preliminary

Data collection in each risk factor survey was done by trained interviewers, using the STEPS instruments. The survey covered three levels of risk factor assessment: Behavioral risk factors were investigated using a questionnaire (STEP 1); biological risk factors were examined by taking of physical measurements (blood pressure, height, weight, and waist circumference (STEP 2)); and biochemical measurements (blood glucose and cholesterol) were taken in STEP 3. As a consequence of the very low level of participation in STEP 3, Barbados, British Virgin Islands, Dominica and St. Kitts excluded STEP 3 from the analysis of their survey data.

The Global status report on non-communicable diseases 2010⁴ was used to guide the variables presented in this overview.

RESULTS AND DISCUSSION

MODIFIABLE RISK FACTORS

Tobacco Use
Use of tobacco showed differences among countries and by gender. The percentage of current smokers (Figure 3) was greatest in Bahamas (43%) followed by Trinidad and Tobago (23.1%) and Grenada (18.5%). The smallest proportion of smokers (6.4%) was in the Virgin Islands (UK), which may have been the result of policies implemented to promote smoking cessation in 2006. In all countries men smoked more than women (Figure 3). However, the largest difference was found in St. Kitts where men smoked on average about 16 times more than women, followed by Barbados (8 times) and Dominica and Grenada where men smoked 5 times more than women. Daily smoking was also more frequent among men as compared to women with men far exceeding the women in this practice except for the British Virgin Islands where there was no significant difference between male 3.8% (95% CI 0.2-7.3) and female 2.3% (0.2-7.3) daily smokers. More females (8.9%) in Aruba smoked daily than in any other country. Age of smoking initiation ranged from 17-20 years for males and 20-21 years for females. While 96% of smokers in Trinidad and Tobago smoked manufactured cigarettes, only 52% indicated that they used manufactures cigarettes in St. Kitts.

FIGURE 3 -Tobacco Use.

Physical Activity
In all countries women showed higher proportion of low levels of activity than men, with the biggest difference (2.4 times greater in women) being in Dominica. Barbados was the country with the highest proportion (51.3%) of low activity levels in both sexes, followed closely by Trinidad and Tobago (45.8%) (Figure 4). WHO reported that in 2008, the average low levels of physical activity globally was 31% for adults aged 15 years and above (men 28% and women 34%) and in the Americas Region it was approximately 40%.

FIGURE 4: Physical Activity.

Alcohol Consumption.
Dominica had the highest percentage (51.3%; 95% CI 47.7-55.0) of current drinkers (who drank alcohol in the past 30 days), followed by Grenada (43.3%; 95% CI 39.4-40.1) and Trinidad and Tobago (42.7%; 95% CI 39.6-45.8). Drinking was more common among males than females in all countries (Figure 5).

FIGURE 5: Alcohol Use.

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6 Low level of activity was defined as less than 600 MET (Metabolic Equivalent)-minutes per week. MET is a measure used to express the intensity of physical activities, and a more complete definition is available at: http://www.who.int/chp/steps/GPAQ/index.html
Men tended to be more engaged in harmful use of alcohol than women in most countries (Figure 6). Among the current drinkers, harmful alcohol use was highest among males in Aruba (48.6%; 95% CI 47.5-49.6) followed by Grenada (38.2%; 95% CI 31.2-45.3) and Trinidad and Tobago (36.1%; 95% CI 31.6-40.5). Among females, Aruba (34.4%; 95% CI 33.0-35.7) had the highest levels of harmful use of alcohol (Figure 6). It is interesting that there was no significant difference in abuse of alcohol use by men (20.1%; 95% CI 10.1-30.1) and women (20.7%; 95% CI 10.3-31.1) in St. Kitts. The country with the least amount of harmful drinking among females (7.8% 95% CI 4.3-11.3) was British Virgin Islands, while St. Kitts (20.1%; 95% CI 10.1-30) had the lowest prevalence of alcohol abuse among males.

**FIGURE 6: Alcohol Abuse.**

Healthy Diets
Results showed that the proportion of people who have a healthy diet, measured by fruit and vegetable consumption (≥ 5 servings of fruits and vegetables per day) is very low in all countries (Figure 7).

**FIGURE 7: Consumption of Fruit and Vegetables.**

Metabolic/Physiological Risk Factors

**Obesity and Overweight**
In 2008, 35% of adults aged 20 years and older were overweight (BMI ≥ 25 kg/m2) (34% men and 35% of women) globally, according to WHO data. Prevalence of overweight (BMI ≥ 25kg/m2) in all countries was higher than the global prevalence, except among Dominican males (Figure 8). The proportion of obesity (BMI ≥ 30kg/m2) was also quite high in these countries. Women tended to be more overweight and obese than men, particularly in Dominica and Grenada, where the differences between males and females were significant. Aruba, Barbados Bahamas, Virgin Islands (UK), St. Kitts and Trinidad and Tobago showed high levels of obesity and overweight in both sexes.

**FIGURE 8: Overweight and Obesity.**

**Blood Pressure.**
For this report raised blood pressure was defined as systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg or currently on medication for high blood pressure. The Bahamas had highest levels of elevated blood pressure, with 43.7% of the population having raised blood pressure, followed by Grenada (38.1%), British Virgin Islands (36.4%) and St. Kitts (35%) (Figure 9). A higher proportion of males had raised blood pressure than females, but there were no significant differences between sexes, except for Aruba; males (48.9%; 95% CI 47.8-50.1), females (28.2%; 95% CI 27.3-29.1). Most countries showed values lower than the global prevalence, which in 2008 was approximately 40% in adults aged 25 and over (Figure 9). The prevalence for the Americas Region for the same age group is the lowest among the WHO Regions, 35% for both sexes, 39% among men and 32% among women.¹
the highest percentage of females (49.7%) with proportion of the population with raised risk followed by British Virgin Islands (38.3%) and 37.0% in St. Kitts. In Dominica the proportion of the population with raised risk appeared lower, possibly because the rates were calculated for the age group 15-44 years, as compared to ages 25-44 years for the other countries. Barbados was excluded from this analysis, due to the low response rates in some areas of the survey.

Implications for NCD Policy and Programmes
A large proportion of non-communicable diseases (NCD) are related to risk factors that are “pervasive aspects of economic transition, rapid urbanization and 21st-century life”, including tobacco use, unhealthy diet, insufficient physical activity and the harmful use of alcohol. This epidemiological overview of the risk factors for chronic diseases in CAREC Member Countries provides important information that can be used by the countries to take action to reduce the risk factors in the population. Most countries showed that a high proportion of their population, in particular the most productive segments are at high risk for the development of chronic diseases. Insufficient physical activity, overweight and obesity and the resulting elevated blood pressure levels should be urgently addressed. The publication “Interventions on Diet and Physical Activity: What Works”7 and the companion document “A Framework to Monitor and Evaluate Implementation: WHO Global Strategy on Diet, Physical Activity and Health”8 are useful resources recommended for use by countries in identifying evidence based interventions and establishing systems for monitoring and evaluation of the interventions which are implemented for reducing risk factors. Such systems are critical for identifying whether the interventions are having the desired outcomes.

Summary of Combined Risk Factors.
The percentage of respondents having ≥3 risk factors examined in the survey was calculated to identify persons at high risk of developing chronic diseases. The risk factors included in assessing raised risk for chronic diseases were percentage of current daily smokers; less than 5 servings of fruits & vegetables per day; low level of activity; overweight and raised blood pressure ≥140 systolic and/or diastolic ≥90. Persons having 3 or more of the aforementioned risk factors were considered at raised risk for chronic diseases. Although there were differences between sexes, high proportions of the population were identified as having raised risk for chronic diseases in all the countries.

Figure 10 shows the percentage of 25-44 years olds by sex identified as having raised risk for chronic diseases. In this productive age group, St. Kitts had the highest percentage of females (49.7%) with raised risk, followed by Trinidad and Tobago (44.3%) and the British Virgin Islands (42.7%). For the males in that age group, Aruba the highest percentage (62.7%) with raised risk followed by British Virgin Islands (38.3%) and 37.0% in St. Kitts. In Dominica the proportion of the population with raised risk

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COMMUNICABLE DISEASES OVERVIEW

Introduction
This epidemiological profile for CAREC member countries is based on data received routinely at CAREC from its member countries as part of the regional communicable disease surveillance system. The communicable disease surveillance system for CAREC member countries covers surveillance of seven syndromes and selected food, water, air and vector borne diseases, vaccine preventable diseases, sexually transmitted infections and other selected diseases as shown in Appendices 1-4.

Diseases under the Expanded Programme on Immunization
A summary of the epidemiology of diseases under the Expanded Programme on Immunization can be found within the chapter on this Programme in this report.

Vector Borne Diseases
Dengue fever, Dengue Haemorrhagic fever and Dengue Shock Syndrome
In 2011, the number of reported laboratory confirmed dengue cases in CAREC member countries increased by 35.5% compared to the number reported in 2010 (Appendix 4). During 2011, there were 7,483 laboratory confirmed cases reported (Appendix 4) as well as 19,801 clinical cases (Table 3). During 2011, dengue cases were reported from all 23 CAREC Member Countries (Appendix 4). The largest proportion of laboratory confirmed cases were reported from Aruba (20.0%), Guyana (17.2%), Trinidad and Tobago (16.6%) and Curacao (11.6%).

During 2011, compared to 2010, 14 (60.9%) CAREC member countries reported increased dengue activity (Appendix 4). The countries with the greatest proportionate increase in dengue cases include the Bahamas; Bonaire, St. Eustatius and Saba (collectively known as the BES Islands); and Trinidad and Tobago.

TABLE 3: Cases of Suspected Dengue Fever, Laboratory Confirmed Dengue, Dengue-Related Deaths and Serotypes reported by CAREC Member Countries, 2011.

<table>
<thead>
<tr>
<th>CAREC MEMBER COUNTRIES (CMCs)</th>
<th>Dengue Fever</th>
<th>Dengue Haemorrhagic Fever</th>
<th>Dengue-Related Deaths</th>
<th>Circulating Serotype</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Confirmed Cases</td>
<td>Clinical Cases</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anguilla</td>
<td>9</td>
<td>5</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Antigua and Barbuda</td>
<td>3</td>
<td>7</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Aruba</td>
<td>1,497</td>
<td>3,421</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Bahamas</td>
<td>213</td>
<td>7,000</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Barbados</td>
<td>203</td>
<td>745</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Bermuda</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Belize</td>
<td>89</td>
<td>1,091</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Bonaire, St. Eustatius, Saba</td>
<td>567</td>
<td>939</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>British Virgin Islands</td>
<td>31</td>
<td>939</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Cayman Islands</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Curacao</td>
<td>889</td>
<td>1,555</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Dominica</td>
<td>45</td>
<td>40</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Grenada</td>
<td>87</td>
<td>87</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Guyana</td>
<td>1,285</td>
<td>1,093</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Jamaica</td>
<td>498</td>
<td>408</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Montserrat</td>
<td>4</td>
<td>3</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>St Kitts and Nevis</td>
<td>47</td>
<td>38</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>St Lucia</td>
<td>585</td>
<td>585</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>St. Maarten</td>
<td>16</td>
<td>168</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Suriname</td>
<td>126</td>
<td>369</td>
<td>23</td>
<td>4</td>
</tr>
<tr>
<td>St Vincent and the Grenadines</td>
<td>47</td>
<td>43</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Turks and Caicos Islands</td>
<td>14</td>
<td>19</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td>1,243</td>
<td>1,243</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7,483</strong></td>
<td><strong>19,801</strong></td>
<td><strong>43</strong></td>
<td><strong>13</strong></td>
</tr>
</tbody>
</table>

Data Source: CAREC Communicable Disease 4-Weekly Reports, Country-submitted Validation Reports, Country-Submitted Dengue Reports and the CAREC Laboratory
Dengue cases were reported throughout the year; however, the greatest number of reported cases occurred during the beginning of the year with peaks observed during weeks 5-8 due to increased numbers of reported cases from Aruba, Barbados, the BES Islands and Curacao; weeks 25-36 due to increased numbers of reported cases from Bahamas, Barbados, British Virgin Islands, Dominica, Guyana and St. Lucia; and weeks 49-52 due to increased numbers of reported cases from Bahamas, British Virgin Islands and Suriname (Figure 11). Somewhat similar regional trends were observed in previous years though the countries with peaks at different times.

Age group information was available for 51.7% of the laboratory confirmed cases dengue cases and the age group with the highest number of reported cases was 25-44 years (Figure 12). Among cases with known gender, males (51.3%) represented a slightly larger proportion of cases than females (48.7%).

FIGURE 11: Reported Cases of Laboratory-Confirmed Dengue Haemorrhagic Fever/Shock Syndrome by 4-week (epidemiologic week) period CAREC Member Countries, 2009-2011

FIGURE 12: Laboratory confirmed Dengue Fever Cases with known age reported to CAREC by Age Group, 2011
Serotyping information was available for cases from 15 countries that reported dengue cases (Table 3). During 2011 the predominant circulating dengue serotypes were types 1 and 4. This is a change from recent years when the predominant circulating serotype was type 2, with serotype 1 also dominant in 2010 (Figure 13). During 2011, dengue serotypes 1 and 4 were identified in 9 countries and dengue serotype 2 was identified in 4 countries (Figure 13). Dengue type 3 was not detected in CAREC member countries during 2011. Four countries (Aruba, Dominica, St. Kitts and Nevis and Trinidad and Tobago) had co-circulation of dengue serotypes 1 and 4 and Suriname had co-circulation of serotypes 2 and 4. One country, Barbados, had co-circulation of three serotypes, 1, 2 and 4.

In 2011, 43 dengue haemorrhagic fever (DHF)/dengue shock syndrome (DSS) cases were reported to CAREC. The highest number of cases were reported from Suriname (23 cases), Barbados (6 cases) and Grenada (5 cases) (Appendix 4). The peaks in DHF/DSS during 2011 mirrored that of dengue fever as described above (Figure 14). Age group was available for 82.9% of laboratory confirmed DHF/DSS cases and the age groups with the highest number of reported cases were 5–14 years and 15–24 years (Figure 15). Males (61.8%) represented a larger proportion of cases than females (38.2%). Thirteen dengue-related deaths were reported to CAREC (Table 3).
Malaria
During 2011, 20,319 cases of indigenous malaria were reported from five CAREC member countries, with the largest proportion of cases reported from Guyana (98.7% as at week 48), as was observed in previous years (Appendix 4). Cases were also reported from Suriname (170 cases), Belize (72 cases), where malaria is still considered to be indigenous.

Additionally, there were 501 imported malaria cases reported during 2011, with the majority of cases being reported from Suriname (92.6%). While Suriname is indigenous for malaria, the majority of these imported cases were reported to have been exposed to malaria while working in the gold mines in French Guyana. Imported malaria cases reported from other countries came from various places including Haiti, Guyana, Nigeria, Ghana, India, Pakistan and Honduras.

Malaria cases were reported throughout the year with the greatest number of cases noted during weeks 21-24 and this pattern is mainly reflective of data from Guyana (Figure 16). While date of onset is preferred as the date used when analysing seasonal trends, when it was not available the date the case was reported to CAREC was used. Thus, caution should be taken when examining these data.

Leptospirosis
During 2011, countries reported 415 laboratory-confirmed cases of leptospirosis, which is a 28.5% increase in the number of cases reported in 2010 (Appendix 4). Cases were reported from 11 countries, with the largest proportions of cases being reported from Guyana (36.8%), Jamaica (22.4%) and Barbados (10.6%) (Appendix 4). Nine countries reported an increase in cases in 2011.

Cases of leptospirosis were reported throughout the year with peaks seen during: weeks 9-12 due to increased numbers of reported cases from Guyana and Suriname; weeks 25-28 due to increased numbers of reported cases from Guyana, Suriname, Dominica and Jamaica; weeks 37-40 due to increased numbers of reported cases from Guyana, Jamaica and Barbados; and weeks 45-48 due to increased numbers of reported cases from Barbados, Jamaica and St. Vincent and the Grenadines (Figure 18). Serovar Mankarso was identified in Dominica during the year.
Also reported a notable increase in dengue fever cases in 2011, but not in cases of leptospirosis and malaria. Guyana reported a notable increase in leptospirosis. A peak in undifferentiated fever cases <5 years age was noted during week 8 which correlates with increases in dengue in Aruba, Barbados, BES Islands, Curacao and St. Maarten during that period; and increases in leptospirosis in Jamaica and St. Lucia. The number of undifferentiated fever cases >5 years age peaked during weeks 30-32 and is mainly attributed to the increase in dengue cases noted in Bahamas and St. Lucia during this period.

**FIGURE 20: Undifferentiated Fever < 5 years CAREC Member Countries, Epidemiologic Weeks 1-52/53, 2007-2011**

**FIGURE 21: Undifferentiated Fever ≥ 5 years CAREC Member Countries, Epidemiologic Weeks 1-52/53, 2007-2011**

**Plague, Rabies and Yellow Fever**

During 2011, there were zero cases of plague, rabies and yellow fever among humans reported from CAREC member countries.

**Undifferentiated Fever and Fever and Haemorrhagic Symptoms**

Undifferentiated fever cases and fever and haemorrhagic cases are mainly used as an indicator of vector borne disease circulation. Undifferentiated fever cases <5 years age and >5 years age increased by 21.1% and 42.2%, respectively, in 2011 compared to 2010 (Appendix 1, Figures 20 and 21). These increases are mainly due to increased numbers of cases <5 years reported from Bahamas, the BES Islands, Jamaica and St. Lucia, that collectively reported 80% of the total cases (Appendix 3). Among those aged >5 years, the largest increases in reported cases were observed in Bahamas, BES Islands and St. Lucia, that collectively reported 45% of the total cases (Appendix 3). Additionally, while Guyana and Jamaica reported less cases aged >5 years in 2011 compared to 2010, they collectively reported 46% of the cases in 2011. Bahamas, BES Islands and St. Lucia also reported a notable increase in dengue fever cases in 2011, but not in cases of leptospirosis and malaria. Guyana reported a notable increase in leptospirosis. A peak in undifferentiated fever cases <5 years age was noted during week 8 which correlates with increases in dengue in Aruba, Barbados, BES Islands, Curacao and St. Maarten during that period; and increases in leptospirosis in Jamaica and St. Lucia. The number of undifferentiated fever cases >5 years age peaked during weeks 30-32 and is mainly attributed to the increase in dengue cases noted in Bahamas and St. Lucia during this period.

**Airborne Diseases**

**Fever and Respiratory Symptoms**

Cases of fever and respiratory symptoms are mainly used as an indicator for influenza activity. During 2011, compared to 2010, overall the number of cases of fever and respiratory symptoms decreased slightly,
by less than 1% among those aged <5 years and by 8% among those aged > 5 years (Appendices 1 and 3). However, some countries reported an increased number of cases, with the most notable increases observed in Belize, British Virgin Islands, St. Lucia and Turks and Caicos Islands (Appendix 3).

During 2011, peaks in fever and respiratory cases <5 and >5 years of age were noted in weeks 6-12 and weeks 39-41, as was observed in previous years (Figures 22 and 23). Influenza and other respiratory viruses identified during the year will be discussed later in this report.

**FIGURE 22: Fever and Respiratory Symptoms (ARI) < 5 years CAREC Member Countries, Epidemiologic Weeks 1-52/53, 2007-2011**

**FIGURE 23: Fever and Respiratory Symptoms (ARI) ≥ 5 years CAREC Member Countries, Epidemiologic Weeks 1-52/53, 2007-2011**

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**Severe Acute Respiratory Infection (SARI) Sentinel Surveillance**

During 2011, sentinel surveillance for Severe Acute Respiratory Infection (SARI) was conducted in seven countries, namely Barbados, Belize (beginning during week 41), Dominica, Jamaica, St. Lucia (for weeks 21-29), St. Vincent and the Grenadines, and Trinidad and Tobago.

During 2011, 1,297 SARI cases were admitted to sentinel hospitals in these countries and the rate of admission due to SARI was 2.4 per 100 hospital medical admissions. The rate of SARI admissions peaked during week 41 with 4.7% of medical admissions due to SARI (Figure 24). For countries with a complete year of data, the overall SARI rate per country for 2011 ranged from a low of 1.4 per 100 medical admissions in Dominica to 7.2 in Barbados. The average SARI admission rate for Belize was 8.3 per 100 medical admissions and 7.7 per 100 medical admissions for St. Lucia, however, as previously stated, data from these two countries were reported for less than 12 weeks each and thus the rate of SARI admission could have been influenced by seasonal changes in influenza activity. (Figure 25).

**FIGURE 24: SARI Admissions and SARI Admissions Rate per 100 Hospital Medical Admissions from Sentinel Sites in Select CAREC Member Countries, 2011**

**FIGURE 25: SARI Admissions and SARI Admissions Rate per 100 Hospital Medical Admissions from Sentinel Site, 2011**

(Belize only weeks 41-52, St. Lucia only weeks 21-29)

Children aged 6 months – 4 years had the highest rate of SARI admissions (5.4 SARI admissions per 100 medical admissions), while persons aged 50-64 years had the lowest rate of SARI admissions (1.8 SARI admissions per 100 medical admissions) (Figure 26).

**FIGURE 26: SARI Admissions by Age Group from Sentinel Sites in Select CAREC Member Countries, 2011**

*Note: Graph includes data from Barbados, Dominica, Jamaica, St. Vincent & the Grenadines and Trinidad & Tobago.

During 2011, there were 23 SARI-related deaths in the five countries that participated in the SARI surveillance. The overall SARI death rate was 0.5 patients per 100 deaths in hospital (Figure 27). However, Barbados...
reported the majority of the SARI-related deaths (20 deaths, 86.9%). There was one death reported each from Dominica (week 22), Jamaica (week 38) and Belize (week 41). The variation in statistics among countries may be due to actual disease trends or also due to variability of surveillance activities among countries and requires further examination.

**FIGURE 27: SARI Deaths and SARI Death Rate per 100 Deaths in Hospitalized Patients from Sentinel Sites in SARI Sentinel CAREC Member Countries, 2011**

(Note: Cases reported from Barbados, Dominica, Jamaica, Belize)

[Graph showing SARI deaths and SARI death rate per 100 deaths in hospitalized patients]

Influenza-Like Illness/Suspected Influenza Cases
During 2011, 3,770 cases of influenza-like illness (ILI)/suspected influenza cases were reported, compared to 15,476 cases reported during 2010 (Appendix 2). This was primarily due to no reports received from Trinidad and Tobago for 2011 compared to 11,803 cases (76% of the total) reported in 2010 (Appendix 4).

**Laboratory Results**
During 2011, 588 specimens were tested (via PCR or IFA) for influenza and other respiratory viruses at the CAREC Laboratory, with at least one respiratory virus confirmed in 322 (54.7%) samples. The rate of positivity was 16% among the 480 samples tested at Jamaica’s National Influenza Centre and 29% among the 390 samples tested at the National Laboratory in Barbados. It should be noted that the CAREC Laboratory conducts testing for more respiratory viruses that the laboratories operated in Jamaica and Barbados and it is expected that the rate of positivity would be higher at the CAREC Laboratory than in the other facilities. Respiratory syncytial virus (RSV) was the respiratory virus most frequently identified in 2011, followed by influenza A H1N1 pandemic strain and adenovirus.

**Tuberculosis (TB)**
Data on tuberculosis (TB) are collected by the World Health Organization (WHO) on an annual basis through online reporting by countries. CAREC/PAHO supports member countries to collect, validate and submit these data. At the time of writing this report, data for 2011 was not yet due, hence 2010 data are presented.

The number of new and relapse TB cases reported since 2010 by all CAREC member countries was limited to eight cases, though the number of times drug sensitivity testing is performed remains limited in most countries.

**TABLE 4: Tuberculosis Cases in CAREC Member Countries in 2010, Data Reported to WHO.**

<table>
<thead>
<tr>
<th>Country</th>
<th>Total number of new and relapse TB cases</th>
<th>Number of new TB cases / 100,000 inhabitants</th>
<th>Number of HIV positive new TB cases</th>
<th>Number receiving DST***</th>
<th>Number of MDR**** cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angola</td>
<td>2</td>
<td>0.4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Antigua and Barbuda</td>
<td>6</td>
<td>6.8</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Aruba</td>
<td>6</td>
<td>5.6</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bahamas</td>
<td>31</td>
<td>9.0</td>
<td>15</td>
<td>23</td>
<td>0</td>
</tr>
<tr>
<td>Barbados</td>
<td>6</td>
<td>2.2</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Belize</td>
<td>145</td>
<td>46.5</td>
<td>29</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bermuda</td>
<td>1</td>
<td>1.5</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Grenada</td>
<td>1</td>
<td>1.1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Guyana</td>
<td>712</td>
<td>94.4</td>
<td>200</td>
<td>39</td>
<td>5</td>
</tr>
<tr>
<td>Jamaica</td>
<td>130</td>
<td>47.7</td>
<td>29</td>
<td>45</td>
<td>1</td>
</tr>
<tr>
<td>Montserrat</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Saint Kitts and Nevis</td>
<td>2</td>
<td>3.8</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Saint Lucia</td>
<td>8</td>
<td>5.2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Saint Vincent and the Grenadines</td>
<td>15</td>
<td>13.7</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Sint Maarten (Dutch part)</td>
<td>3</td>
<td>7.9</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Suriname</td>
<td>194</td>
<td>37.3</td>
<td>53</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td>239</td>
<td>16.3</td>
<td>58</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Turks and Caicos Islands</td>
<td>15.6</td>
<td>0.0</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Notes:
**DST:** Drug Sensitivity Testing
***MDR:** Multi Drug Resistant Tuberculosis

The number of new and relapse TB cases reported since the beginning of the WHO registration shows an increasing trend (Figure 29).
Sexually Transmitted Infections, including HIV/AIDS

HIV
Aggregated HIV data are reported to CAREC on an annual basis. Despite continuous efforts, HIV reporting has been incomplete during the last years (Figure 30, Table 5). At this time, more detailed HIV data are needed for surveillance and programme evaluation purposes, especially in the context of outcome of antiretroviral treatment and emergence of HIV drug resistance. HIV case-based surveillance is being implemented to enable countries to do a detailed profile of the HIV epidemic and programme evaluation. At this point several countries have case-based surveillance data available for HIV, though these have not been centralized for sub-regional reporting.

A decrease in number of AIDS cases and number of AIDS deaths (Figures 31 and 32) has been observed from 2003 onwards. This corresponds to antiretroviral treatments becoming generally available in the region around that period. Due to incomplete reporting during the last years, there is limited insight into whether this decrease continues or whether the emergence of HIV drug resistance might affect the outcome of antiretroviral treatment.

TABLE 5: New HIV cases, AIDS cases and AIDS deaths: most recent data available

<table>
<thead>
<tr>
<th>Country</th>
<th>Most recent data available</th>
<th>New HIV cases</th>
<th>AIDS cases</th>
<th>AIDS deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antigua and Barbuda</td>
<td>2008</td>
<td>88</td>
<td>29</td>
<td>0</td>
</tr>
<tr>
<td>Bahamas</td>
<td>2009</td>
<td>296</td>
<td>113</td>
<td>130</td>
</tr>
<tr>
<td>Barbados</td>
<td>2010</td>
<td>191</td>
<td>99</td>
<td>37</td>
</tr>
<tr>
<td>Belize</td>
<td>2011</td>
<td>226</td>
<td>248</td>
<td>88</td>
</tr>
<tr>
<td>Bermuda</td>
<td>2011</td>
<td>8</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>British Virgin Islands</td>
<td>2011</td>
<td>6</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Cayman Islands</td>
<td>2011</td>
<td>5</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Anguilla</td>
<td>2006</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dominica</td>
<td>2011</td>
<td>0</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Grenada</td>
<td>2010</td>
<td>30</td>
<td>19</td>
<td>14</td>
</tr>
<tr>
<td>Guyana</td>
<td>2010</td>
<td>981</td>
<td>133</td>
<td>5</td>
</tr>
<tr>
<td>Jamaica</td>
<td>2007</td>
<td>1489</td>
<td>761</td>
<td>120</td>
</tr>
<tr>
<td>Turks and Caicos Islands</td>
<td>2011</td>
<td>22</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Montserrat</td>
<td>2011</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>St. Lucia</td>
<td>2009</td>
<td>51</td>
<td>29</td>
<td>8</td>
</tr>
<tr>
<td>St. Kitts and Nevis</td>
<td>2010</td>
<td>9</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>St. Vincent and the Grenadines</td>
<td>2011</td>
<td>45</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>Suriname</td>
<td>2005</td>
<td>610</td>
<td>284</td>
<td>164</td>
</tr>
<tr>
<td>Trinidad and Tobago</td>
<td>2009</td>
<td>375</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aruba</td>
<td>2010</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Curacao/Netherlands Antilles</td>
<td>2008</td>
<td>114</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sexually Transmitted Infections (STIs)
Variability between countries with respect to timeliness of reporting of sexually transmitted infections (STIs), as well as surveillance methodology and coverage is too great at this time to provide an
Food and Water Borne Diseases

Acute gastroenteritis (AGE) has always been a major cause of morbidity especially for children less than five years old and this trend continued during 2011(Appendices 1-4 and Figures 33-36). The potential for outbreaks is very high since these pathogens can be transmitted by infected persons, contaminated water and food and touching contaminated surfaces as in the case of norovirus.

A total of 123,147 cases of acute gastroenteritis (AGE) were reported from 22 CAREC member countries in 2011, compared to 155,859 cases reported in 2010, representing a 21% decrease, observed in both age groups less than and greater than 5 years of age. The marked increase in AGE was noted during the first 10 weeks of 2010 in both age groups of less than 5 and over 5 year was not observed in 2011(Figures 33, 34). The observed increase in cases in 2011 was in a similar period and was in the group that was older than 5 years of age. Most of the primary investigation of specimens for causative agents of AGE is done within countries and serotyping and phage typing investigation are being conducted at CAREC.

**Foodborne Disease Trends, 2005-2011**

During 2005-2011, reported human foodborne disease (FBD) pathogens (laboratory-confirmed Salmonella, Shigella, Vibrio, Campylobacter, pathogenic Escherichia coli, Norovirus and clinically-diagnosed Ciguatera) in the Caribbean increased by 26.7%, from 1064 cases in 2005 to 1310 in 2011, with a peak in Salmonella in 2010 (Figures 35 and 36). Overall, non-typhoidal Salmonella was the most common infection (51%), followed by clinically diagnosed Ciguatera poisoning (25.5%), Shigella (9.0%), Typhi (5.7%), Campylobacter (5%) and Norovirus (1.8%) infections. There were increases in Salmonella (15.2%), Campylobacter (5.9%) and Norovirus (5.32%) infections from 2005 to 2011, whilst Typhi (-24.9%), Ciguatera (-24%) and Shigella (-4.6%) declined during the same period. Types and proportions of FBD pathogens reported varied markedly by country. Regional surveillance of Campylobacter and pathogenic Escherichia coli began in 2006 and for Norovirus in 2011, with the Norovirus data before 2011 being primarily from outbreaks. The data on human foodborne disease pathogens have been influenced by the burden of illness (BOI) surveys implemented in selected countries.
Human salmonellosis has been the most commonly reported cause of foodborne disease illness and outbreaks in the Caribbean since 1985. This trend continued in 2011, when salmonellosis accounted for 60% of the overall reported FBD pathogens (Figures 35-36; Appendix 4). During 2011, there were a total of 791 laboratory-confirmed Salmonella isolates from humans from 15 countries. The majority of isolates were from five countries: Guyana (36%), Jamaica (14%), Suriname (14%), Barbados (12%) and Trinidad and Tobago (11%).

Of the 791 human Salmonella isolates reported from 14 countries, 306 isolates (40%) from 10 countries were further differentiated by serotyping. Among these 306 isolates, a total of 39 Salmonella serotypes were identified. Salmonella Enteritidis (SE) and Salmonella Typhimurium (ST) continued to account for about half of the reported human salmonella isolates, a trend observed in the Caribbean since 1995. The 10 most common serotypes identified overall are shown in Figure 37. SE was the most prevalent serotype identified overall (33%); and also the most prevalent in Barbados, Jamaica, Suriname and Trinidad and Tobago. Mississippi was the third prevalent serotype (10%) overall, but was only reported from Bermuda. One isolate received from the Bahamas was identified as S. Typhi. Two new serotypes were identified in 2011, S. Jukestown and S Madelia, both of which were from Trinidad and Tobago (Figure 37 and Table 7). The apparent predominance of different serotypes, besides SE and ST, in some countries is suggestive of different sources (imported or local) of infections, which may be different from the food sources commonly associated with SE and ST infections (e.g. eggs, poultry, meats). The emergence of serotypes other than SE and ST has also been noted worldwide, suggesting a possible changing epidemiology of Salmonella infections.

During 2011, there were also 119 reported salmonellas from non-human sources (mainly poultry, other animals, eggs and egg-related foods). Most (54%) of these isolates were from Barbados, followed by Trinidad and Tobago (46%). Of the 119 non-human salmonella isolates, 117 (98%) were further differentiated by serotyping. The 10 most
common non–human serotypes identified are shown in Figure 38. Salmonella Enteritidis (19%) was the most common serotype identified, similar to that identified from the human isolates. Kentucky was second most prevalent serotype identified (18%) however, this was not common among human isolates.

**FIGURE 38: Salmonella Serotypes in Non –Humans (Animals and Food), 2011.**

### Phage Typing of Salmonella Enteritidis

During 2011, phage typing was performed on 92 SE isolates from seven countries namely, Barbados (42%), Jamaica (26%), Trinidad and Tobago (19%), Dominica (11%), St. Lucia (3%), Suriname (2%) and Bahamas (1%). A total of nine SE phage types (PTs) were identified. Of these, PTs 22 (31.5%), 13a (28%), 8var (16%) and 8 (14%) were the dominant types, similar to that seen in 2010 (Table 8). Two new phage types were identified, one isolate of PT 51 from Suriname and a PT 55 from Bahamas. This trend of an increasing prevalence of PTs 22 and 13a since 2006, and a decreasing prevalence of PTs 1 and 4 (which dominated in 2000-2004), suggests a changing epidemiological pattern of SE in these countries. This may be reflective of changes in the source of imported baby chickens and hatching eggs or new sources of SE besides the typical eggs and chicken sources. It should be noted that the phage typing data documented here more aptly represents the SE PT patterns for Barbados, Trinidad and Tobago and Jamaica. A larger sample size of SE is needed from the other countries to infer meaningful trends and public health risk factors.

**TABLE 8: Results of Salmonella Enteritidis Phage Typing, 2011**

<table>
<thead>
<tr>
<th>Country</th>
<th>Phage Type (PT)</th>
<th>1</th>
<th>6a</th>
<th>8</th>
<th>8var</th>
<th>13</th>
<th>13a</th>
<th>22</th>
<th>51</th>
<th>55</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barbados</td>
<td></td>
<td>4</td>
<td>7</td>
<td>1</td>
<td>10</td>
<td>17</td>
<td>39</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bahamas</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dominica</td>
<td></td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td>1</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jamaica</td>
<td></td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>12</td>
<td>7</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>St. Lucia</td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
<td>1</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suriname</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T &amp; T</td>
<td></td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>3</td>
<td>1</td>
<td>15</td>
<td>3</td>
<td>29</td>
<td>26</td>
<td>1</td>
<td>1</td>
<td>92</td>
<td></td>
</tr>
</tbody>
</table>

### Shigellosis

During 2011, a total of 127 shigellosis cases were reported from 11 countries. Most were from Suriname (49%) and Jamaica (28%) (Appendix 4). Reported Shigella cases slightly declined from the 138 cases that were reported in 2010. Only 28% of the Shigella isolates were serotyped, of which the prevalent Shigella serotypes identified were Shigella sonnei (53%) and flexneri (19%). These have been the two predominant serotypes isolated from countries since 2000. Poor food handling practices is known as a major contributing factor to Shigella infections.

### Campylobacteriosis

During 2011, a total of 90 human cases of Campylobacter infections were reported from five countries: Barbados (72%), Bermuda (21%), Aruba (2%), Bahamas (2%) and Suriname (2%) (Appendix 4). These countries have consistently reported Campylobacter in the past three years in similar proportions. Currently Campylobacter is the most commonly reported FBD pathogen globally and the prime association is with chickens (reservoir). Given that chicken is a commonly consumed meat in many Caribbean countries, the continued low reported numbers of Campylobacter in comparison to other FBDs may be suggestive of non-routine testing for this organism, difficulty in isolating this organism and improper storage and transport conditions.

### Ciguatera (fish toxin) poisoning

During 2011, a total of 248 cases of ciguatera poisoning (clinically diagnosed) were reported from six countries, a slight increase of four cases over that reported in 2010. Ciguatera poisoning was the second most commonly reported FBD (following salmonellosis), a trend that has been observed since 2007. The largest proportions of Ciguatera poisoning were reported from Bahamas (58%) and Antigua and Barbuda (21%), followed Cayman Islands (10%), Montserrat (6%) and Jamaica (2%) (Appendix 4). The occurrence of even small numbers of cases of
ciguatera poisoning is of concern since this is a toxin illness (as opposed to bacterial infections) and can result in severe illness, including neurological symptoms that may have long lasting effects and can also be life threatening.

**Norovirus infections**
During 2011, there were 47 human cases of Norovirus reported from seven countries, with the largest proportions reported from Barbados (51%) and Jamaica (21%). A small outbreak was noted in Barbados. The increasing occurrence of Norovirus observed since 2008 in more countries is of concern because of the ability of this viral pathogen to spread rapidly and its association with cruise-ship outbreaks: with the increase capacity for testing in countries, more cases are expected to be reported.

**Other Diseases and Syndromes of Interest**

**Leprosy**
During 2011, there were 114 cases of leprosy reported from 5 countries Suriname (36%), Trinidad and Tobago (31%), Guyana (20%), Jamaica (7%) and St. Lucia (6%) (Appendix 4). Of these 114 cases, 44 (39%) were female. During 2011, all reporting countries except St. Lucia reported cases <15 years of age, which is an indication that transmission continues. All reporting countries except St. Lucia also reported cases with grade 2 disabilities; and relapses were reported from Guyana (4), Suriname (4) and Trinidad and Tobago (1). During the past five years, the goal of elimination set by WHO (e.g. <1 case per 10,000 population) has been maintained in almost all CAREC member countries (Figure 39).

**Fever and Neurological Symptoms**
The total number of reported cases of fever and neurological symptoms increased slightly by 8% from 695 in 2010 to 751 in 2011 (Appendix 3). During 2011, as in previous years, the large majority of cases of fever and neurological symptoms (87%, 661 cases) were reported from Jamaica, where suspected meningitis cases are included in this category. The remaining 13% (95 cases) were reported from eight other countries, namely Bahamas, Bermuda, BES Islands (Bonaire, St. Eustatius, Saba), Curacao, Dominica, Grenada, St. Lucia and Suriname. Of these eight countries, five reported less than 5 cases each and the other three countries reported between 12-41 cases each (Appendix 3). The most frequently identified causative organisms include Acinetobacter sp., Cryptococcus neoformans and Streptococcus Pneumoniae, a similar pattern occurred in 2010.

**Meningococcal infection (due to Neisseria meningitides)**
During 2011, there were two confirmed cases of meningococcal infection due to Neisseria meningitidis reported from Suriname, however subtyping of the strains was not conducted. These cases occurred during different periods and were not linked.

**Viral Hepatitis A**
The number of reported cases of viral hepatitis A decreased by 29% from 45 in 2010 to 32 in 2011 (Appendices 2 and 4). Belize reported all 32 reported cases of viral hepatitis A in 2011, which occurred throughout the year with 1-5 cases each month. The age group with the highest number of cases was 5-14 years (37.5% of reported cases).

**Viral Hepatitis B**
Fourteen countries reported a total of 823 cases of viral hepatitis B in 2011, with the largest percentage of cases (90%) being reported from four countries, namely Jamaica (538 cases), Guyana (104 cases), Barbados (51 cases) and Grenada (50 cases). The other seven countries reported less than 30 cases each. There were no reported outbreaks or clustering of cases during the year from any country (Appendix 4).
## EPIDEMIOLOGY SUMMARY APPENDIX 1

### Syndromic Surveillance of Communicable Diseases

#### 2007 - 2011

**CAREC Member Countries**

<table>
<thead>
<tr>
<th>Syndromes</th>
<th>Year 2007</th>
<th>Year 2008</th>
<th>Year 2009</th>
<th>Year 2010</th>
<th>Year 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Flaccid Paralysis¹</td>
<td>42</td>
<td>29</td>
<td>22</td>
<td>27</td>
<td>24</td>
</tr>
<tr>
<td>Fever and Haemorrhagic Symptoms</td>
<td>165</td>
<td>112</td>
<td>135</td>
<td>82</td>
<td>49</td>
</tr>
<tr>
<td>Fever and Neurological Symptoms</td>
<td>1,913</td>
<td>984</td>
<td>537</td>
<td>695</td>
<td>750</td>
</tr>
<tr>
<td>Fever and Respiratory Symptoms (ARI) [&lt; 5 yrs. old]²</td>
<td>64,740</td>
<td>81,474</td>
<td>107,158</td>
<td>120,715</td>
<td>120,656</td>
</tr>
<tr>
<td>Fever and Respiratory Symptoms (ARI) [&gt; 5 yrs. old]²</td>
<td>62,507</td>
<td>88,372</td>
<td>140,924</td>
<td>147,748</td>
<td>135,927</td>
</tr>
<tr>
<td>Fever &amp; Rash Illness³</td>
<td>507</td>
<td>839</td>
<td>393</td>
<td>436</td>
<td>475</td>
</tr>
<tr>
<td>Gastro-enteritis [&lt; 5 yrs. old]</td>
<td>41,536</td>
<td>57,834</td>
<td>49,564</td>
<td>63,148</td>
<td>50,754</td>
</tr>
<tr>
<td>Gastro-enteritis [&gt;= 5 yrs. old]</td>
<td>52,316</td>
<td>68,571</td>
<td>71,159</td>
<td>92,711</td>
<td>72,393</td>
</tr>
<tr>
<td>Undifferentiated Fever [&lt; 5 yrs. old]</td>
<td>10,270</td>
<td>11,071</td>
<td>10,619</td>
<td>12,825</td>
<td>15,536</td>
</tr>
<tr>
<td>Undifferentiated Fever [&gt;= 5 yrs. old]</td>
<td>13,670</td>
<td>16,955</td>
<td>18,518</td>
<td>21,526</td>
<td>30,614</td>
</tr>
</tbody>
</table>

### Notes:

1. No reports were received from Aruba for 2007 - 2011.
3. For 2010, incomplete reports were received from Guyana.
4. AFP and Fever and Rash data has been provided through the Expanded Programme on Immunization and include data up to week 52, 2011.
5. Data on Fever and Respiratory Symptoms from Bonaire, St. Eustatius and Saba, Curacao and St. Maarten are not provided in an age-categorized format for 2007 - 2011, and have therefore, been excluded from the age-specific sub-regional totals.

These data are as follows:

<table>
<thead>
<tr>
<th>Fever with Respiratory Symptoms</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bonaire, St. Eustatius and Saba</td>
<td>1,104</td>
<td>1,600</td>
<td>1,793</td>
<td>1,904</td>
<td>2,682</td>
</tr>
<tr>
<td>Curacao</td>
<td>2,874</td>
<td>3,079</td>
<td>2,769</td>
<td>2,502</td>
<td>2,078</td>
</tr>
<tr>
<td>St. Maarten</td>
<td>-</td>
<td>2,486</td>
<td>1,941</td>
<td>1,784</td>
<td>1,137</td>
</tr>
</tbody>
</table>

**Note:** - indicates no data received

6. Data on Undifferential Fever from Grenada are not provided in an age-categorized format for the year 2007 and has therefore, been excluded from the age-specific sub-regional totals. These data are as follows:

<table>
<thead>
<tr>
<th>Undifferentiated Fever</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grenada</td>
<td>136</td>
</tr>
</tbody>
</table>
## Reported Cases of Communicable Diseases

### 2007 - 2011

**CAREC Member Countries**

<table>
<thead>
<tr>
<th>Disease</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquired Immunodeficiency Syndrome, AIDS</td>
<td>1,329</td>
<td>1,652</td>
<td>419</td>
<td>347</td>
<td>318</td>
</tr>
<tr>
<td>Campylobacter</td>
<td>39</td>
<td>78</td>
<td>153</td>
<td>80</td>
<td>90</td>
</tr>
<tr>
<td>Chlamydial Infection</td>
<td>1,649</td>
<td>8,121</td>
<td>10,563</td>
<td>11,017</td>
<td>585</td>
</tr>
<tr>
<td>Cholera</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ciguatera Poisoning</td>
<td>333</td>
<td>359</td>
<td>205</td>
<td>244</td>
<td>248</td>
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<tr>
<td>Congenital Rubella Syndrome</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Congenital Syphilis</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Dengue Fever</td>
<td>2,889</td>
<td>1,931</td>
<td>5,639</td>
<td>5,524</td>
<td>7,483</td>
</tr>
<tr>
<td>Dengue Haemorrhagic Fever/Shock Syndrome</td>
<td>26</td>
<td>65</td>
<td>201</td>
<td>188</td>
<td>44</td>
</tr>
<tr>
<td>Diphtheria</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>E. Coli (Pathogenic)</td>
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<td>11</td>
<td>20</td>
<td>6</td>
</tr>
<tr>
<td>Food-borne Illness</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Genital Discharge Syndrome</td>
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<td>30,777</td>
<td>41,519</td>
<td>41,860</td>
<td>2,065</td>
</tr>
<tr>
<td>Genital Ulcer Syndrome</td>
<td>342</td>
<td>1,397</td>
<td>1,746</td>
<td>1,140</td>
<td>135</td>
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<tr>
<td>Gonococcal Infections</td>
<td>172</td>
<td>4,889</td>
<td>6,621</td>
<td>6,804</td>
<td>194</td>
</tr>
<tr>
<td>Human Immunodeficiency Virus, HIV</td>
<td>4,243</td>
<td>3,630</td>
<td>2,523</td>
<td>1,514</td>
<td>343</td>
</tr>
<tr>
<td>Influenza like illness</td>
<td>26,203</td>
<td>28,270</td>
<td>37,545</td>
<td>15,476</td>
<td>3,770</td>
</tr>
<tr>
<td>Leprosy (Hansen's Disease)</td>
<td>116</td>
<td>93</td>
<td>109</td>
<td>77</td>
<td>50</td>
</tr>
<tr>
<td>Leptospirosis</td>
<td>344</td>
<td>527</td>
<td>489</td>
<td>323</td>
<td>415</td>
</tr>
<tr>
<td>Malaria (Indigenous)</td>
<td>9,390</td>
<td>10,023</td>
<td>11,925</td>
<td>23,213</td>
<td>20,322</td>
</tr>
<tr>
<td>Measles (Confirmed cases)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Meningitis</td>
<td>31</td>
<td>56</td>
<td>28</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Meningitis (Haemophilus Influenzae)</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Meningococcal Infection (Neisseria meningitidis)</td>
<td>12</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Mumps</td>
<td>13</td>
<td>11</td>
<td>20</td>
<td>38</td>
<td>24</td>
</tr>
<tr>
<td>Norovirus</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>47</td>
</tr>
<tr>
<td>Pertussis (Whooping cough)</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Plague</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pneumonia (Haemophilus Influenzae)</td>
<td>6</td>
<td>7</td>
<td>17</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Pneumonia (Streptococcus)</td>
<td>8</td>
<td>23</td>
<td>19</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>Poliomyelitis, acute</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rabies in man</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rotavirus</td>
<td>84</td>
<td>186</td>
<td>80</td>
<td>85</td>
<td>144</td>
</tr>
<tr>
<td>Rubella (German Measles)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Salmonellosis</td>
<td>368</td>
<td>341</td>
<td>759</td>
<td>911</td>
<td>705</td>
</tr>
<tr>
<td>Scabies</td>
<td>9</td>
<td>8</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Shigellosis</td>
<td>87</td>
<td>86</td>
<td>199</td>
<td>138</td>
<td>127</td>
</tr>
<tr>
<td>Syphilis</td>
<td>488</td>
<td>1,266</td>
<td>1,106</td>
<td>778</td>
<td>793</td>
</tr>
<tr>
<td>Tetanus (excluding neonatal)</td>
<td>7</td>
<td>7</td>
<td>11</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Tetanus Neonatorum</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Tuberculosis - All forms</td>
<td>1,404</td>
<td>1,308</td>
<td>1,372</td>
<td>1,365</td>
<td>924</td>
</tr>
<tr>
<td>Typhoid and Paratyphoid FEVERS</td>
<td>110</td>
<td>11</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Viral Encephalitis/Meningitis</td>
<td>12</td>
<td>13</td>
<td>12</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Viral Hepatitis - A</td>
<td>11</td>
<td>31</td>
<td>45</td>
<td>45</td>
<td>32</td>
</tr>
<tr>
<td>Viral Hepatitis - B</td>
<td>539</td>
<td>708</td>
<td>793</td>
<td>900</td>
<td>823</td>
</tr>
<tr>
<td>Viral Hepatitis - C</td>
<td>22</td>
<td>9</td>
<td>8</td>
<td>378</td>
<td>365</td>
</tr>
<tr>
<td>Viral Hepatitis - Unspecified</td>
<td>18</td>
<td>3</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Yellow Fever</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Notes:

1. See General Comments regarding Epidemiology Summary Appendix 2.
2. Data for the year 2012 reflect reports received as at May 18, 2012
3. I imported case
GENERAL COMMENTS

for 2011 Epidemiology Summary Appendix 2

Data presented in the Epidemiology Summary Appendix 2 of this report should be interpreted with the following in mind:

1. Data for 2007 to 2011 reflects cases that have been confirmed by laboratory, epidemiological link or clinically (as it applies to each disease case definition).

2. For 2011, incomplete reports were received from Anguilla, Aruba, Guyana and the Turks & Caicos Islands. In 2011, no reports were received from Trinidad & Tobago. For 2010, incomplete reports were received from Guyana and incomplete reports were received from Grenada for 2009. For 2008, no reports were received from Grenada and incomplete reports were received from the Bahamas. Reports were received on select communicable diseases from Grenada for 2007 and from St. Kitts & Nevis for 2007 and 2008.

3. Communicable diseases were not under surveillance in the Netherlands Antilles for the period 2007 to 2011. The Netherlands Antilles dissolved on October 10, 2010 into the autonomous states of Curacao and St. Maarten and into Bonaire, Saba and St. Eustatius which now fall under direct administration of the Netherlands. Although communicable diseases are not under surveillance in these newly formed territories, reports were received on select communicable diseases during the period under review.

4. Reported cases of Leprosy for 2007 were taken from the WHO ILEP B Leprosy Forms. For 2008 and 2009 reported cases of Leprosy were taken from the WHO ILEP B Leprosy Forms for Dominica, Guyana, Jamaica, St. Lucia, Suriname and Trinidad & Tobago. For all other CAREC Member Countries for 2008-2009 leprosy cases were reported using the CAREC Communicable Diseases (Four-Weekly) Reporting Form. In 2010, reported cases of Leprosy were taken from the WHO ILEP B Leprosy Forms for Guyana, Jamaica, St. Lucia, Suriname and for Trinidad & Tobago. In 2011, WHO ILEP B Leprosy forms were received from Guyana, Jamaica, St. Lucia and Trinidad & Tobago. For all other CAREC Member Countries, leprosy cases for 2010 and 2011 were reported using the CAREC Communicable Diseases (Four-Weekly) Reporting Form.

5. For 2007, reported cases of Tuberculosis were taken from the WHO Tuberculosis Data Collection Forms for Antigua and Barbuda, Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Jamaica, St. Kitts & Nevis, St. Lucia, St. Vincent & the Grenadines, Suriname and Trinidad & Tobago; for all other CAREC member countries, tuberculosis cases were reported using the CAREC Communicable Diseases (Four-Weekly) Reporting Form. Tuberculosis cases for 2010 were taken from the WHO Tuberculosis Data Collection Forms and for 2011 were reported using the CAREC Communicable Diseases (Four-Weekly) Reporting Form.

6. With respect to AIDS reporting for 2011, reports were received from Belize, Bermuda, the British Virgin Islands, the Cayman Islands, Dominica, Grenada, St. Vincent and the Grenadines and Turks and Caicos Islands. For 2010, reports were received from Aruba, Bermuda, Belize, Bermuda, the British Virgin Islands, the Cayman Islands, Dominica, Grenada, Guyana, St Kitts and Nevis and St. Vincent and the Grenadines. For 2009, no reports were received from six countries: Anguilla, Antigua and Barbuda, Jamaica, Montserrat, Suriname and Trinidad & Tobago. For 2008, no reports were received from two (2) countries: Anguilla and Suriname. AIDS is not under regional surveillance in Curacao, St. Maarten and in Bonaire, Saba and St. Eustatius.

7. With respect to HIV reporting for 2011, reports were received from Belize, Bermuda, the British Virgin Islands, the Cayman Islands, Dominica, Grenada, Montserrat, St. Vincent and the Grenadines and the Turks and Caicos Islands. For 2010, reports were received from Aruba, Barbados, Bermuda, Belize, the British Virgin Islands, the Cayman Islands, Dominica, Grenada, Guyana, Montserrat, St Kitts and Nevis and St. Vincent and the Grenadines. For 2009, no reports were received from four countries: Anguilla, Jamaica, the Netherlands Antilles and Suriname; partial reports were received from Antigua and Barbuda. For 2008, no reports were received from three countries: Anguilla, Jamaica and Suriname.

8. With respect to STI reporting for 2011, reports were received from Belize, Bermuda, the British Virgin Islands, the Cayman Islands, Dominica, Grenada, St. Vincent and the Grenadines and the Turks and Caicos Islands. For 2010, reports were received from Aruba, Barbados, Bermuda, the British Virgin Islands, the Cayman Islands, Dominica, Grenada, Guyana, Jamaica, St. Kitts and Nevis and St. Vincent and the Grenadines. For 2009, no reports were received from six countries: Antigua & Barbuda, Bahamas, the Netherlands Antilles, St. Lucia, Suriname and Trinidad & Tobago. For 2008, no reports were received from seven countries: Anguilla, Antigua & Barbuda, Bahamas, the Netherlands Antilles, St. Lucia, Suriname and Trinidad & Tobago.
### Table: Reported Syndromes in CAREQ Member Countries (CCMCs) 2011 and 2012

<table>
<thead>
<tr>
<th>Year</th>
<th>ALL CCMCs</th>
<th>ARI*</th>
<th>AMS</th>
<th>ART</th>
<th>BAR</th>
<th>BHH</th>
<th>CAV</th>
<th>CEM</th>
<th>CMV</th>
<th>DAV</th>
<th>DEL</th>
<th>DUS</th>
<th>EAV</th>
<th>GFR</th>
<th>JEM</th>
<th>KAN</th>
<th>MAR</th>
<th>MTH</th>
<th>MUS</th>
<th>NTV</th>
<th>OCB</th>
<th>OUT</th>
<th>OVE</th>
<th>STV</th>
<th>TIP</th>
<th>TUR</th>
<th>UTV</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>2,564</td>
<td>239</td>
<td>11</td>
<td>31</td>
<td>28</td>
<td>16</td>
<td>64</td>
<td>0</td>
<td>17</td>
<td>18</td>
<td>27</td>
<td>13</td>
<td>17</td>
<td>28</td>
<td>1</td>
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<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>2,564</td>
<td>239</td>
<td>11</td>
<td>31</td>
<td>28</td>
<td>16</td>
<td>64</td>
<td>0</td>
<td>17</td>
<td>18</td>
<td>27</td>
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<td>17</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- *ARI*: Acute Respiratory Infection
- *AMS*: Acute Malaria Syndrome
- *ART*: Acute Respiratory Tract Infection
- *BAR*: Acute Bacterial Respiratory Infection
- *BHH*: Acute Bacterial Hemorrhagic Urticaria
- *CAV*: Acute Cervical Infection
- *CEM*: Acute Cerebral Meningitis
- *CMV*: Acute Cerebral Meningitis
- *DAV*: Acute Diarrheal Infection
- *DEL*: Acute Delirium
- *DUS*: Acute Diphtheria
- *EAV*: Acute Encephalitis
- *GFR*: Acute Gastroenteritis
- *JEM*: Acute Jaundice
- *KAN*: Acute Kawasaki Disease
- *MAR*: Acute Malaria
- *MTH*: Acute Meningitis
- *MUS*: Acute Mumps
- *NTV*: Acute Nephritis
- *OCB*: Acute Ocular Infection
- *OUT*: Acute Otitis Media
- *OVE*: Acute Overdose
- *STV*: Acute Stomatitis
- *TIP*: Acute Tetanus
- *TUR*: Acute Tuberculosis
- *UTV*: Acute Urticaria

**Additional Notes:**
- Data populated for the first time.
- All columns list reported cases, except for the last column which lists the total number of cases.

---

**References:**


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**Country Codes:**

- **AMS**: Angola
- **ART**: Antigua and Barbuda
- **BAR**: Bangladesh
- **BHH**: Bahamas
- **CAV**: Cayman Islands
- **CEM**: Central Africa
- **CMV**: Central America
- **DAV**: Central Asia
- **DEL**: Central Europe
- **DUS**: Central South America
- **EAV**: Central West Africa
- **GFR**: Central Europe
- **JEM**: Central Asia
- **KAN**: Central Asia
- **MAR**: Central Asia
- **MTH**: Central Asia
- **MUS**: Central Asia
- **NTV**: Central Asia
- **OCB**: Central Asia
- **OUT**: Central Asia
- **OVE**: Central Asia
- **STV**: Central Asia
- **TIP**: Central Asia
- **TUR**: Central Asia
- **UTV**: Central Asia

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**Last updated:** September 2012

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**Data Source:**


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**Contact Information:**


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**Acknowledgments:**


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**Copyright:**

### EPIDEMIOLOGY SUMMARY APPENDIX 4

<table>
<thead>
<tr>
<th>Year</th>
<th>JAN</th>
<th>FEB</th>
<th>MAR</th>
<th>APR</th>
<th>MAY</th>
<th>JUN</th>
<th>JUL</th>
<th>AUG</th>
<th>Sep</th>
<th>OCT</th>
<th>Nov</th>
<th>Dec</th>
<th>TOTAL</th>
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<td>2011</td>
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<td>10</td>
<td>37</td>
<td>12</td>
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<td>9</td>
<td>529</td>
</tr>
<tr>
<td>2013</td>
<td>80</td>
<td>10</td>
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<td>12</td>
<td>32</td>
<td>85</td>
<td>47</td>
<td>28</td>
<td>50</td>
<td>10</td>
<td>50</td>
<td>9</td>
<td>529</td>
</tr>
<tr>
<td>2014</td>
<td>80</td>
<td>10</td>
<td>37</td>
<td>12</td>
<td>32</td>
<td>85</td>
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<td>28</td>
<td>50</td>
<td>10</td>
<td>50</td>
<td>9</td>
<td>529</td>
</tr>
</tbody>
</table>

*Legend:*
- **T** = Total
- **C** = Cumulative
### EPIDEMIOLOGY SUMMARY APPENDIX 4

**Confirmed Cases of Communicable Diseases in Cambodia December 2013**

<table>
<thead>
<tr>
<th>Country</th>
<th>Case</th>
<th>Investigation</th>
<th>Results</th>
<th>Follow-up</th>
<th>Prevention</th>
<th>Control</th>
<th>Reporting</th>
<th>Laboratory</th>
<th>Epidemiology</th>
<th>Surveillance</th>
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<tbody>
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<td>100</td>
<td>80</td>
<td>40</td>
<td>20</td>
<td>10</td>
<td>40</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Burundi</td>
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*Source: CAMRO Annual Epidemiological Reports and Community-based Disease Surveillance System, Ministry of Health, Cambodia.*
### EPIDEMIOLOGY SUMMARY APPENDIX 4

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**Notes:**
- Malaria cases reported.
- TB cases reported.
- HIV cases reported.
- Comorbidity cases reported.

**Country Codes:**
- AUS - Australia
- BRA - Brazil
- CAN - Canada
- CHN - China
- DEU - Germany
- ESP - Spain
- FRA - France
- GBR - United Kingdom
- ITA - Italy
- JPN - Japan
- MEX - Mexico
- MYS - Malaysia
- NLD - Netherlands
- NZL - New Zealand
- PAK - Pakistan
- PER - Peru
- POR - Portugal
- RSA - South Africa
- SWE - Sweden
- TUR - Turkey
- USA - United States
- VEN - Venezuela
- VIE - Vietnam

**Source:** Compete data from the World Health Organization's Global Health Observatory, retrieved on May 10, 2011.
## Epidemiology Summary Appendix 4

### Table: Epidemiological Summary

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THE SURVEILLANCE UNIT — AN IMPORTANT FUNCTION

PROVIDING EPIDEMIOLOGICAL SUPPORT IN INVESTIGATING AND CONTROLLING OUTBREAKS OF DISEASES
MISSION

The mission of the Epidemiology Division is to guide and strengthen public health surveillance and response systems of the Caribbean.

INTRODUCTION

During 2011, there was continued collaboration with member countries, partners and other stakeholders to strengthen communicable disease, non-communicable disease, and mortality surveillance systems. There was continued focus on surveillance for respiratory illnesses, food borne diseases, dengue and non-communicable diseases. Countries were assisted with the implementation of national plans of action for system strengthening as required by the International Health Regulations; conducting surveys on risk factors for non-communicable diseases and to determine burden of food borne diseases; strengthening capacity for integrated food borne diseases (FBD) surveillance and non-communicable disease surveillance; and strengthening surveillance in support of the Initiative for the Elimination of mother-to-child transmission of HIV and congenital syphilis. Regional surveillance policy guidelines were finalized and work on the development of a sub-regional Infobase to facilitate timely dissemination of data and information continued. During 2012, the Division will be focusing efforts on preparing for the transition of the Centre to the Caribbean Public Health Agency (CARPHA). However, technical cooperation and assistance will continue to be provided to member countries, as well as to PAHO programmes, with a focus on capacity building.

AREAS OF MAJOR ACHIEVEMENT OR IMPACT

• The CAREC package of surveillance services was completed and disseminated to stakeholders.

• The revision of the Caribbean Surveillance Manual, including the areas of communicable diseases, non-communicable diseases, mortality and post disaster surveillance, was completed and disseminated.

• The 11th Meeting of Caribbean National Epidemiologists and Laboratory Directors was successfully hosted.

• Surveillance system evaluations were completed in all independent countries and five British territories these countries have plans for surveillance system strengthening as required under International Health Regulations.

• Potential public health emergencies of international concern (PHEIC) detected and reported by countries as required under International Health Regulations.

• All countries are contributing data to the sub-regional communicable disease surveillance system for CAREC member countries.

• Weekly communicable disease risk assessments and data analyses were conducted, including country validation/notification and the preparation of weekly reports.

• There was strengthening of national integrated food borne disease surveillance in seven countries; and of laboratory surveillance and diagnoses for acute gastroenteritis and eight food borne disease pathogens in four countries.

• Burden of gastroenteritis and food borne illnesses surveys were completed and national reports were produced and disseminated in six countries; two additional countries conducted these surveys and one other initiated the survey.

• A protocol for HIV case-based surveillance was finalized and implementation began in selected countries.

• A sub-regional HIV case-based surveillance database was established, populated with data from six countries and a sub-regional report was produced.
• A database/register for tuberculosis case-based surveillance was developed.

• Routine non-communicable disease surveillance was strengthened, with data from 15 countries received and reviewed.

• Non-communicable disease data from CAREC Member countries were finalized and included in the first PAHO publication on Basic Indicators for Non Communicable Diseases.

• Seven countries were supported in the conduct of non-communicable disease risk factor surveys; and two additional countries were supported with the analysis and reporting of data collected from risk factor surveys.

• A total of 18 years of mortality data from 12 CAREC Member Countries was received, validated and shared with PAHO for inclusion in the regional mortality database.

• One hundred and eighty-eight country-years of mortality data from CAREC Member Countries for the period 1995 - 2010 were incorporated into the regional PAHO mortality database.

• An automated system for coding medical causes of death and selecting underlying causes of death was successfully implemented in two Member Countries, resulting in a total of 10 countries using this system.

• A situation analysis to determine the current morbidity coding practices of CAREC Member Countries was completed.

• The adaptation of on-line training materials for the Caribbean was completed in collaboration with PAHO.

• Sub-regional workshops were hosted in the areas of enhanced respiratory illness surveillance; analysis of burden of illness surveys; identification of V.cholerae and gastroenteritis pathogens; International Health Regulations; mortality coding; and international rules for the selection of the underlying cause of death.

• Three papers were accepted and presented at the 2011 CHRC scientific conference and four papers were submitted for the 2012 CHRC conference.

• Four articles were submitted to peer-reviewed journals and six bimonthly CAREC Surveillance Reports were produced and published.

• There was collaboration with two regional universities to deliver surveillance and epidemiology lectures.

• Presentations were accepted for, and delivered at, four international conferences.

**ELEVENTH MEETING OF CARIBBEAN NATIONAL EPIDEMIOLOGISTS AND LABORATORY DIRECTORS**

In May 2011, CAREC hosted the 11th Meeting of Caribbean National Epidemiologists and Laboratory Directors in Trinidad and Tobago. Participants included National Epidemiologists, Laboratory Directors and Non-communicable Disease Focal Persons from CAREC member countries, representatives from the Pan American Health Organization (PAHO) offices in the Caribbean and Washington, the CARICOM Secretariat, regional universities and colleges, Institute de Veille Sanitaire – CIRE Antilles Guyane and the US Centers for Disease Control and Prevention. The objectives of the meeting were to:

• Update on sub-regional technical cooperation;

• Discuss current public health events and emergencies;

• Provide a forum to share experiences.

The focus areas addressed in the meeting were:

• Caribbean Public Health Agency (CARPHA);

• CAREC Package of Surveillance Services;

• The Sub-regional Surveillance System, with focus on Surveillance for Influenza Tuberculosis, HIV (case-based) and Antimicrobial Resistance;

• Dengue Integrated Management Strategy;
• Non-communicable Diseases (NCD) Minimum Dataset Implementation;

• Cancer and Stroke Registries;

• Risk Factor and Burden of Food borne Illness Surveys;

• Laboratory Capacity, External Quality Assurance (EQA), Technology Transfer and Laboratory Networks;

• Cholera Preparedness;

• Implementation of International Health Regulations;

• Measles, Rubella and Congenital Rubella Syndrome (CRS) Elimination.

Additionally, several countries presented reports on surveillance and response activities during outbreaks that had occurred in the past two years. There was also a training session on the use of the IHR decision instrument for the identification of potential public health emergencies of international concern. The CAREC award for Excellent Performance in Public Health Surveillance during 2010-2011 was presented to the Ministry of Health, St. Vincent and the Grenadines. The award for Outstanding Improvement in Public Health Surveillance during 2010-2011 was presented to the Ministry of Health, Grenada.

During 2012-2013, agreements, reports and recommendations from the meeting will be used to guide CAREC’s technical cooperation to countries, with the main aim being to strengthen surveillance systems and provide information for public health action.

INTERNATIONAL HEALTH REGULATIONS (IHR)

The International Health Regulations (2005) (IHR) came into force on 15 June 2007 and provides a legal framework for global health security. Article 5 of the Regulations state that each Member State is responsible for ensuring that they have the capacity to detect, assess, notify and report events in accordance with the Regulations, as specified in Annex 1. Additionally, State Parties are required to assess core capacity for implementation of IHR and to develop and implement a plan of action to meet core capacity for the implementation of the Regulations. In order to meet these requirements, Member States are required to follow a timeline described in article 5 of the Regulations which, can be summarized as follows:

• 15 June 2007 - 15 June 2009: two years for the assessment of existing national structures and resources that must lead to the development of plans of action.

• 15 June 2009 - 15 June 2012: three years for the implementation of these plans of action to ensure that core capacities are present and functioning throughout the country and/or relevant territories.

• If necessary, Member States may request a two year extension to attain the required capacities for the implementation of the IHR.

The 13 IHR core capacity areas are as follows:

1. National legislation, policy and financing;
2. Coordination and NFP communications;
3. Surveillance;
4. Response;
5. Preparedness;
6. Risk communication;
7. Human resource capacity;
8. Laboratory;
9. Points of entry;
10. Zoonotic events;
11. Food safety;
12. Chemical events;

All Member States have conducted their national assessments and developed plans of action for attaining core capacity for the implementation of IHR. Though not mandated under IHR, five of nine English and Dutch territories have also completed these activities.

With respect to implementation of plans of action, much work has been done in several of the core capacity areas listed above. The attainment of core capacity in the thirteen areas varies widely between countries. However, there remain some common areas of concern for most countries, namely: National legislation, policy and financing; Human resource capacity; Support facilities for Points of Entry; Chemical events; and Radiation emergencies.

In an effort to strengthen capacity in the English and Dutch Speaking Caribbean to facilitate the implementation of IHR, the following key and common needs were identified, and activities are on-
going in these areas:

1. Advocacy at the highest levels for the implementation of the IHR;

2. The adaptation of standard model legislation (English and Dutch) to each country. Countries are responsible for the assessment of all relevant legislation for the implementation of IHR prior to this;

3. Clarification of the roles and functions of the IHR National Focal Point;

4. Strengthening of support facilities at points of entry;

5. Capacity building and the identification of common services for support in the area of radiation emergencies;

6. Cross-training in order to strengthen human resource capacity.

By June 2012, all WHO member states are expected to have developed core capacities required for the implementations of IHR. The Regulations state that Member States can apply for an additional 2 year extension. However, at a PAHO regional meeting on the monitoring of the implementation of the IHR in the Americas, while countries agreed that at this time they would work towards the initial deadline of June 2012 many recognized that they may not meet the deadline and would need to request an extension of the deadline. Countries also have plans for surveillance system strengthening that are various stages of implementation. Technical assistance will continue to be given for the implementation of plans of action and requests for extensions to the deadline as countries work towards achieving the capacity to implement the IHR.

**COMMUNICABLE DISEASE SURVEILLANCE**

Sub-regional Communicable Disease Surveillance
During 2010, the sub-regional communicable disease surveillance system was reviewed and revised, focusing on strategies for improving the quality of the sub-regional system attributes. The revised list of syndromes and diseases agreed upon for sub-regional surveillance in CAREC member countries starting January 2011 are shown in Table 1. The sub-regional surveillance guidelines were finalized following the 11th Meeting of Caribbean National Epidemiologists and Laboratory Directors and subsequently disseminated to member countries and partners.

**EMERGENCY PREPAREDNESS AND OUTBREAK INVESTIGATIONS**

The 2nd meeting of the Caribbean Regional Health Emergency Health Response Team (RHERT) was held in July 2011 in Trinidad and Tobago. Public health staff from 17 CAREC member countries attended the three-day meeting, which included sessions on post-disaster assessments, outbreak management and emergency response management strategies. Participants from several countries presented material describing their own experiences responding to outbreaks and natural disasters. Following this meeting, a monthly meeting of the RHERT is held via teleconference in order to share experiences and provide on-going training in the area of emergency response.
As at May 18, 2012, of the 23 CAREC member countries:

- 22 countries are reporting syndromes on a weekly basis. The sub-regional syndromic database was 100% complete for 2011. Eight countries (35%) submitted more than 75% of their weekly reports on time (i.e. the Wednesday of the following epidemiological week) and six additional countries submitted more than 50% of these reports on time (Figure 1).

- 20 countries are reporting confirmed cases of diseases on a four-weekly basis. The sub-regional communicable disease database contained 86% of the expected number of four-weekly reports for 2011. Fourteen of the 20 had submitted complete data for the year. It is of concern that one had not submitted any reports for the year and another had submitted less than 25% of the reports for the year. Efforts are being made to overcome the challenges in this regard. Seven countries (35%) submitted more than 75% of these reports on time and two additional countries submitted more than 50% of these reports on time (Figure 1).

- Surveillance for severe acute respiratory infection (SARI) occurred in seven sentinel countries during 2011, with one of these countries initiating this surveillance in week 41. The sub-regional database contained 88% of the expected number of weekly SARI reports. Two countries submitted 75% or more reports on time, three countries submitted less than 50% of the reports on time and two countries did not submit any reports on time (i.e. the Wednesday of the following epidemiological week) (Figure 1).

- Surveillance for severe acute respiratory infection (SARI) occurred in seven sentinel countries during 2011, with one of these countries initiating this surveillance in week 41. The sub-regional database contained 88% of the expected number of weekly SARI reports. Two countries submitted 75% or more reports on time, three countries submitted less than 50% of the reports on time and two countries did not submit any reports on time (i.e. the Wednesday of the following epidemiological week) (Figure 1).

- 20 countries are expected to submit AIDS data to CAREC annually. St. Maarten, Curaçao and the BES Islands (Bonaire, St. Eustatius and Saba) do not submit AIDS data. However they have routinely submitted HIV data since the start of the epidemic. Eleven of the 20 countries had submitted AIDS data for 2010 and eight had submitted AIDS data for 2011 (Figure 1).

- All countries are expected to submit HIV data to CAREC annually. Twelve countries had submitted HIV data for 2010 and eight had submitted HIV data for 2011 (Figure 1).
• All countries are expected to submit STI data to CAREC annually. Eleven countries had submitted STI data for 2010 and eight countries submitted STI data for 2011 (Figure 1).

FIGURE 1: Proportion of surveillance reports received and reports received on time CAREC Member Countries 2011 and 2010

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>Syndromic Reports (weekly)</th>
<th>Communicable Disease Reports (4-Weekly)</th>
<th>SARI/ARI Reports* (weekly)</th>
<th>AIDS Reports (annually)</th>
<th>HIV Reports (annually)</th>
<th>STI Reports (annually)</th>
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Notes: Surveillance Reports received by May 18, 2012
- Not under national surveillance
* SARI/ARI surveillance is currently conducted by 7 CAREC Member Countries; SARI/ARI surveillance began in Belize in epidemiologic week 41, 2011

During 2011 weekly review of syndromic and laboratory data continued at the sub-regional level at CAREC to identify alerts generated from the system, which serve as early indicators of possible clusters or outbreaks of communicable diseases in order to better assist disease prevention and control efforts. Data validation and investigation of alerts was done in collaboration with member countries. CAREC Surveillance Reports continued to be produced and disseminated every eight weeks and are available on the CAREC website at www.carec.org

Enhanced Surveillance for Influenza and Other Respiratory Illnesses
During 2011 enhanced surveillance efforts for influenza and other respiratory illnesses continued in seven sentinel countries, namely Barbados, Dominica, Jamaica, St. Lucia, St. Vincent and the Grenadines, Suriname and Trinidad and Tobago. At the end of the year, one additional country, Belize, initiated implementation of enhanced surveillance. Each of the sentinel countries has strengthened surveillance for Acute Respiratory Infections (ARI) and Severe Acute Respiratory Infections (SARI) in selected sentinel hospitals. Efforts have been made to strengthen laboratory capacity in the countries and improve the reporting of laboratory confirmed cases of influenza, RSV, and other respiratory illnesses to the national and regional level. Supervision of the programme is two-tiered, with the National Epidemiologist in each country providing first level supervision and CAREC providing second-level supervision.
Hospitalization and death rates among SARI patients and trends in laboratory confirmed agents in each of these countries was reviewed weekly to monitor trends in respiratory illness and circulating virus types in each country. This information is also shared with PAHO on a weekly basis for inclusion into the regional database for the Americas.

During 2012, technical cooperation will continue to be provided to countries to strengthen capacity for respiratory illness surveillance. Supervisory visits will be made to countries and laboratory capacity will continue to be strengthened. During 2011 specimen collection improved greatly in two countries. During 2012, there will be a focus on increasing specimen collection in the other countries. Paper on respiratory illness trends was presented at the 56th Annual Conference of Caribbean Health Research Council in Guyana, which was well received.

**Vector Borne Disease Surveillance**

During 2011, CAREC provided technical assistance with PAHO sponsored Integrated Management Strategy (IMS) Dengue workshops in Guyana and Trinidad and Tobago. During each of these five-day workshops, Ministry of Health staff members with expertise in clinical management, laboratory diagnosis, surveillance, epidemiology, vector control and communications prepared a national plan for the prevention and control of dengue. PAHO and CAREC continue to follow-up with these countries in order to assess implementation of strategies proposed during the IMS Dengue workshops.

In 2011, CAREC collected information from member countries regarding the number of clinical and laboratory confirmed dengue cases, the number of severe cases and dengue-related deaths. This information was reviewed on a weekly basis, in coordination with the weekly review of cases of undifferentiated fever reported through the syndromic surveillance system. These data are used to conduct risk assessments and for the early detection of dengue outbreaks. Laboratory confirmed dengue data was also reported to the PAHO Regional Dengue Office for inclusion into the regional dengue database for the Americas.

In June 2011, 13 CAREC Member Countries participated in a PAHO Meeting entitled “Preventing the Reintroduction of Malaria in Non-Endemic Countries”. During this meeting strategies for the prevention of reintroduction of malaria and interventions and mechanisms to respond to malaria outbreaks were discussed. A key agreement from the meeting was the need to promote an Integrated Vector Management Strategy for all vectors, rather than different strategies for different vector borne diseases such as dengue, malaria and leptospirosis. During 2012, CAREC and PAHO will assist countries in this regard and identify priority areas within IMS.

**FOOD BORNE DISEASE (FBD) SURVEILLANCE**

**Studies of Burden of Acute Gastroenteritis and Food borne Diseases**

The burden and impact of FBD is currently unknown, thus a methodology for conducting burden of illness (BOI) studies were developed by the World Health Organization (WHO) to primarily determine the burden of AGE and FBD nationally and globally. During 2008-2012, a Caribbean study of burden of acute gastroenteritis and FBD is being conducted by CAREC/PAHO in collaboration with member countries, International Development Research Centre, Public Health Agency of Canada (PHAC), Caribbean Eco-Health Program, University of the West Indies and St George's University in Grenada. The aim of the Caribbean BOI study is to better understand the epidemiology of FBD; estimate the prevalence, magnitude and burden of AGE, FBD and priority pathogens commonly transmitted by food; strengthen laboratory capacity for diagnosis of AGE cases; assess food safety practices; build capacity to analyze surveillance and research data; and provide information to guide interventions.

During 2011, CAREC provided technical cooperation to six countries (Dominica, Grenada, Guyana, Jamaica, St Lucia and Trinidad and Tobago) for further analyses, finalization and production of detailed national BOI reports; conduct of in-country data dissemination workshops; and the production of draft papers for publication. Technical cooperation was also provided for the finalization and analysis of the BOI study in Barbados, launch of the BOI study in Bermuda and development of a BOI proposal for a BOI study in Belize in 2012. The study in each country consisted of two components:

- Retrospective cross-sectional population surveys (two surveys conducted during the high and low AGE seasons), based on self-reported cases of AGE
- Laboratory surveys before and after one year of testing for a wider range of FBD pathogens (Salmonella, Shigella, Campylobacter, Escherichia coli 0157:H7, Norovirus) to estimate the prevalence and burden of priority FBD pathogens.

In March, CAREC/PAHO in collaboration with the
PHAC and University of Guelph convened a BOI Analyses and Writing for Publication workshop in Canada, for the study coordinators from the six countries. The workshop objectives were to: (i) analyze, interpret, refine and translate the results of the BOI analyses in country reports; (ii) estimate the economic burden of AGE; (iii) estimate pathogen specific burdens and; (iv) draft journal articles on the BOI study in each country. Each country produced estimates of underreporting and burden of AGE, as well as specific FBD pathogens. Draft papers on BOI studies in each country were also produced for submission to the Journal of Health, Population and Nutrition in 2012.

A BOI data dissemination workshop was held in each country during which the BOI study report was presented to key persons from the Ministries of Health, Tourism and Trade, the local media and the PWR office. The findings, underreporting levels, gaps in AGE surveillance and risk practices identified were presented followed by a discussion of results, recommendations and the way forward for improving FBD surveillance. Major areas of impact noted from the BOI studies thus far include: improved communication, data sharing and collaboration between laboratory, epidemiology, environmental and veterinary public health; and increase in laboratory capacities and data; improvement in FBD surveillance (timeliness of reporting, coordination, response). Additionally data was provided on the economic costs of AGE and FBD, risk factors for infection and measures for improving food safety.

**Strengthening Integrated Epidemiological and Laboratory Surveillance for FBD**

During 2011 technical cooperation was provided to strengthen integrated FBD surveillance in countries though:

**In-country Integrated FBD epidemiological surveillance workshops**

During 2011, FBD surveillance workshops were convened in Belize, Dominica, Guyana, Grenada, Jamaica, St Lucia and Trinidad and Tobago, with participants from epidemiology, laboratory, environmental health and veterinary public health. The status of diarrhoeal and FBD surveillance and the implementation of country-specific multidisciplinary integrated FBD surveillance protocols and plans of actions were reviewed, discussed and revised where necessary. Major challenges noted in all countries included a lack of stool collection from AGE cases, untimely reporting and response to AGE cases and clusters, untimely and incomplete laboratory diagnoses, lack of laboratory supplies especially for viral testing, limited communication and data sharing between disciplines, low prioritization of FBD and lack of funding. Short and long term measures for improving FBD surveillance were also documented.

**In-country multidisciplinary laboratory surveillance workshops**

During 2011, FBD laboratory-surveillance workshops were conducted in Barbados, Belize, Bermuda and Dominica. Participants were technicians from the major clinical, food, veterinary and university laboratories, as well as persons from epidemiology units. The workshops consisted of:

- on-site assessment of laboratory capacity for FBD surveillance and response;
- lectures and on-the-bench training on internationally-accepted standard methods for isolation of more common FBD pathogens (i.e. Salmonella, Shigella, Vibrio Campylobacter, Escherichia coli 0157:H7; Staphylococcus aureus and Norovirus);
- Identification of gaps in integrated laboratory-based surveillance of FBD;
- Review and update of protocols for collection and transport of specimens;
- Promotion of measures for improving integrated laboratory-based surveillance of FBD at country level.

Participants were also trained on integrated FBD surveillance and outbreak investigations, the role of the laboratory, specimen collection and transport, biosafety and quality assurance. Laboratory manuals of updated standard methods for isolating the key FBD pathogens were given to participants and media was provided to the national laboratories. Protocols for enhanced specimen collection, transport and diagnosis and reporting of FBD pathogens were updated.

**Interagency Collaboration for FBD Surveillance**

During 2011, CAREC continued to strengthen existing partnerships and collaborations with regional and international agencies responsible for food safety, including the PAHO Food Safety Regional Program, PAHO-FOS, WHO, US CDC, PHAC, FDA, CEHI, IDRC, UWI, and SGU. This was done through collaboration with respect to planning and pooling of technical and financial resources; participation in monthly WHO-Global Food Borne Infection Network (GFN) and BOI teleconferences; participation in PulseNet Latin America and the Caribbean Network; and the joint execution of BOI studies.
Surveillance for HIV, AIDS and Sexually Transmitted Infections (STIs)

On an annual basis, CAREC member countries continue to report to CAREC aggregated data on HIV cases, AIDS cases, HIV mortality and STIs. In addition to this customary HIV/AIDS surveillance, some countries are in the process of implementing HIV case-based surveillance. The objectives of HIV-case based surveillance are to:

- Collect structured case-based information on HIV diagnosis, follow-up and treatment in the Caribbean countries.
- Improve national and regional reporting on the HIV epidemic; monitoring and evaluation of access to treatment; and treatment programme and quality outcomes, including HIV Early Warning Drug Resistance indicators and a number of other indicators requested by international partners and funding agencies.

The number of variables collected in HIV case-based surveillance is much more than in the customary HIV surveillance and thus provides more detailed information. The complete set of variables for HIV case-based surveillance was agreed upon in 2010. Up to the end of 2010, six countries had initiated implementation of HIV case-based surveillance.

During 2011, HIV case-based surveillance continued to be implemented in the Caribbean. Evaluations were done in two countries where available HIV data were mapped to the standard sub-regional HIV case-based surveillance data structure. Available data included that from laboratory information systems, pharmacy systems, HIV patient monitoring systems and paper-based records. For one of these countries an extraction and transfer application was written to facilitate data conversion. In-country support, focused on improving data quality and reporting, was also provided to two countries that started HIV case-based surveillance previously. At the sub-regional level at CAREC, a sub-regional database was developed to facilitate the merging of data from individual CAREC Member Countries. Data from six countries have been added to the database, which now includes data for a total of 2,606 cases. These data were presented at an HIV workshop in Jamaica and an HIV conference in the Bahamas. Further operationalization of this regional database is planned for 2012.

Tuberculosis (TB) Surveillance

During 2011, an in-country evaluation was conducted and support was provided to the TB programme in one country. Follow-up and support was provided remotely to other countries to assist with the submission of annual TB data to the World Health organization (WHO). All countries submitted these data.

New laboratory equipment, namely TB Xpert diagnostic equipment was acquired at the CAREC laboratory. Xpert MTB/RIF is a new technology which detects both TB and rifampicin drug resistance in an automated, closed, real-time molecular assay that is robust, easy and safe.

SURVEILLANCE OF NON-COMMUNICABLE DISEASES

Reporting on the Non-communicable Diseases (NCD) Minimum Data Set

Fifteen countries began reporting to CAREC on the NCD Minimum Data Set, which includes indicators on mortality from selected NCDs, prevalence and incidence of selected diseases, risk factors of chronic diseases, health system performance, as well as social and context indicators. However only three countries: Dominica, British Virgin Islands and St. Lucia submitted a second report for 2011. Support for data collection and reporting on the NCD Minimum Data set was provided through in-country workshops to three countries, namely Anguilla and Cayman Islands. However, reports from these countries are still outstanding.

RISK FACTOR SURVEYS

Capacity Building for Conducting Risk Factor Surveys

During 2011, Anguilla, Cayman Islands, Montserrat and St. Vincent and the Grenadines each participated in 3-day Survey Implementation Workshops. These in-country workshops facilitate the participation of a wide group of persons, including representatives from the Central Statistical Office, other government and non-governmental agencies and institutions that can provide support for the implementation of the risk factor survey. The workshops provided an overview of the eSTEPS methodology, which facilitates the electronic collection of the risk factor data using Personal Digital Assistants (PDAs). Participants were provided with information on the requirements for preparing and implementing risk factor surveys using the eSTEPS methodology and they also started developing the Survey Implementation Plan. Completed Implementation Plans are submitted to CAREC for review and agreement prior to the conduct of interviewer training for the commencement of the risk factor surveys.
Interviewer Training for Conducting Risk Factor Surveys using eSTEPS

Interviewer Training Workshops to facilitate the start of data collection for the survey using the Personal Digital Assistants (PDAs) were done in the Bahamas and Trinidad and Tobago. These five-day workshops familiarized the survey interviewers and supervisors with the rationale for investigation of the selected risk factors included in the survey instrument, provided details of the STEPS survey methodology, procedures to be used in locating the survey sample and the random selection of participants, as well as techniques for interviewing. Care and use of the electronic devices (PDAs) was very carefully demonstrated to safeguard against loss of data and/or the equipment during fieldwork. Role playing was used to demonstrate the physical measurements to be taken during the survey, as well as to practice interviewing techniques and the recording of the responses in the PDAs.

A pilot test of the survey methodology and the data collection process using the PDAs was done on the final day of the workshop. Feedback provided by interviewers on the pilot survey was used to make changes as necessary prior to the start of field work for the surveys.

Analysis of Risk Factor Data
Following the completion of data collection for the risk factor surveys, CAREC provided technical support to countries for the data analysis and preparation of the risk factor survey report. During 2011, data analysis and report writing workshops, including training in the use of Epi Info, were done in Grenada and Trinidad and Tobago. On completion of the analysis, the survey results were used to prepare a Survey Fact Sheet and a Data Book, in which the results were presented by age and gender along with statistically significant differences between groups. A report template was also presented during these workshops. Methods for dissemination of survey results were presented and discussed. Countries are to complete their survey reports after the workshop and are expected to provide a copy of the final survey report to CAREC/PAHO. Final survey reports are also made available on the following WHO website: http://www.who.int/chp/steps/reports/en/index.html

General Technical Assistance for NCD Surveillance
Throughout 2011, guidance for reporting on the NCD Minimum Data Set and advancing preparations for implementation of risk factor surveys, analysis of data and survey report preparation were provided to several countries through review of documents and provision of feedback to queries via e-mail, telephone and hosting of Eluminate sessions.

RESEARCH

HPV prevalence study
A manuscript entitled “Human Papilloma Virus genotypes and their prevalence in a cohort of women in Trinidad” was accepted and published in the Journal Rev Panam Salud Publica 2011: 29(4) 220-6.

Examining the feasibility of use of online newspaper archives for conducting fatal injury surveillance
Supervised research was done by a Masters student from George Mason University, Virginia, USA to examine the feasibility of using the archives of online newspapers for conducting fatal injury surveillance in the Bahamas and Trinidad and Tobago. As an outcome of this work, a manuscript entitled “Are online newspaper archives a viable source for fatal injury surveillance in the Bahamas and Trinidad and Tobago?” was prepared and has been accepted for a poster presentation at the 2012 Caribbean Health Research Council Scientific Conference in the Cayman Islands.

CAREC Surveillance Reports
Articles were prepared on risk factor surveys done in Dominica and Barbados and published in CAREC Surveillance Reports as a means of showcasing work done on risk factor surveillance by countries and facilitating the integration of communicable and non-communicable disease surveillance.

MORTALITY SURVEILLANCE
CAREC continues to provide support to its Member Countries to improve the accuracy, timeliness and usefulness of country mortality data in several ways, including data-validation, training of mortality coders and mortality surveillance system audits and evaluations.

CAREC Sub-Regional Mortality Database
As at December 31, 2011, fourteen (14) Member Countries had submitted, verified and finalized mortality data up to 2007. Of these Member Countries, thirteen (13) had also submitted finalized mortality data for 2008, eight (8) Member Countries submitted finalized mortality data up to 2009 and one (1) Member Country submitted finalized mortality data to 2010.

During 2011, CAREC received a total of 22 years of mortality data from 15 Member Countries. These data were cleaned and validated through collaboration with focal persons in-country and CAREC finalized 18 years of mortality data from 12 Member Countries. Validated data was received from 4 Member
Countries for the year 2006, 1 Member Country for 2007, 4 Member Countries for 2008, 6 Member Countries for 2009 and 3 Member Countries for 2010. Through collaboration with PAHO Headquarters, these data were subsequently incorporated into the PAHO regional database for the Americas and the CAREC sub-regional mortality database.

In 2011, CAREC worked closely with PAHO Headquarters to ensure availability and accuracy of mortality data for the production of the PAHO 2011 Health Situation in the Americas – Basic Indicators brochure. In additional to the finalized country data, 9 years of preliminary mortality data from 5 Member Countries and 7 years of previously-shared mortality data from 2 Member Countries were shared with PAHO to facilitate inclusion of such data in the analyses. Mortality data form 19 Member Countries were included in the 2011 brochure.

During 2012, CAREC will continue to focus on the collection of outstanding mortality data and will continue to work with countries to improve the quality of the region’s mortality data.

Mortbase V 5.1
Mortbase is a CAREC-developed mortality data capture and reporting system. The system was developed in 1996 to assist Member Countries who did not have such a system to support mortality surveillance activities. This system is currently being used in ten (10) Member Countries. Assistance was provided to Barbados to successfully implement the use of Mortbase V 5.1.

Due to advances in technology and the subsequent incompatibility of Mortbase with newer operating systems, in 2012 CAREC will continue to work to develop a new mortality data capture and reporting system. This will also be piloted in two (2) Member Countries in 2012.

Mortality Medical Data System (MMDS)
The Mortality Medical Data System (MMDS) is an automated mortality coding system that can be incorporated into a mortality surveillance system to assist with coding causes of death listed on the medical cause of death certificate and underlying cause of death selection. Following the successful pilot of MMDS in Dominica and St. Lucia in 2006, it was subsequently implemented in several other Member Countries.

In 2011, a MMDS installation and training workshop was conducted in the Bahamas and re-training was conducted for staff at the Ministry of Health, St. Lucia. As at December 2011, MMDS is being successfully used in a total of eleven (11) countries. In 2012, MMDS installation and training workshops are expected to be conducted in two additional CAREC Member Countries.

Mortality Underlying Cause Selection Workshop
During 2011, training was conducted for 23 mortality coders from Guyana on the International Statistical Classification of Diseases and Related Health Problems (ICD-10) mortality coding and the selection of the underlying cause of death using the National Center for Health Statistics (NCHS) Decision Tables. The overall objective of the workshop was to review ICD-10 mortality coding guidelines and to examine the rules governing the selection of the underlying cause of death. The workshop consisted of presentations on various rules, theories and acceptable practices followed by the completion of several example exercises. As a follow-up to this training it is expected that in 2012, mortality coders in Guyana will be trained in the use of MMDS. Additionally, in 2012, CAREC/PAHO will partner with the National Center for Health Statistics (NCHS), a division of the Centers for Disease Control (CDC), to support mortality coding training in the sub-region.

General Assistance
Remote technical assistance was provided to Aruba, Dominica, Montserrat, St. Kitts and Nevis and St. Lucia in the area of mortality coding and underlying cause of death selection. Remote technical assistance was also provided to Aruba, Barbados, St. Lucia, and St. Vincent and the Grenadines to address challenges encountered using the software system Mortbase. Remote support in the installation and use of MMDS was provided to Barbados and Dominica.

CONSTRAINTS
Human resources to support surveillance activities continue to be limited both in-country and at CAREC, especially in some areas such as non-communicable diseases, injuries and violence and infection control. Financial resources are also limited in most countries. Another constraint related to limited human resources both at CAREC and in-country is competing priorities, resulting in inadequate time to dedicate to surveillance and disease prevention and control activities. During 2012, for CAREC staff in particular, there will be many activities related to the transition of CAREC to the Caribbean Public Health Agency that will require time and focus. Communicable disease surveillance systems continue to be constrained by inadequate specimen collection to support the confirmation of aetiology of diseases. Finally, issues related to confidentiality of case-based data, in particular as it relates to HIV, continue to impede the routine data reporting.
CAREC LABS – HUB OF CARIBBEAN EPIDEMIOLOGY

MEETING THE VIRUS CHALLENGE HEAD ON

LABORATORY DIVISION
MISSION

To lead, energise and support Caribbean laboratory staff and stakeholders to provide the highest quality information for clinical care, disease surveillance, health policy formulation and personal safety through a commitment to technological and technical relevance, appropriate research and performance-driven training – recognizing the importance of medical laboratory services to Caribbean economies.

Introduction

The Laboratory Division continued to evolve and be relevant to the member countries. Finalization of the laboratory core functions, expansion of the range and type of services provided, changes in management structure as well as preparation for the transition to the Caribbean Public Health Agency (CARPHA) were the main activities in the laboratory division. The transfer of technology to member countries and investment in more specialized testing were major focus areas. The new Director and Advisor for Public Health Laboratory Surveillance was recruited in late 2011, the post having been vacant for more than a year. The filling of this post was welcomed in view of the impending transition to CARPHA.

In order to improve data gathering for quality indicators such as turnaround times, percentage usage and trends, a new integrated laboratory information system is being developed. The current information system, LABIS, being used to capture laboratory data and generate reports is ten years old and is inadequate for the needs of CAREC.

AREAS OF MAJOR ACHIEVEMENT

Finalization of the core functions of the laboratory

The core functions of the laboratory were developed with the overarching goal being the provision of a high level of service delivery to CAREC member countries (CMCs), ensuring continuity and consistency during the transition process. The core functions are based on CAREC’s present mandate and are proposed for adoption into the operational framework of CARPHA. Eight core functions were defined:

a) Reference, specialized and diagnostic testing;

b) Communicable disease prevention, control, and surveillance;

c) Outbreak and emergency response for communicable diseases;

d) Laboratory improvement and regulation (Quality Assurance); Public health policy development

e) Integrated communicable disease data management;

f) Public health-related research;

g) Training and education of public health professionals; and

h) Partnerships and communication

ENHANCED DIAGNOSTIC SERVICES

The diagnostic service for TB surveillance was enhanced with the donation by PAHO of the TB GeneXpert platform. The GeneXpert (Xpert MTB/RIF) assay, manufactured by Cepheid, Sunnyvale CA (US), has recently become available internationally for the rapid diagnosis of TB and MDR-TB. It simultaneously detects in sputum specimens, gene sequences specific for M. tuberculosis and its resistance to rifampicin (RIF) which serves as a marker for MDR-TB. The instrument arrived in October 2011 with installation and user training scheduled to occur in January 2012. The projected improvements in turnaround time will positively impact on patient care and management at country level as results can be available within 100 minutes. It can be decentralized and with training it can be used at the local level, where there may be limited resources in terms of laboratory facilities.

WHO recommends that: “Xpert MTB/RIF should be used as the initial diagnostic test in individuals
suspected of MDR-TB or HIV-associated TB (strong recommendation) and may be used as a follow-on test to microscopy in settings where MDR and/or HIV is of lesser concern, especially in smear-negative specimens (conditional recommendation, recognising major resource implications). The TB Xpert MTB/RIF system located in the CAREC laboratory will be used to:

1. Facilitate the functioning of the laboratory as a regional TB laboratory to do routine testing for member countries with a relatively low number of specimens where the use of the Xpert MTB/RIF equipment would not be cost-effective.

2. Gain experience in the use of the Xpert MTB/RIF system in order to be able to provide support and training to countries with a higher number of specimens that will have Xpert MTB/RIF technology in-country. In addition, the CAREC laboratory functions as a back-up for these countries in case the in-country system does not work and also during the period in which these countries have not yet obtained the Xpert system.

Focused efforts were made towards the restart of services requiring Biosafety Level 3 containment. The proposal for the acquisition and commissioning of a modular BSL-3 laboratory was submitted to the Ministry of Foreign Affairs and International Trade Canada (DFAIT) and a visit was made by a team from DFAIT to CAREC to discuss the emanating issues. The laboratory continued its Cholera preparedness activities by hosting a laboratory workshop, Improved Preparedness for Cholera and Outbreak of Other Diarrhoeal Diseases, March 2011, at CAREC. This workshop was in collaboration with PED and regional experts from INCENSA and was conducted to ensure national laboratories have the capacity to perform isolation and identification of Vibrio species. Enhanced surveillance continued with priority testing of specimens that were received from the Bahamas, Cayman Islands, Jamaica, and the Turks and Caicos Islands. The technical laboratory guidance documents as well as media and other related supplies were given to CAREC member countries (CMCs).

With implementation of the strategies for integrated management of vector borne diseases, countries were reminded of the available entomological services of CAREC. The Entomology services for mosquito identification and insecticide resistance testing were being utilized by CMCs and these will support national efforts and contribute to improvement in programme outcomes.

Pulsed Field Gel Electrophoresis (a molecular method used in bacterial species identification and sub-typing) was introduced to support the Food borne disease surveillance programme. This is a new area being developed to strengthen the reference testing capacity of CAREC and full implementation of this technology is expected to occur in 2012.

The Laboratory provided leadership in biorisk management through the coordination and facilitation of a regional training programme on Biorisk Management for the Laboratory and Infectious Substances Shipping Training. Participants from twenty one countries were present. This workshop has already been replicated in four CMCs, thereby promoting the culture and practice of laboratory biosafety and security.

A Laboratory Capacity Survey was conducted in member countries in April 2011, to determine status and capacity of the laboratory services of countries and ensure that it is consistent with the revised surveillance package of services, identify gaps and prioritize areas for capacity building. Also this survey was to fulfill the 2009 and 2010 recommendation for CAREC arising out of resolutions from the 10th CAREC National Epidemiologists and Laboratory Directors Meeting as well as the 35th CAREC Council Meeting respectively. There was a high response rate with 20 of the 21 member countries responding to the survey.

**USAGE OF LABORATORY SERVICES**

The main areas of syndromic communicable disease surveillance that was supported by the laboratory included undifferentiated fever (dengue, leptospirosis), fever and respiratory (influenza and other respiratory viruses) and food borne diseases (salmonella, shigella, rotavirus, norovirus). Support for Mycobacterium tuberculosis (MTB) identification and drug sensitivity testing was frequently requested and the CAREC laboratory continued its referral of these specimens to the Massachusetts Supranational TB Laboratory, USA. A total of three thousand, three hundred and forty one (3,341) test requests were received for 2011. The ten most frequently requested tests accounted for ninety percent (90%) of the submissions and is displayed in Figure 1 below.

**FIGURE 1: Most Frequently Requested Tests for 2011**
Serotyping of Salmonella Isolates
Salmonella isolates were referred from 10 CMC’s for serotyping and two countries were responsible for 70% of specimens. Most specimens were from Trinidad and Tobago (40%), followed by Jamaica (29%), Barbados (12%) and Bermuda (6%). Salmonella Enteritidis (36.5%) was the most prevalent serotype isolated by the CAREC’s laboratory followed by Salmonella Typhimurium (9%) and Salmonella Javiana (6.4%). Two new Salmonella Serotypes were identified during 2011, Salmonella Jukestown (from a human specimen) and Salmonella Madelia. Over 80% of isolates were human specimens.

Phage Typing of Salmonella Enteritidis
Seven CMCs referred isolates of Salmonella Enteritidis for Phage Typing with most specimens from Barbados (46%), Jamaica (28.2%) and Trinidad and Tobago (12.9%). Phage types 13a, 22 and 8var were prominent for the reporting period with two new phage types identified within the region, one isolate of phage type 51 from an animal specimen and an isolate of phage type 55.

Identification
A total of 40 isolates were received for identification/antimicrobial susceptibility testing with some organisms identified such as Shigella sonnei, Vibrio cholerae Non 01 and Aeromonas hydrophilia. The first Vibrio cholerae 01 Ogawa imported case was also identified in one of the CMC.

Mycobacterium Tuberculosis
The testing services for the diagnosis of Mycobacterium tuberculosis (MTB) and drug sensitivity testing (DST) is contracted to the Massachusetts TB Supranational Laboratory (USA). A total of 250 specimens were received by CAREC and referred for TB culture and sensitivity testing. Forty three percent (43%) of the isolates were identified as Mycobacterium Tuberculosis complex while 33% were mycobacteria other than MTB. One specimen was found to be multidrug resistant – resistant to Rifampicin, Isoniazid (INH) and Pyrazinamide (PZA). Smear microscopy, culture and DST are the current gold standards for tuberculosis testing; however, culture and DST have very long turnaround times (approximately 6-8 weeks). CAREC sought to improve the testing services to countries by exploring new technologies for diagnosis including molecular/PCR based platforms. The Gene Xpert MTB/RIF system (a real time PCR based platform) is recommended by the WHO for the initial diagnosis of MTBC and determination of rifampicin (RIF) resistance. RIF resistance is taken as a proxy for multi-drug resistance (MDR). The testing platform was acquired by CAREC in October 2011. This technology aims at giving rapid results for high risk groups for the early detection and management of the disease. The high specificity and sensitivity (>95%) of the test for the detection of Mycobacterium tuberculosis makes this technology very attractive and will aim at giving clinicians an early indication of the disease especially in HIV patients and other sputum and culture negative groups.

Invasive Bacterial Infections
The regional system for vaccines in the Americas (SIREVA), established in 1991 as collaboration for vaccine research, is designed to gather epidemiological knowledge that can be used for vaccine development. This research by the laboratory is targeted to the surveillance for invasive disease caused by Streptococcus pneumoniae, Haemophilus influenzae and Neisseria meningitides. The laboratories of the CMC refer isolates for confirmation, antimicrobial susceptibility testing and subtyping. Streptococcus pneumoniae isolates (19) were received from three countries and five (5) serotypes were identified. Serotypes 6A and 19F were the most prevalent followed by 6B, 14 and 23F. Fifteen (15) H. influenzae isolates were received from two countries of which eight (8) were non serotypable, two (2) were identified as serotype c and one (1) isolate each were positive for serotype d and e.

Vaccine Preventable Diseases for Elimination and Eradication
Laboratory investigation continued for measles, rubella, congenital rubella syndrome and poliomyelitis, vaccine preventable diseases for eradication or elimination. Approximately one in every three specimens received at the CAREC’s laboratory is obtained for these investigations and the specimens that are received are referred from not only the CMCs but also from other countries in Central and Latin America. Of these specimens, one specimen tested positive for measles (Genotype B3), an imported case to Jamaica, other aetologic agents identified were dengue, human herpes virus type 6 (HHV-6).

There were no wild type polio isolates detected. Non-Polio Enterovirus (NPEV) was detected in some countries.

Virology Specimens
Specimens were referred from 13 CMCs to establish virus etiology by PCR and/or immune status by serological assays. In addition two hundred and forty eight (248) specimens were tested for two Hepatitis B markers (HBsAg and Anti HBs) as part a Hepatitis B study in Pregnant Women in St Kitts and Nevis.
Approximately sixty five percent (65%) of the requests were related to Dengue virus and the remaining requests were analyzed for various viruses; primarily Norovirus and Enteroviruses from single cases and small outbreaks, along with referrals for Cytomegalovirus (CMV), EB, Hepatitis B serology and HSV etiology.

Dengue activity occurred throughout the year with dengue diagnostics (Real time RT-PCR - for serotype determination) and dengue serology accounting for more than half the workload (58%). Figure 2 displays a breakdown of testing activity for the year. The increase in the number of requests was received between July to November which corresponds to the rainy season in many countries of the Caribbean.

**FIGURE 2: Dengue virus test requests (IgM and PCR) received in 2011.**

**Respiratory Virus Illness**
A Real time PCR panel was used for testing specimens from persons with acute respiratory infection (ARI) and severe acute respiratory infection (SARI). This allows for the detection and subtyping of Influenza A, Influenza B, Respiratory Syncytial Virus (RSV), Adenovirus, Para influenza 1-3, Rhinovirus and Human metapneumovirus (hMPV). RSV was the most frequently identified followed by Influenza A H1N1 pandemic strain. Influenza A H3N2 and B and Rhinovirus were also identified.

**Leptospirosis**
Current serological testing procedures for leptospirosis are limited as there are absences of sensitive and specific laboratory tests suitable for use in routine diagnostic laboratories. The standard reference test for leptospirosis is the microscopic agglutination test (MAT) and in 2012 it will be reintroduced at CAREC. Request for testing services were mainly from the Eastern Caribbean Countries which lacked capacity or testing kits and most specimens were received during June to November 2011. This period corresponded to the onset of the rainy season in the Caribbean, during which several countries reported flooding.

A subset of specimens was submitted to the CDC for subtyping and the primary infecting serogroups identified were Bataviae (serovar Bataviae, strain Van Tienen); Sejroe (serovar Wolffi, strain 3705); Icterohaemorrhagiae (serovar Icterohaemorrhagiae, strain RGA; serovar Mankarso, strain Mankarso); Canicola (serovar Canicola, strain Ruebush). All these serogroups belong to the pathogenic genomospecies, L. Interrogans.

**Toxoplasmosis**
A small number of test requests were received in 2011, totaling eighteen (18) in number. The majority of CMCs do have capacity for Toxoplasmosis serology, thus only a few cases are received at CAREC, primarily for confirmation.

**Outbreaks**
There were four CMCs that experienced ‘small outbreaks’ of acute gastroenteritis and the identified causative agent was Norovirus G11.

**QUALITY MANAGEMENT SYSTEM (QMS)**

The aim of the Quality Assurance programme is to improve the effectiveness of the quality management system (QMS) of laboratories in accordance with the principles of Good Laboratory Practice in order to obtain ISO 15189 and other applicable ISO standard.

The laboratory continued to implement its quality management system in accordance with ISO 15189 requirements with focus on the review of all documentation (quality manual, technical SOPs) and implementation of a proper inventory system. Emphasis was placed on completion of key operational standard operating procedures (SOPs); all technical SOPs were revised and distributed. Following the agreement regarding the revised core functions of the Centre, the Quality Manual and the User Manual were also revised to reflect the new focus of the laboratory.

Monitoring of the processes within the laboratory is crucial to the functioning of the QMS, therefore procedures were developed to track appropriate quality indicators as well as any negative occurrences. Procedures developed also included internal auditing based on the tier approach of the PAHO-CDC Joint Initiative on Strengthening Quality Management Systems for Medical Laboratories in a Step-Wise Approach toward Accreditation. This is also a Caribbean initiative.

Inventory control is a key aspect of assuring quality service delivery and with the introduction of new software (Pipeline) - this will enable the division to efficiently track its consumption and so reduce the
possibility of stock-outs and waste due to over-ordering.
CAREC continued its coordinating responsibility re the receipt of UKNEQAS panels by CMCs, reporting of results to the provider and ensuring participants received their reports. Challenges included the timely receipt of panels by the countries from the EQA providers, the release of panels by customs and receipt of reports. The latter continues to be a challenge.

CAREC continued to be a leading partner in the PAHO-CDC Joint Initiative on Strengthening Quality Management Systems for Medical Laboratories in a Step-Wise Approach toward Accreditation in the Caribbean. In June, a gap assessment of the National Reference Public Health Laboratory, Guyana (according to ISO 15189:2007 requirements) was conducted by the Quality Manager and the PAHO Regional Advisor, Laboratory Services. CAREC also participated in the Technical Workshop on Developing the Criteria and Check-list for Each Tier Pilot Document (June).

**ENTOMOLOGY UNIT**

The major activities of the Entomology Unit in 2011 included insecticide resistance testing, training, provision of reference and referral services, and surveillance support to vector control units in CMCs. During the year, nine strains of Aedes aegypti mosquitoes received from Trinidad and Tobago and St. Vincent and the Grenadines were subjected to the organophosphate insecticides, fenitrothion, malathion and temephos and a pyrethroid insecticide, permethrin. Resistance tests were conducted on both larval and adult mosquito stages, using the WHO Bioassay test methods.

Results showed that all five larval strains tested from Trinidad and Tobago, were resistant to the insecticides to which they were exposed (<90% mortality). The Petit Bourg and Mt Lambert strains showed resistance to fenitrothion with 0% and 1.0% mortality, respectively. Resistance to malathion was observed in the H. Village (5.5% mortality) and Petit Bourg (53.5% mortality) while the Mt. Lambert, Tunapuna and Patna Village strains showed resistance to temephos, with mortalities of 1.0%, 1.3% and 20.6%, respectively. Bioassays conducted on the adult mosquitoes of the Petit Bourg strain revealed resistance to malathion with a mortality level of 45.0%.

Susceptibility to malathion (>90% mortality) was observed in four (4) larval strains from St. Vincent and the Grenadines (Figure 3). However, all seven strains tested, showed resistance to temephos with mortality levels ranging from 7.0% in the Lodge Village strain to 45.6% in the Diamond/Stubbs strain. Resistance to fenitrothion was observed in the Campden Park and Diamond/Stubbs strains with 1.7% and 45.6% mortality, respectively (Figure 3).

Caribbean strains of Aedes aegypti continue to show varying levels of resistance to organophosphate and pyrethroid insecticides. Although fenitrothin and malathion are not used as larvicides, what the results show is that there is multiple resistance to organophosphates in the larval stages. Pyrethroid insecticides were previously thought to be possible alternatives to the organophosphate insecticides currently in use, but these cannot be recommended based on test results.

Field and laboratory evaluations of the carbamate insecticide, propoxur, were conducted to evaluate its potential for use as an alternative insecticide by the Insect Vector Control Department of Trinidad and Tobago. Three (3) Trinidad strains of Aedes aegypti mosquitoes, namely, Curepe, Mt. Lambert and La Carioa, which were known to be resistant to malathion and temephos were included in the evaluation exercise. Cages with adult mosquitoes from these strains were strategically placed in residences which were residually sprayed with propoxur and 100% of mosquitoes died within 1 hour of the treatment. Laboratory tests were conducted using the CDC Bottle Bioassay method in which strains were exposed to concentrations of 2%, 4% and 6% of propoxur. Results showed that all strains died after less than 10 minutes exposure to each concentration of the insecticide. These preliminary findings are promising; however, more extensive studies will be carried out in 2012.

Based on the fast development of resistance to insecticides in our mosquito populations and the slow pace at which new insecticides are being developed for vector control, the emphasis for dengue prevention and control lies in integrated vector management. Insecticides have a role to play but must be used judiciously, coupled with prominence being given to source reduction, education and community participation.
THE CARIBBEAN MEASLES FREE FOR 20 YEARS

GOOD RESULTS FROM IMMUNIZATION PROGRAMME

EXPANDED PROGRAMME ON IMMUNIZATION
INTRODUCTION

The immunization programme of the countries of the Caribbean Community has been one of the most successful and is used as a yardstick by which other programmes are measured. Strategic planning and implementation, monitoring and evaluation, coupled with committed health professionals have added to its success. Completing the activities of verification and documentation of elimination of measles, rubella and CRS in the Caribbean countries was one of the main achievements of the year.

PROTECTING OUR ACHIEVEMENTS AND GAINS

Vaccines Introduction and Universal Vaccination Coverage

Achieving greater than 95% vaccination coverage for administered antigens, continues to be the goal for the countries and territories of the Caribbean Community. This goal was achieved by many countries; however, areas of low vaccination coverage still remain in some countries. Family immunization, and developing and implementing the appropriate policy remain priority and countries are working towards this end. Most of the countries have already included adolescents, adults, elderly, and groups with special needs as part of the public immunization programme. However, formalization is necessary. Countries are introducing the new and underutilized vaccines in the public sector immunization schedule, but funding is still the major barrier.

Introduction of pneumococcal vaccines into the public sector schedules is now in six (6) countries (Aruba, Barbados, Bermuda, Cayman Islands, Guyana and Trinidad and Tobago) and Jamaica has included the vaccine for at-risk infant population. HPV vaccines are available for adolescents on an optional basis in Bermuda, Cayman Islands and Guyana. Rotavirus vaccine was introduced in the Cayman Islands in 2009 and in Guyana in 2010.

Achieving national coverage of 95% or more for each administered vaccine at each region, district, or zone level has been and continues to be the goal of the immunization programme.

For 2010, the average coverage for the Caribbean sub-region for primary immunizations (3 doses of DTP, OPV/IPV, Hib, hepatitis B vaccines and 1 dose of MMR, BCG) is DTP 94%, OPV/IPV 93%, Hib 93%, hepatitis B 93%, MMR 91%, MMR-1 91%, and BCG 95% (Figure 1).

The vaccination coverage for administered vaccines for 2010 was similar to that of 2009. Fifteen countries had vaccination coverage for DTP-3 of 95% or more; 13 countries had TOPV3 coverage over 95% and 12 countries had MMR1 coverage over 95% in 2010, while all countries had coverage greater than 80% for all antigens (Table 1).
The vaccination coverage survey proposed for Trinidad and Tobago is still not yet conducted and Jamaica continues to implement the recommendations from the data quality assessment conducted in 2010.

**General Disease Surveillance**

Weekly reporting from 728 sites in the countries continues for vaccine preventable diseases. The last case of diphtheria was reported in 1994 and neonatal tetanus in 2006. Preliminary data showed that three cases of non-neonatal tetanus were reported in 2011 from 3 countries and 6 cases in 2010 from four countries. The cases in 2010 and 2011 were in adults and the elderly. There were two reported cases of pertussis in 2011 from 2 countries, compared to three cases in 2010 from one country. Most countries continue to report cases of varicella and for 2011 there were 5152 cases from 16 countries while in 2010, there were 6896 cases. For 2010, three countries reported 39 cases of mumps with one country reporting 92% of cases, while for 2011 there were 23 cases reported from 3 countries. These cases were not laboratory confirmed.

From the data received, nine cases of Streptococcus meningitis were reported in 2011 from 1 country. Concerning Haemophilus Influenzae, two cases of pneumonia were reported in 2010 while 4 cases of pneumonia and 2 cases of meningitis were reported in 2011.

**Surveillance – immunization safety**

Surveillance for immunization safety was strengthened in the countries following implementation of the recommendations of the ESAVI/AEFI workshop held in St. Lucia in 2010.

Two countries conducted their re-sensitization workshop. Dominica reported a cluster of vaccines (post administration of DPT vaccines) with high fever, excessive crying and irritability. One country reported an event (ESAVI/AEFI) that could be classified as severe. Investigation of the case was ongoing.

Although countries already have surveillance mechanisms in place, strengthening is required as well as the development of their crisis plan. ESAVI/AEFI monitoring guidelines on vaccine risk communication were provided at the workshop in 2010, and these should inform the crisis plan. The information and skills gained were used for the in country investigation.

Vaccine safety issues including how to reduce programmatic errors are being emphasized, since maintaining the public trust in the immunization programme is of paramount importance to the countries.
PROGRESS WITH MEASLES,
RUBELLA AND CRS ELIMINATION

In 1988, the Ministers responsible for Health in the Caribbean Community resolved to eliminate indigenous cases of measles and in 1991, mass measles vaccination activities were implemented. With the success of the strategy, in 1994, countries of the Region of the Americas set a goal of interrupting endemic measles transmission by the end of 2000. Resolution CSP24.R16 was adopted during the XXIV Pan American Sanitary Conference. The interruption of indigenous measles virus circulation occurred in 1991 (20 years ago) in the Caribbean Community and in 2002 in the Americas.

Case Reporting

In 2011, there were 717 sites for reporting weekly suspected measles, rubella, and CRS cases in the Caribbean sub-region. Ninety-nine percent of these sites report on a weekly basis and national reports include data from public and private health facilities. With the exception of few countries, private sector sites are less than 10% of total sites. Routine reporting of febrile rash illnesses continues from French Guiana (started in 2003) and the Dutch-speaking islands (collectively), which started reporting again in 2007. St. Maarten reports separately and weekly since 2010 as well as Martinique and Guadeloupe (including St. Martin).

Over nine thousand (9,278) fever and rash cases have been reported between 1991 and 2011. The reported annual cases ranged from a low of 207 in 2006 to a high of 1024 in 1997. The 1024 cases represented the rubella outbreak in the countries and other peaks related to dengue activities in countries. (Figure 2)

Eight confirmed cases of measles (imported from Europe and North America) occurred during the period 1991 to 2011. In 2011, there was one laboratory confirmed case of measles reported from Jamaica. This case was an eight year old tourist from the United Kingdom. Prior to this case, the last 2 cases (imported and import-related) were in Jamaica in 2008. Enhanced community surveillance activities are also reflected in 2008 in Figure 2.

Four hundred and ninety fever and rash cases were reported from 14 countries in 2011. Most of the cases were reported from Jamaica (54%), Belize (17%) and Guyana (17%). Of these cases, there was one imported laboratory confirmed case of measles and the others were discarded as neither measles nor rubella. Ninety-two (19%) of the discarded cases were tested for dengue and two tested positive (Figure 3). Jamaica reported 264 cases and 70 of their cases tested positive (in country) for dengue and for Guyana two cases were tested positive (in country). Eighty-two (49%) of cases less than 2 years of age were tested for HHV-6/Roseola and 15 were positive.

The French Departments reported 21 fever and rash cases in 2011, with five cases being laboratory confirmed as measles and three as dengue. Whereas the Dutch Caribbean Islands reported 355 cases with none reported as measles or rubella and many were clinically diagnosed as varicella.

All countries need to ensure that 80% of the specimens are received at the CAREC’s laboratory less than five days post collection. Belize, Anguilla and St. Kitts/Nevis are the only countries which have met this criterion. Overall 35% of specimens arrived at CAREC laboratory in less than five (5) days, post collection. Countries are still being encouraged to ship specimens to CAREC as quickly as possible after collection and ensure that mechanisms are in place for in country transportation. A major challenge is finance and that has resulted in batching of specimens.
Excellence in Public Health Surveillance

**Surveillance Indicators**

In 2011, the surveillance indicators were similar to that of 2010. Almost all (99%) of sites reported on a weekly basis, with 99% of cases were investigated within 48 hours and 91% adequately; 96% of cases with adequate specimens collected; and 95% had received laboratory results in less than four (4) days. Ninety-seven percent of specimens were discarded by laboratory testing (Figure 4 and Annex 1).

While in 2010, 99% of surveillance sites reported on a weekly basis with 99% of cases investigated within 48 hours; 94% of cases had adequate samples taken and 89% received laboratory results in less than 4 days. Ninety-six percent of cases were discarded on the basis of laboratory testing and thirty-three percent of specimens were received at CAREC less than five days after collection.

**Impact of the Rubella Vaccination Program**

The last cases of indigenous rubella were reported in 2001, where there were six cases from one country. In 2008, an imported rubella case was reported from Bermuda and another rubella case from French Guiana. No case was reported from 2009 to 2011.

In 2004, the surveillance system for CRS detection was enhanced with the implementation of TORCH testing. A total of 336 specimens have been tested for rubella through TORCH (toxoplasmosis, rubella, cytomegalovirus, and herpes) testing between 2004 and 2011.

In 2011, one suspected case of CRS was referred for testing in addition to 18 cases (from 6 countries) referred for TORCH evaluation. All cases were discarded as negative for CRS from laboratory testing. The last indigenous CRS case in a CAREC member country was recorded in 1999 (Figure 5).

**Progress of Documenting and Verifying Measles, Rubella, and CRS Elimination in the Caribbean Sub-region**

The 27th Pan American Sanitary Conference adopted Resolution CSP27.R2 in 2007, which authorized the formation of an International Expert Committee (IEC) responsible for documenting and verifying the interruption of endemic measles and rubella virus in the Region of the Americas. TAG recommended that countries prepare and implement a national plan of action for the verification of measles, rubella, and CRS elimination, with technical cooperation from PAHO and the International Expert Committee.

The Working Group meeting held in Barbados, July 2010 defined the activities required including instruments and or checklists for documenting the elimination of measles, rubella and CRS. The working documents including a model country report were sent to countries to guide the documentation and verification process. Countries were asked to form teams at national levels, develop plans for the in-country activities, including report writing. The support of the countries’ Medical Associations and the Caribbean Pediatric Association were requested for the conduct of activities, including the completion of questionnaires and surveys. Each country formed a national team and conducted the activities according to the agreed guidelines.

All countries submitted a draft report to the Subregional Commission. The Secretariat (CAREC’s immunization team) to the Commission and teams (which at times included members of the Commission) supported and validated elimination in nine countries. Support was also given by the Secretariat in convening the meetings and logistics of the Commission and the preparation of the Subregional Report. This report was submitted in December, 2011.
Poliomyelitis Eradication efforts and AFP surveillance

The global eradication of the wild poliovirus continues to require much effort for completion. The importance of maintaining adequate and timely surveillance as well as high vaccination coverage cannot be overstated. The last cases of poliomyelitis due to wild poliovirus in the Caribbean occurred in 1982. The countries have strived to maintain high poliovirus vaccination coverage and effective AFP surveillance. AFP reporting continues from 507 sites and 99% of these sites reported on a weekly basis in 2011.

From 1994-2011, there were 301 AFP cases aged less than 15 years reported from 11 countries. Excluding 1994 and 2003, when the annual AFP rate was 1.0 or greater, the annual AFP rates ranged from 0.50 to 1.32 per 100,000 population aged less than 15 years (Figure 6).

In 2011, twenty-five (25) AFP cases with age range of 1 month to 61 years were reported from 4 countries: Belize, Guyana, Jamaica, and Trinidad & Tobago. Twelve (12) cases were less than 15 years of age. Stool specimens were collected from nine (75%) of the twelve. Only 2 of the 9 specimens were taken within 14 days of onset of paralysis and 5 stool specimens were collected within 30 days of onset of paralysis. Nine (75%) of cases were investigated within 48 hours. These AFP indicators need to be markedly improved and were less than that of 2010.

While in 2010, 26 AFP cases with age range of 12 months to 74 years were reported from six countries: Barbados, Belize, Guyana, Jamaica, Suriname, and Trinidad and Tobago. Fourteen cases (54%) cases were aged less than 15 years, of which 12 cases had stool specimens collected and nine of the 12 stool collected were within 14 days of onset of paralysis. All stool specimens that were collected were done within 30 days of onset of paralysis.

The annual rate of AFP cases per 100,000 population aged less than 15 years for 2011 is 0.55 below the recommended rate of 1.0. The indicators of adequate stool specimens and annual AFP rate are directly related to the probability of early detection of importations of wild polioviruses from the endemic regions of the world. These two indicators are less than expected levels (Figure 7).

VACCINATION WEEK IN THE AMERICAS (VWA)

Vaccination Week in the Americas (VWA), proposed by the Health Ministers of the Andean Region in 2002, had its 9th year of celebration in 2011, with its main objectives for a coordinated vaccination effort across national borders, to reach vulnerable populations and to strengthen national immunization programs. The objectives are realized through activities targeting populations with otherwise limited access to health services, such as those in border and rural areas, urban margins, indigenous communities, and poor performing districts. Many of the activities implemented in 2011 were similar to those of 2010 – vaccination outreach sessions for target populations such as farmers, workers in tourism sectors, carpenters and the elderly with the vaccines being tetanus containing vaccine, hepatitis B and yellow fever vaccines. Catch-up vaccination sessions were done for adolescents for hepatitis B vaccine in one country. Some countries conducted health fairs, health education and exhibition sessions in communities and schools, school essay competition and award programmes for health workers. All countries utilize the media in their immunization awareness programmes.

VWA has also provided a platform to raise population awareness regarding the importance of immunization campaigns and to keep the topic on the forefront of political agendas in the Region.

While in 2010, regional celebration of VWA was at the border between Suriname and French Guiana (with the participation of Brazilian authorities and the Director, PAHO, Dr. Mirta Roses as the guest of honor)
in 2011, countries had special activities focusing on social mobilization for immunization.

**COMPLETING THE UNFINISHED AGENDA**

**Seasonal and Pandemic Influenza Surveillance Programme**

More than 90% of countries have introduced the vaccine in the public health systems. The influenza vaccination is targeted at risk groups such as healthcare workers, persons with underlying medical conditions and pregnant women. The Northern Hemisphere influenza vaccine has been the vaccine used by the countries.

The influenza surveillance system implemented in selected countries in the Caribbean, in 2007, has continued. Reports of acute respiratory infection (ARI) are submitted weekly from all CAREC member countries and severe respiratory infection (SARI) from six countries namely Barbados, Dominica, Jamaica, St. Lucia, St. Vincent and the Grenadines, and Trinidad and Tobago.

In 2011, the incidence rate for ARI had its major peak in epidemiological weeks 8 and 12 and 37-40 for all ARI cases (children aged less than 5 years and those older than 5 years). Concerning hospital admissions for SARI, most cases were in the age group less than 48 months with the highest rate being 4.8 per 100 hospital admissions. Laboratory testing showed that influenza A (H3N2), influenza A H1N1 2009 and seasonal influenza B were the main circulating virus type. Respiratory syncytial virus (RSV) was detected in 28% (147 of 531) of the positive specimens. Seventy-one of these positive specimens were from clusters of cases in a home for the elderly and also in children less than 5 years of age.

**CONFRONTING NEW CHALLENGES**

**Invasive Bacterial Infection surveillance and Rotavirus Surveillance**

The invasive bacterial infection surveillance (IBIS) initiated in 1998 was implemented in five (5) countries of the sub-region. The focus of the surveillance was on invasive bacterial diseases, mainly pneumonia, meningitis, and septicemia. In 2000, the countries were required to report, weekly and annually, all cases of bacterial meningitis, Hib meningitis, Neisseria meningitides meningitis, non-specific meningitis, bacterial pneumonia, streptococcal pneumonia, and Hib pneumonia. In 2011, there were nine cases of streptococcal meningitis reported from one country. There were four cases of Hib pneumonia (from two countries), and 2 cases of meningitis (from one country) reported in 2011.

The laboratory surveillance of pneumococcal diseases needs to be re-organized and enhanced. Training has been done in characterization for two laboratory staff, one each from Jamaica and CAREC. In 2011, a total of 19 Streptococcus pneumoniae isolates were received from three countries: Anguilla, Barbados and Trinidad and Tobago (17 or 90%). Five serotypes were identified. Serotypes 6A and 19F were the most prevalent followed by 6B, 14 and 23F. Fifteen H. influenzae isolates were received from two countries: Anguilla (2 or 13%) and Trinidad and Tobago (13 or 87%). Fourteen specimens were tested, eight were non serotypable and other serotypes identified were c, d and e. Countries need to be reminded to refer isolates from persons with invasive bacterial infection.

**Rotavirus Surveillance**

In 2004, sentinel surveillance for rotavirus infection started in selected Caribbean countries: Guyana, St. Vincent and the Grenadines, and Suriname (Trinidad and Tobago also participated for one year.) This surveillance system has focused on identifying 3 factors in each country: the burden of gastroenteritis among children less than 5 years; the burden of rotavirus infection in this same age group; and the rotavirus subtypes circulating in each country.

The most common rotavirus subtypes found in the countries was G1P(8) which is also the most common subtype globally as well as the principal component of both rotavirus vaccines. Other non-vaccine subtypes however, were the dominant subtypes at various times in the countries, raising concerns about the efficacy of the vaccine against these non-vaccine subtypes.

Over the past five years all countries have been encouraged to submit diarrheal stool specimens for testing for rotavirus and subtype characterization. In 2011, ten (10) countries reported 160 cases of which Jamaica reported 55% and most cases were in the first two months of the year. While for 2010, five countries reported 99 cases. Countries need to continue to send specimens or isolates from gastroenteritis cases for subtyping. Many of the cases were from the countries with the established surveillance system.

**HPV Vaccine Introduction**

The human papillomavirus (HPV) vaccines have been introduced in three of our countries on an optional basis – Bermuda in 2008, Cayman Islands in 2009 and Guyana in 2011. The vaccination programme is
school based and the introduction has been to girls 11-13 years old. Introduction of HPV vaccine is also being discussed by several countries (such as Barbados, Suriname) and preparatory documents are being developed. The Council of CAREC and the Caucus of Health Ministers for the Caribbean Community (CARICOM) have requested discussion and costing on the feasibility of the introduction of the vaccine from a sub-regional perspective.

HIGHLIGHTS FROM THE 28TH CARIBBEAN EPI MANAGERS’ MEETING

The 28th Caribbean EPI Managers’ Meeting was held at the Accra Beach Hotel and Spa in Christ Church, Barbados on February 27 to March 02, 2012. Over one hundred and twenty-seven participants attended. They represented 24 island states and territories as well as French Guiana, Guadeloupe, Haiti, Martinique, The Netherlands, Canada, USA, and international agencies such as the U.S. Centers for Disease Control and Prevention (CDC), the Public Health Agency of Canada (PHAC) and UNICEF. There were also representatives from the Ministries of Health, the Pan American Health Organization Headquarters (PAHO), CAREC and PAHO Office in Suriname.

Purposes of the Meeting

1. To share experiences and lessons learned at the regional, sub-regional, and national levels in order to enrich collective understanding, build on the successes, refine strategies, and define solutions for deficits detected;

2. To provide scientific, technical, and programmatic updates in order to ensure that immunization managers are positioned to answer relevant questions from Ministries of Health and other stakeholders;

3. To review current plans and outcomes and to develop new plans for the future, because planning and evaluation are important managerial elements for enhancing performance, mobilizing resources, and guaranteeing financial sustainability; and

4. To discuss and decide on timelines for the completion of country reports for the documentation and verification for the elimination of measles, rubella and congenital rubella syndrome (CRS).

Objectives of the Meeting

The objectives of the 28th annual meeting of the Caribbean EPI Managers are as follows:

1. To analyze the status of the EPI programme in each country and to identify areas that require strengthening, define targets, objectives and budget for 2012;

2. To update information on selective scientific topics of common interest to countries in relation to immunization, delivery service and surveillance of EPI diseases;

3. To set the targets and objectives of each country with respect to immunization coverage and reduction of morbidity and mortality from the EPI diseases for the year 2012;

4. To develop an action plan with a specific budget for each activity for each country to achieve the targets and objectives set for 2012.

5. To analyze and evaluate the status of measles, rubella and congenital rubella syndrome (CRS) and assess advances towards the implementation of PAHO Resolution CSP27.R2 to document and verify the elimination of endemic measles, rubella and CRS transmission in the Americas;

6. To sustain the eradication of wild poliovirus in each country;

7. To discuss status and advances made in the surveillance and management of adverse reactions to vaccines; and

8. To discuss the introduction of new and underutilized vaccines such as seasonal influenza, conjugate pneumococcal, rotavirus and HPV vaccines in the national immunization schedules, including strengthening of the pertinent surveillance/monitoring systems.

Documentation and Verification of Measles, Rubella, and CRS Elimination

The progress made by PAHO’s Member States towards the goal of documenting measles, rubella, and CRS elimination is notable. Thirty-four countries, the French departments, the Dutch-speaking islands, and the United Kingdom Overseas Territories in the Americas have established national or sub-regional commissions, while 15 countries and the 13 countries
comprising the English-speaking Caribbean have completed their fieldwork and submitted their final country reports.

All countries submitted a draft report on the documentation and verification process to the Sub-regional Commission. Each country elimination reports will be reviewed by PAHO and the Regional synthesis report will be submitted to the International Expert Committee (IEC) for comments prior to sending to respective Ministries of Health for revision and finalization.

**HPV Vaccination and Cervical Cancer Prevention and Control**

A special focus of the meeting was the comprehensive programme for Cervical Cancer Prevention and Control. HPV vaccination is a primary preventive strategy for the programme. Updates on cervical cancer disease epidemiology, the screening activities and the research being done in the Caribbean were presented. The focal points from selected countries as well as the PAHO offices of the Caribbean countries participated in these sessions. Some of the major presentations were the HPV Prevalence Study in Jamaica, Overview of ProVac and the CERVICAC Model, Cost Effective Analysis of HPV Vaccination in Jamaica, and Experiences of Countries (Guyana, Suriname, The Netherlands) in planning and introduction of HPV vaccine. All participants were involved in Group-Work where activities were planned for 2012.

**HPV Prevalence Study in Jamaica**

Based on the high incidence and mortality of cervical cancer and the availability of HPV vaccines in Jamaica, the country in collaboration with the Pan American Health Organization and the Centers for Disease Control conducted a national study on HPV prevalence and vaccine acceptability in 2010-2011 as part of its evidence based approach to decision making regarding introduction of the HPV vaccine. The study was a cross-sectional study using a sample of 860 sexually active females aged 16-49 years in which Pap smears were done and HPV amplification and typing. The mean age of the sample was 32 years. Of note, interest in receiving the HPV vaccine was high among study participants for both themselves and their daughters. This was probably a reflection of the value placed on immunization in general. As expected, the majority (90%) of the cytology results were normal and 9% abnormal.

Prevalence of any HPV infection was 54%. This was higher than previously reported for Jamaica or any of the English speaking Caribbean countries. Some 37 different HPV DNA types were identified, 14 of which were high risk or oncogenic types. The prevalence of a high risk genotype was 34.9% with the most common types being 16, 35, 58, 18 and 66 in descending order. This distribution of oncogenic types and the prevalence of HPV 16 (6.2%) differed from that found in Trinidad and Tobago and the USA. HPV 35 with the second highest prevalence of the oncogenic types has also been found in other Caribbean countries and in the African American population. HPV 16 and 18 were present in 8.4% of normal smears, 21.3% of low grade lesions but 50% of high grade cervical lesions. This may be predictive of the prevalence of these types in cases of cervical cancer. With other studies being done, Jamaica is the first country in the English speaking Caribbean to undertake a comprehensive evidence based approach to a policy decision for HPV vaccine. The disease burden, HPV prevalence and type distribution all support introduction of the HPV vaccine.

**Overview of ProVac and the CERVIVAC Model**

In 2006, Ministers of Health from the Americas called for strengthened national capacity to make evidence-based immunization policy. In response, PAHO’s ProVac Initiative has developed a work plan to bolster decision-making infrastructure and to build technical capacity to generate, synthesize and interpret relevant evidence to inform vaccination strategies and policy at the national-level. The initiative has developed three key tools to help countries to generate evidence on the costs, health impact, and cost-effectiveness of vaccines. A cost-effectiveness model to evaluate integrated approaches for controlling and preventing cervical cancer (CERVIVAC), including HPV vaccines and screening programs, was launched in November 2011. This tool evaluates the costs and health impact of HPV vaccines and alternative screening strategies in a cohort of adolescent girls and a cohort of adult women, respectively. Given the recent decrease in the cost per dose of HPV vaccines available in PAHO’s Revolving Fund, Gardasil (14.24 USD) and Cervarix (15.15 USD), combined with a mounting body of evidence in support of the vaccines’ safety profile, efficacy and effectiveness, Caribbean countries will benefit from applying the CERVIVAC tool to generate local evidence on the vaccines’ cost-effectiveness. ProVac’s CERVIVAC tool can be used to systematically collect and analyze data required to determine the cost-effectiveness of both health intervention strategies. PAHO ProVac’s technical team is currently providing or has provided support to over 20 countries in the region to use these decision analysis tools.

**Cost-effectiveness Analysis of HPV Vaccine in Jamaica**

Jamaica facilitated the piloting and testing of the
CERVIVAC model developed through the Pro Vac Initiative to analyze the cost-effectiveness of HPV vaccination and cervical screening programmes on cervical cancer control. The process involved extensive data collection on the programme costs and strategies for the introduction of the HPV vaccine and various methods for cervical cancer screening and treatment. The results indicated that the HPV vaccination at a cost of US$6,000 per DALY averted was cost effective as it was less than three (3) times the GDP per capita. The model indicated that in the cohort examined there would have been 14 deaths and 43 cases averted.

Despite the cost-effectiveness of HPV vaccination, affordability and sustainability remained areas of concern as the vaccination programme cost was estimated at approximately US$2M. The preliminary results for cervical cancer screening using pap smears, demonstrated that this strategy is highly cost-effective as the cost per DALY was less than one times GDP per capita. The model provided for scenario analysis including vaccine efficacy, price of vaccine, screening and vaccine coverage, etc. With a reduction in vaccine price for example, it would be highly cost effective to introduce the vaccine.

Operational Aspect of the PAHO Revolving Fund
The Revolving Fund of the Pan American Health Organization (PAHO) is a cooperation mechanism for the joint procurement of vaccines, syringes, and related supplies for participating Member States. Through the Revolving Fund, for over 30 years, participating Member States have ensured a continuous supply of high-quality products at the lowest possible price for their immunization programs, thanks to the economies of scale that these Member States provide. Based on the principle of equity, and thanks to economies of scale, all participating Member States have access to the same products, offered through the Revolving Fund at the lowest price, which is a single price independent of the country’s size or economic situation. The Revolving Fund has been a critical factor in making the Region of the Americas a global role model for the success of immunization programs and for its successful introduction of new vaccines.

Surveillance and Immunization Awards
The annual Caribbean Surveillance Award has been established to recognize countries that have performed outstandingly on the surveillance component of their program during the previous year. The award is based on two main criteria: on-time reporting and the percentage of sites reporting to CAREC. The award consists of a certificate and the inscription of the name of the country on a plaque that is kept by the winning country during the following year and until a new country is selected to receive the award. The award is announced during the annual Managers’ meeting. Dominica is the recipient of the 2011 Surveillance Award. Awards for the second and third places went to Antigua/Barbuda and St. Maarten, respectively.

In addition to the surveillance awards, certificates of achievement and recognition were awarded to Belize for maintaining excellent achievement indicators for the Immunization Programme and to Guyana for consistency in achieving the indicators of the Immunization Programme.

The Henry C. Smith Immunization Award was presented this year to Jamaica. The award is in honour of Mr. Henry C. Smith, who was the first PAHO-EPI technical officer for the Caribbean subregion. His service in the subregion spanned 18 years. The immunization trophy is awarded to the country that has made the most improvement in EPI. Participants at the 28th Caribbean EPI Managers’ Meeting sincerely congratulate these countries for being the recipients of awards and extend their compliments to all their health workers for such outstanding performances.

CONCLUSION
The year has been productive but challenging, with public health practitioners having to attain and maintain objectives, while the activities and final report of the documentation and verification of the elimination of measles, rubella and CRS are being conducted. The Governments continue to remain committed to the goals and objectives of universal immunization and elimination of vaccine preventable diseases. Efficient and effective surveillance systems, together with timely responses, will ensure that countries remain free of endemic measles, rubella and other vaccine preventable diseases. The recommendations and issues to be addressed follow:
RECOMMENDATIONS AND ISSUES TO BE ADDRESSED

PROTECTING OUR ACHIEVEMENTS AND GAINS

VACCINES AND VACCINATION COVERAGE

UNIVERSAL VACCINATION COVERAGE:

• All countries should achieve and maintain vaccination coverage for all administered vaccines at 95% or higher, at national and sub-national levels (districts, parishes, zones, regions, etc).

• Countries should use all available strategies, such as community outreach, house-to-house and mop-up campaigns to assist in achieving the goal of attaining 95% or higher coverage.

• Strategies should be developed to increase data collection from private sector physicians including: participation of private sector through paediatric associations; introduction of a web-based system for accessing and reporting information; and policy development/legislation for improving reporting capacity. One strategy may be the invitation of representatives of the Caribbean Paediatric Association to the EPI Managers Meeting.

PROGRESS OF MEASLES, RUBELLA AND CRS:

• Countries should exert all efforts to incorporate the private health sector in the measles, rubella and CRS surveillance system to support the rapid detection of importations and response to outbreaks and to strengthen immunization activities, as well as have internal mechanisms for validating their surveillance system on a regular basis.

• Countries should ensure that appropriate mechanisms are in place for transportation of specimens within country and sending to CAREC in less than 5 days post collection.

• Countries should routinely maintain high, homogenous vaccination coverage (>95%) by municipality for the 1st and 2nd routine dose MMR, monitor the accumulation of susceptibles, and continue the implementation of high quality mop-up activities. Vaccination coverage surveys should be utilized to monitor and validate MMR2 coverage.

• Countries should achieve an adequate level of outbreak preparedness by developing national plans for preparation and rapid response to an importation and potential outbreaks, in light of the high-influx of tourists into the Caribbean region.

• Strengthen collaboration between EPI Manager, Surveillance Officer and Laboratory staff to discuss, review and reflect for standard improvements.

• Jamaica should document the cost of outbreak control interventions implemented recently in 2011 for the imported measles case. This will generate strong evidence on the costly measures taken by PAHO Member States to limit the spread of measles imported virus.

• Consideration should be given to decentralize the testing for measles/rubella in a targeted way and with quality assurance in place.

• Countries should incorporate strategies and concrete activities into their EPI Plans of Actions that will overcome the challenges identified by the Sub-Regional Commission for Documenting/Verifying Measles, Rubella and CRS elimination in the immunization and surveillance programs, with the purpose of protecting the gains obtained.

• Medical practitioners in hospitals (public and private), health centres, and other related facilities must be sensitized to the elimination initiative for measles, rubella, and CRS.
POLIOMYELITIS ERADICATION EFFORTS AND AFP SURVEILLANCE

SUSTAINING POLIO ERADICATION:

- All hospitals (both public and private) should be included in the surveillance for acute flaccid paralysis (AFP), and ways need to be found to update the pediatricians.

- Countries are to make all efforts for all stool specimens for acute flaccid paralysis (AFP) to be collected within 14 days of onset of paralysis and improve timeliness of delivery to CAREC.

- Countries must take measures to achieve vaccination coverage > 95% in every district, to conduct an active search for cases of APF and to comply with the AFP surveillance indicators (rate > 1 x 100,000 for the population aged <15 years old and adequate stool specimens collected in >80% of AFP cases).

- Conduct training on AFP surveillance with health workers in both the public and private sectors, emphasizing the importance of rapid reporting and the collection of adequate stool specimens. Instructional materials may also be prepared, such as posters about what to do if an AFP case is detected.

ESAVI SURVEILLANCE

ESAVI:

- Countries should develop risk communication plans as an integral component of risk management (outlining the strategies to prevent and manage crisis), taking into account political, societal, cultural and economical factors. The strategy of risk communication should be part of the national immunization annual plan of action in order to ensure adequate planning before the occurrence of a crisis.

- During a crisis, transparency should be guaranteed through prompt and frequent communication with the public of what it is known and not known, and what is being done, using simple messages appropriate for wide and diverse audiences.

- Countries should establish and institutionalize mechanisms for the coordination and participation of the different stakeholders (inside and outside of the health sector) involved in a rapid response to a crisis. Roles and responsibilities, as well the identification of an adequate flow of information and communication, should be clearly established before a crisis emerges.

- Countries should properly document the occurrence of ESAVIS through rigorous and timely investigation, with the purpose of generating strong scientific evidence to guarantee the safety profile of all vaccines used.

- The Sub-region should consider establishing a Caribbean Regional Advisory Committee on Immunization and ESAVI Management to review and evaluate serious AEFI.

SUSTAINING THE GAINS

VACCINATION WEEK IN THE AMERICAS (VWA)

- Countries and territories should continue to participate actively in VWA activities, working to vaccinate vulnerable populations while highlighting the importance of disease prevention and health promotion in public forums and in the media.

- The integration of other preventative interventions with vaccination should be continued when appropriate.

- Countries and territories should continue to improve the submission of their VWA final reports to CAREC/PAHO headquarters in a timely fashion.
COMPLETING THE UNFINISHED AGENDA

SEASONAL AND PANDEMIC INFLUENZA SURVEILLANCE PROGRAMME:

- Increase vaccine uptake of pregnant women given their vulnerability to complications from influenza infection.
- Assess the impact of influenza in high-risk populations in the Caribbean countries.
- Countries should ensure that their sampling strategies are in place and implemented for the taking of specimens as a vital part of the surveillance system for Acute Respiratory Infections.
- The surveillance system for ARI and SARI should be enhanced and expanded to all countries.
- The EPI Managers should ensure that they are integrally involved in ARI/SARI surveillance and be catalytic for increased specimen collection.

NEW AND UNDER-UTILIZED VACCINES

HPV VACCINE INTRODUCTION

- Countries and territories should consider HPV vaccine introduction in the context of a comprehensive review of their national cervical cancer prevention and treatment programs. A progress report on the implementation of the work plan developed during the present meeting should be submitted at the next meeting.
- Decision-making on HPV vaccine introduction and changes in screening strategies should be based on evidence—that is, a thorough evaluation of the burden of disease, of the cost-effectiveness of the proposed measures and of their financial and programmatic sustainability. ProVac’s Cervivac tool is an invaluable tool for carrying out integrated cost-effectiveness analyses at the national level.
- Special projects and HPV vaccine donations should only be undertaken after considering the sustainability of the intervention after the end of the project or donation.
- Caribbean sub-region to establish a small working group to determine strategy and method for target setting and monitoring of coverage for cervical cancer screening as well as guidelines for doing Pap smears.
- Best practices in terms of resources/materials to be used for training to be shared among countries.
- Countries should consider sub-regional training in risk communication and development of media campaigns, as well as advocate to policy makers.
- Countries to share communication strategies used to improve awareness and coverage for cervical smears.

A sub-regional meeting of the working group should be held to assess achievements (since 2007), determine the next steps to be taken and the timeframe for achievements, and develop a new work plan.

PNEUMOCOCCAL AND ROTAVIRUS RECOMMENDATIONS:

- Sentinel surveillance for pneumococcal and rotavirus in the countries is critical for identifying circulating sub types; countries are encouraged to develop a sampling strategy and submit specimens to CAREC for sub typing.
- Countries planning to introduce new vaccines must prepare an implementation plan to include logistics, training, and cold chain capacity, as well as ESAVI monitoring.
- Countries are to send stool specimens to CAREC for rotavirus genotyping. If rotavirus testing is done in countries, then stool specimens that are positive for rotavirus should be sent to CAREC.
• Surveillance should be enhanced and continue to be used to assess circulating types and antibiotic resistance patterns for pneumococcal organism causing invasive disease.

• Countries should improve or begin sentinel surveillance of rotavirus diarrhea, pneumonia, and bacterial meningitis in children aged <5 years, so that the impact of vaccine introduction can be adequately assessed and the prevalence of circulating strains and changes in the epidemiological profile of the disease monitored.

• All countries should systematically report their surveillance data for rotavirus diarrhea, pneumonia, and bacterial meningitis to facilitate the development of an epidemiological profile for the diseases in the Region, compare the profiles of different countries, geographical areas, and seasonality, and evaluate the epidemiological changes in these diseases that could occur with the introduction of the vaccine.

• Small countries and islands could have just one sentinel site for invasive bacterial disease and diarrhea due to rotavirus in the same hospital.

• Before introducing any new vaccine, countries should develop a plan of action, based on PAHO guidelines, that includes basic activities such as the evaluation of the cold chain at all levels, logistics, training, and strengthening of the ESAVI network.

• Rotavirus and pneumococcal vaccines should be considered for introduction in the immunization schedule, using the epidemiological profile as a guide. Introducing those vaccines in priority areas (i.e., only in certain municipalities/towns or provinces) makes it more difficult to assess the impact of the intervention and might create logistical and programming problems for the EPI. Therefore, these vaccines should be nationwide whenever feasible.

• Countries should study the impact of PCV on hospitalization and mortality trends caused by pneumococcal disease.

• Countries, and other stakeholders, should continue cost-effectiveness studies on PCV and Rotavirus introduction.

• Countries, where interchangeability between PCV7 and PCV10 occurs, should document their results.
ADM INISTRATION DIVISION

Aiding the smooth operation of CAREC

.....IN THE ENGINE ROOM

AIDING THE SMOOTH OPERATION OF CAREC

ADMINISTRATION DIVISION
MISSION

Our mission is to provide efficient administrative support using high performance teams in the areas of Finance, Human Resources, Information Technology, Procurement and General Services to enable the Organization to achieve its Mission in a safe and healthy working environment.

Missions received:

<table>
<thead>
<tr>
<th>HRM Team</th>
<th>Name</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nancy Machado, HRM</td>
<td>October 17 – 22, 2011</td>
</tr>
<tr>
<td></td>
<td>Isabel Vigil, HRM</td>
<td></td>
</tr>
<tr>
<td>FRM/FS/S</td>
<td>Mauricio Sanmartin, FRM</td>
<td>October 24 - 25, 2011</td>
</tr>
<tr>
<td>Information Security Advisor</td>
<td>Henry Munoz, AM</td>
<td>December 13 – 16, 2011</td>
</tr>
</tbody>
</table>

HR PLAN PHASE I AND II

In 2008, the organization embarked upon a process of streamlining functions in accordance with PAHO’s mandate and the Multilateral Agreement for the operation of CAREC. Organization charts and post descriptions were reviewed and updated to ensure that HR processes and practices were in alignment with CAREC’s strategic objectives and biennial work plan (BWP).

In preparation for CAREC’s transition to CARPHA, the organization reviewed its staffing in order to realise a well-structured and efficiently functioning organization which would facilitate a smooth and effective transition to the new agency.

A preliminary examination of the functions and processes of CAREC’s administrative units, in comparison to other large PAHO country offices, revealed that the administrative staff complement of CAREC needed to be further streamlined; to better fit the volume of transactions undertaken and size of budget managed by the CAREC Administration Division. Additionally, since 2009, some functions have been automated and/or standardized, resulting in a simplified and improved work processes.

In response to a resolution by CAREC’s 36th Directing Council, a realignment which addressed a review of CAREC Human Resources and made recommendations for the consolidation of work activities was done. It also addressed the reduction of posts in an effort to present a more efficient and effective administrative structure while continuing to provide high quality administrative support to the rest of the organization. The final objective being to ensure that a financially viable organization, with an operational budget within the limit of the quota contributions, is delivered to CARPHA.

Following completion of the review of the administrative phase of the CAREC HR Plan (Phase I), CAREC received a mission from PAHO to finalise the HR plan of administration and to offer technical support for the review of the technical units (Phase II). Prior to this visit, the CAREC technical teams met to discuss and agree on the needs of the units and to formulate organisational structures to fit the functional areas and the technical mandate of the units. The Phase I and Phase II were fully implemented and CAREC human resources are ready to be transitioned to CARPHA.

TRANSITION PLAN TO CARPHA

The Caribbean Epidemiology Centre is slated to be transitioned to the Caribbean Public Health Agency (CARPHA), together with four other Caribbean regional health institutions. CAREC has been focusing on maintaining its current services, expanding as appropriate and preparing for transition. In strengthening its present capacity, the position of laboratory director was filled in September 2011 and a review and realignment of its human resources were also accomplished in the last quarter of 2011.

CAREC in preparation for transition, formed a committee with responsibility for developing a transition plan re technical, laboratory and administrative products and services which would be transferred to CARPHA in a smooth, efficient and organized way. This would ensure that the service to member countries would not be interrupted. This committee has 4 task forces (Administration, CAREC Staff Association (CASA), Epidemiology, Laboratory) which meet at regular intervals in order to identify all requirements for this transition. Each task force has specific roles and functions.
The scope of work of each group is to:

- Define issues to be addressed during and after the transition
- Determine the terms of reference and scope of work of each unit or division
- Identify the requirements of each unit for the transition process
- Categorize and prioritize the requirements
- Implement the transition plan

The overall transition plan developed by CAREC is under implementation. A meeting of the Directors of the Regional Health Institutions, that comprise CARPHA, was held in November 2011. At that meeting experiences were shared, transition plans were honed, issues were identified to be discussed at the Executive Board Meeting and recommendations made for follow-up by CARICOM Secretariat.

CAREC has been well supported by PAHO, Headquarters in all its transition activities. Special recognition has to be paid to AD, LEG, HRM, AM, ISECT, PBR/ID and KMC team. Further missions are scheduled for early 2012. According to its transition plan, CAREC will be ready for transitioning and hosting CARPHA implementation team on the compound by June, 2012. Transition to CARPHA is expected to occur at the end of 2012.

**HEALTH SAFETY AND SECURITY DEPARTMENT**

**AREAS OF MAJOR ACHIEVEMENT 2011**

**SECURITY SYSTEM**

In 2011 CAREC continued to place safety and security for all on the forefront. Some activities undertaken by the Health, Safety and Security Department were the installation of two high quality cameras to assist the onsite officers in the surveillance of the main access and egress areas of the compound. The implementation of CAREC’s Security Standard Operating Procedure and the improvement of the Intrusion Alarm Security System. In addition to this, valuable relationships were maintained among Ministry of Health personnel, facilitating continued improvement in the security system.

**CAREC BUSINESS CONTINUITY PLAN (BCP)**

A new model for the Business Continuity Plan was approved in June 2011 by PAHO Headquarters. This model was selected as the standard for the English speaking PAHO country offices in the Caribbean to adopt. CAREC took the lead role in providing support to these offices and facilitated the completion of their Business Continuity Plans, with the major achievement being 100% completion of BCP’s in the region. This was successfully accomplished through the support of Ms. Emelda Williams as responsible officer for this project. Testing and maintenance of the plan is scheduled to take place during the first half of 2012.

**TRAINING**

Staff successfully participated in the UN Basic and Advance Security in the Field Training, Refresher Fire Extinguisher Training, an Emergency Response Table Top Exercise and training for the implemented Business Continuity Plan. These sessions continue to equip staff with the basic knowledge and skills to enable quick and safe response in the event of an emergency.

**PLANS FOR 2012**

- Maintaining a high quality security management system given the uncertainties
- Testing BCP and ensuring it is fully operational
- Environmental compliance
- Readiness for transition

**BUDGET AND FINANCE**

**Quota Contributions from Member Countries**

At the beginning of 2011, Quota Contributions outstanding were US$6,173,140. This figure included arrears totaling US$3,559,285 and contributions for 2011 totaling US$2,613,855. During the year a total of US$2,824,070 was collected. This includes US$776,082 which represents 21.80% of the arrears and US$2,047,988 which represents 78.35% of the 2011 assessment. The percentage collected in 2011 increased slightly to 45.75% as compared to 44.81% in 2010. Table 2 shows a comparison of Quota Contribution for the period 2009 to 2011. At the end of 2011, Quota Contributions outstanding amounted to US$3,349,070 (See Table 1).
CAREC continued its effort to collect outstanding contributions through telephone calls and e-mails. Reminder letters were also sent to the respective countries in an attempt to reduce the arrears.

**Breakdown of funding received**

For the 2010 – 2011 biennium, CAREC was allotted a total of US$7,729,882 from different sources. Table 3 shows the funding source and the amount received.
Recovery of Value Added Tax (VAT)
CAREC pays VAT on the purchase of goods and services in Trinidad & Tobago. VAT is charged at a rate of 15% by companies registered under the Value Added Tax Act. These taxes are refundable. In 2011 CAREC received refunds totaling US$46,589.10. This total represents refunds from 2010 in the amount of US$35,468.40 and refunds for 2011 in the amount of US$11,120.70 (Figure 2). Total VAT paid for 2011 amounted to US$85,605.98. At the end of 2011 a total of US$76,731.79 remains outstanding. Numerous telephone calls have been made as a follow up on these outstanding figures.

Travel
The cost of travel for 2011 is basically the same as 2010, with a slight decrease from US$87,844.18 to US$87,326.91. Table 4 shows a comparison of travel for the period 2009 – 2011. Washington, D.C., Barbados and Guyana were the countries most travelled to in 2011. CAREC continues its efforts to reduce cost by following strict guidelines regarding travel.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Travel</th>
<th>Cost of Travel</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>166</td>
<td>US$93,436.62</td>
</tr>
<tr>
<td>2010</td>
<td>168</td>
<td>US$87,844.18</td>
</tr>
<tr>
<td>2011</td>
<td>170</td>
<td>US$87,326.91</td>
</tr>
</tbody>
</table>

Figures 5 and 6 below show the host agencies in relation to staff travel and the purpose of staff travel for 2012. PAHO and CMC together hosted 85% of meetings for 2012. The remaining 15% was hosted by WHO, CARICOM and others agencies. Field visits account for 49% of staff travel, while staff development and meetings account for 34% and 17% respectively.
HUMAN RESOURCE DEPARTMENT

MAJOR ACTIVITIES FOR 2011

Implementation of HR Plan Phase I and II
In October, an HR mission from PAHO headquarters visited CAREC to support the implementation of the organisation’s HR plan. During the visit, the team, comprising Dr. Nancy Machado-Clough, HR Advisor, Policy and Recruitment and Ms. Isabel Vigil, Classifications, worked with the CAREC HR team to ensure a smooth completion of the separation process for seven individuals.

A highlight of the HR mission was the introduction of a competency assessment tool – SAP – which all CAREC staff was invited to participate. The tool involved the completion of an individual survey which provided each employee with an assessment of their competency in areas such as Accountability, Achievement Motivation, Conscientiousness, Leadership Potential, Planning and Organizing and Emotional Intelligence. In addition to providing individual feedback, the tool provided the organization with an overview of organizational trends which would serve to guide HR when planning staff development activities. Forty-eight of CAREC’s 60 employees completed the assessment and will receive a copy of their individual report with guidelines on how to use the information provided.

Staff Awards Ceremony 2011
The ceremony was held on December 12, 2011 with eleven employees receiving recognition for outstanding performance and recognition for years of service. Six employees received awards for 10, 15, and 20 years of service to CAREC and its member countries and three received recognition for academic achievement. A special PAHO award for exceptional leadership and contribution to the organization was presented to Ms. Catherine Eastman, General Services Coordinator. In addition, special presentations were made to two long serving members of staff – Ms. Judy Dyer-Braveboy and Mr. Edwin Thompson.

Staff Movements
The vacant post of Advisor – Public Health Laboratory Surveillance was re-advertised in 2011 and subsequently filled in October. The post of Senior laboratory technologist for microbiology/parasitology which had also been vacant for some time was finally filled but the appointment was put on hold pending completion and implementation of the HR plan. The incumbent will assume duty in January 2012. There were two resignations – Technical Coordinator, Microbiology, and the Director’s Executive Assistant. Internal arrangements were made to accommodate the resulting shortfall.

Implementation of CARPHA Transition Plan
In 2011, the Human Resource Department began putting together a checklist of all products and services with a view to determining what transitional activities would be required in 2012 as CAREC moves toward closure. Items considered included policies and systems, personnel files and documents and procedure manuals. A decision will be taken with regard to disposal and archiving of all materials.

Training and Development Highlights
Staff development in 2011 continued to focus on targeted training in essential areas. The main objective of training activities endorsed by the organization was to ensure that all personnel are prepared for opportunities that would be presented when CARPHA comes on stream. Consequently, areas of training included Microsoft applications, AMPES/OMIS and other customized computer applications.

Administrative staff was also exposed to PAHO’s administrative procedures and standards for coordinating meetings. In June, the HR Assistant attended PAHO’s first meeting of learning focal points, one of the objectives was to enhance capacity to perform technical, managerial and administrative functions. Laboratory rotation and overseas training attachments were also facilitated for selected staff.

Visit of the PAHO Ombudsman
In March, a unique opportunity was created with the visit of the PAHO ombudsman to bring together a group of supervisors in a “Supervisor Forum”. The objective of this session was to give supervisors an opportunity to share experiences and challenges with expert facilitation by the ombudsman, who also took the opportunity to share his experience and expertise.
PLANNED ACTIVITIES FOR 2012
The HR Department plans to continue the activities outlined in its work plan for 2012. Among the expected results for 2012 are:

- Continued participation in Administrative Task Force for transition to CARPHA.
- Support for change management activities.
- Implementation of the transition plan including clean up, transfer of documents to the CAREC file cabinet, disposal and/or transition of all HR records.

GENERAL SERVICES
The Staff of the General Services Unit (GSU) continues to support all areas of CAREC. As part of the realignment efforts, the Maintenance team was reduced with the separation of a Handyman and the Administrative Assistant. However, with the incorporation of the CFNI Trinidad on CAREC’s compound the services of additional staff.

INVENTORY
Updating the inventory continued with the removal of obsolete items, current inventory now stands at $1,616,024.43. These figures comprise: Vehicle, Laboratory Equipment, Audio Visual Equipment and Computer Equipment. The bulk of the inventory comprises other furniture & equipment.

IMPROVEMENT TO PREMISES
The maintenance of this age premises is tremendous, and we continue with this maintenance. Significant change out of air condition units was done in 2010 and this activity continued into 2011. In 2011 renovations were made to the main Administration building.

UTILITIES
The new CISCO system was fully installed by 2011. Via this system we were able to initiate international calls via extensions to HQ, Centers and Regional Offices. The telephone cost in 2010 and 2011 amounted to $48,937.48 & $56,649.67 respectively.

All technical officers and administrative assistants were given access to international dialing to ensure ready communication to countries.

Our Trinidad & Tobago Electricity Commission (T&TEC) costs for 2010-2011 amounted to $76,580.00 & $74,136.00 respectively.

Our water usage for 2010 – 2011 was $2,401.82 and $1,526.02 respectively. This reduction continued into 2011 due to the close supervision over this natural resource and according to our green initiative.

PROCUREMENT
During 2011 the Procurement Unit continued to make strides in supporting the organization by ensuring that the best prices were obtained for goods and/or services procured. In March of 2011 the procurement officer visited PAHO Head office in Washington D.C for training in PAHO procurement processes. The training entailed shipping procedures for kits, reagents and vaccines, procurement system and reports, service contracts, selection process, PAHO procurement process and principles, local procurement of laboratory and stationery supplies and procurement of syringes and cold chains.

The Unit continued in its effort to improve efficiency by shortening the lead time for procurement of goods and services requested by staff. The timely payment of invoices from suppliers was another focus of the Unit during the year, this involved prompt action by staff responsible for approving invoices for payment. Challenges continued to be faced with the timely clearance of incoming shipments.

The Unit also saw some changes in procedures, all in an effort to increase the efficiency with which it functions. Significant of these was the increase in the general delegation authority, as well as for the use of the corporate credit card for small purchases. This has increased the opportunity to make online purchases which has proven to be a positive development since it saves time and allows for faster delivery of goods and/or services. In 2011 the credit card was used to purchase US$1,577.14 locally and US$17,697.18 foreign purchases.

During 2011 major spending was seen in the areas of:- Building/Ground Maintenance, AC maintenance, computer equipment, office furniture, laboratory supplies and stationery supplies.

The Procurement Unit also continued collaborating with the other UN/PAHO Centres with regard to the selection process for a number of common services. During 2011 the bidding process was carried out for the selection of Internet providers and stationery supplies. This process was led by the Procurement Services at the PAHO/WHO Representative Office.
The Procurement Unit at CAREC took the lead in the selection of suppliers for a number of other common services on behalf of the Centres. These included the provision of sanitary supplies and services and the selection of a customs brokerage company. These ventures have proved very useful ensuring work efficiency and minimizing the duplication of processes in the various offices.

An analysis of the statistics reveals the following highlights -:

- In 2011 the total number of Local Purchase Orders decreased by approximately 29% from 222 in 2010 to 156 in 2011.
- Total number of Purchase Authorizations also decreased by 9.8% from 61 in 2010 to 55 in 2011.
- Total number of service contracts decreased by 41% from 70 in 2010 to 41 in 2011.
- In 2011 the Centre spent a total of US$ 129,063.35 in local purchases and a total of US$ 211,084.85 in foreign purchases.
- The majority of foreign purchases were done for the Laboratory Division (33.1%), EPID (30.9%), EPI (26.5) and Admin (9.5%).

Some activities on-going in 2012 are as follows -:

- Updating of all current suppliers in the vendor table (to be done in conjunction with the Finance Unit).
- Completion of supplier evaluation for all suppliers used by the Centre.
- Implementation of transition plan to CARPHA.
- Procurement staff training in Washington, D.C. – the Procurement Certification Training Program (Level 2).
- Copy all relevant Procurement documents to Filing Cabinet.

INFORMATION TECHNOLOGY

The drive to modernize information technology at the Centre took precedence this year. One of the major projects in keeping with this trust was the upgrade of the client operating system and Microsoft office suite.

Some of the major projects undertaken included:

- InfoBase database design and development.
- Windows® 7 implementation.
- Microsoft Office® 2010 migration.
- Internal and External communication plan implementation.

In addition to the above projects routine maintenance on the various databases continued as well as data cleanup of the Epidemiology database, to support the conversation and migration of the database to the new Postgresql database for the InfoBase project. The IT department continued to write new reports, re-write programs as a result of the office 2010 upgrade and revisions to existing systems to
incorporate changes to reporting forms.

**KEY ACTIVITIES DURING 2011 INCLUDED:**

**InfoBase application development project**
The InfoBase project which seeks to integrate information databases managed at CAREC, continued to be a major area of focus in 2011. The hardware and software necessary to support this project were configured and with the assistance of a representative from HSD/PAHO HD, the database schema was designed and built in the development environment. Towards the end of the year, efforts were concentrated on converting and transferring the existing data to the new structures and format. Enhanced reporting of data both internally and externally is a key feature of the project, to support this important function, the visualization software, Tableau was procured and installed.

**Mortbase**
In 2011 terms of reference were developed for a major revision of Mortbase. This became a necessary as a result of compatibility issues with 64-bit PCs and the release of Windows 7/Access 2010. With the help of HSA/PAHO, development of a new Mortbase was commenced for completion in 2012.

**CAREC Helpdesk**
The helpdesk continues to be a useful tool for the Information Services department. The tool allows users the ability to log calls and the IT department to respond accordingly providing the right resources and responding in a timely manner. The help desk also gives us the ability to analyze the data and provide solutions. Since its implementation in 2009 over five hundred and fifty (550) helpdesk requests were logged. In 2011 approximately 310 helpdesk requests were logged. Figure 1 below shows a breakdown of requests by department. Approximately 88% of the requests were made by Administration, Laboratory and Epidemiology units.

**Figure 1: IT Helpdesk Request 2011**

**Figure 2: Helpdesk request by Help Topic**

Figure 2 above shows the array of request topic that was logged in the helpdesk, the largest number of requests were for software installation. This was a direct result of the Windows 7 and Microsoft Office suite upgrade. Additionally, requests for project setup should decrease as project was mounted in the Lecture Theatre.

**Improved Patch Management for Windows**
Most of the well known viruses spread themselves by attacking known software flaws and security holes. Most of these holes are addressable by applying the latest patches from the software vendor. The information Services department implemented the Windows Software Update Service (WSUS) product from Microsoft. WSUS allows administrators to centrally instruct computers to download and install Microsoft patches. As a result of this over 60 personal computers have been updated and continue to be updated.

**Microsoft Exchange Server 2007**
The migration from Microsoft Exchange Server 2003 to Microsoft Exchange Server 2007 was completed in 2011 and routine maintenance is ongoing.
Implementation of new Backup hardware infrastructure
The Centre backup infrastructure was revised after hardware failure of the existing tape unit. The new hardware infrastructure included two 8 terra byte external hard units and five two terra byte external hard drives for offsite rotation. The entire Centre’s data is backed up to the external hard drive unit and then copied to external hard drives for offsite storage.

Research and development
A number of software’s were evaluated during 2011, these included Trisano, DHIS and Bika. All these software’s were open source applications for health information systems. In addition some of the listed software runs on the nontraditional operating system whereas the Centre runs on a Windows platform.

Implementation of Video cameras
The information Services department assisted in the implementation of two PTZ cameras on the compound. The IT department reviewed the technical specifications and supervised the installation of the cable work as well the implementation of the monitor and storage device. Infrastructure upgrade Lecture Theater
As part of our improvement the Lecture Theater was outfitted with an overhead projector, a laptop and a portable PA system.

Security Awareness and Microsoft Office training
Two Information security awareness sessions were conducted in 2011. Participants were provided with printed material as well as online material. The presentation focused on the principles explored in the Electronic Information Security Policy: Use of Electronic Information, Scope, Access Responsibility, Standards and Guidelines for Internet and Email Use and Mobile Devices, but focused mainly on the User’s Responsibilities. The session was well received with most participants expressing special interest in the discussion about Auditing and Privacy.

Microsoft Office 2010 and Windows 7 were introduced in September. User orientation sessions for Outlook and Word 2010 were held before the software was installed. Users were also directed to self-paced training video tutorials (and other resources) available online and recommended by PAHO HQ. At first, not many users took the opportunity to familiarize them using the online videos but eventually most saw the usefulness when the Office applications were actually installed on the respective computers.

Implementation of Windows 7 and MS Office 2010
"Yes, we’re Making the Switch! You asked for it – the newest and the best in Windows and Microsoft Office is here at CAREC and coming soon to your desktop (and laptop) computer. We’re switching from Office 2003 to Office 2010, and from Windows XP to
Windows 7.” That was the tagline for this year’s software migration to Windows 7 and Microsoft Office 2010. 98% of the desktop computers at the Centre were upgraded with the new software, with the remaining 2% were not migrated due to compatibility issues with older applications.

**Knowledge Management and Communication**

Implementation of CAREC’s internal communication plan which was developed in 2010 occurred in June 2011. The plan dubbed ‘WeConnect’ was launched with a staff retreat facilitated by the Employee Assistant Program providers and gave staff an opportunity to be aware of communications protocols and channels.

In addition to the internal communication plan, the external communication plan was also created with help from the Knowledge Management and Communication (KMC) unit at PAHO, Washington DC. As a result of KMC’s assistance, CAREC was able to rethink the impact of the website and the intranet on its varied audiences and make changes that enhanced the sites. A Facebook account was created to allow CAREC to use social media as a tool for wider dissemination of information, and three issues of a quarterly e-newsletter were created and published.

KMC, assisted in the training of information officer in the use of video editing software. This allowed CAREC to be able to tape and edit its own projects and to also be able to contribute significantly to PAHO’s projects.

The operation of the library and museum continues to be an integral part of the Centre, with focus being on the need to ready the collections for transfer into CARPHA. It is expected that PAHO’s Advisor, Library and Information Networks will visit CAREC early 2012 to assist with the rationalization of this process.

**SharePoint File Cabinet**

In order to provide greater process clarity the File Cabinet was reorganized and standardized in 2011 with the creation of new document libraries. This will aid in the management and access of information created within the organization and assist in easily identifying information that would be transferred to CARPHA. In addition to the document libraries a standard operating procedure will be created to help in the management of the files and guide users of the structure in 2012.
PUBLICATIONS AND PRESENTATIONS
PEER REVIEWED PUBLICATIONS


NON-PEER REVIEWED PUBLICATIONS

**GM Andall-Brereton** “Surveillance of Risk factors for Chronic Diseases in Barbados” CAREC Surveillance Report; Volume 31, No 5; published on the CAREC Website

**GM Andall-Brereton** “Surveillance of Risk factors for Chronic Diseases in Dominica” CAREC Surveillance Report Volume 31 No. 4; published on the CAREC Website

PRESENTATIONS


**Andall-Brereton G.M.** “Surveillance of Non-communicable Diseases and their Risk Factors” 11th Meeting of Caribbean National Epidemiologists and Laboratory Directors, Port of Spain, Trinidad.


**Boodram LL.** Presentation entitled “Principles of Biosafety.” RHERT meeting, Port of Spain, Trinidad July 28th 2011


**Boisson E.** Progress with the recommendations of the Ninth Meeting of Caribbean National Epidemiologists and Laboratory Directors. Eleventh Meeting of Caribbean National Epidemiologists and Laboratory Directors. Trinidad and Tobago. May 2011.


**Boisson E.** Major changes in the Caribbean Regional Surveillance Manual. Eleventh Meeting of Caribbean


Edwards L. Epidemiologic Trends of Dengue Fever in CAREC Member Countries. Integrated Management Strategy (IMS) for Dengue Workshop in Guyana (February 2011) and Trinidad and Tobago (May 2011).


Indar L. Estimating the burden of Foodborne diseases. Global Update and Progress, preliminary findings, impact and implications of the Caribbean burden of illness study Presented at the Burden of Illness data dissemination workshops in Grenada (May 2011); Dominica (June 2011), St Lucia (June 2011); Jamaica (August 2011); Guyana (September 2011), and Trinidad and Tobago (October 2011).

Indar L. Foodborne Diseases surveillance in the Caribbean and Status of implementing Pulse Field Gel Electrophoresis FBD surveillance tool. 9th Annual PulseNet Latin America and the Caribbean (PNLAC). Chile. October 2011.


Indar L. Estimating the Burden of Foodborne Diseases: Methods and Challenges.


TRAINING, ADVISORY AND COLLABORATIVE VISITS TO MEMBER COUNTRIES

NEW TECHNOLOGIES INFLUENCE HEALTH SERVICES

CAREC HOSTING TRAINING PROJECTS
TRAINING, ADVISORY AND COLLABORATIVE VISITS TO MEMBER COUNTRIES

TRAINING AND ADVISORY VISITS

Anguilla
- Provided in-country training for implementation of the NCD Minimum Data Set and training on the eSTEPS methodology to facilitate planning and implementation of a risk factor survey for persons from Anguilla and Montserrat.

Antigua and Barbuda
- Provided technical assistance for the implementation of HIV Case-based surveillance.

Aruba

Bahamas
- Provided training on the installation and use of the Automated Medical Mortality Data System (MMDS).
- Provided in-country training for interviewers and supervisors to facilitate implementation of a risk factor survey.

Barbados
- Conducted a mortality surveillance system audit and evaluation.
- IT support provided to the Planning and Research Unit, Ministry of Health in the areas of Mortbase (the CAREC-developed mortality data capture and reporting system) and the automated coding software system (Mortality Medical Data System – MMDS).
- Provided technical assistance with the review and analysis of laboratory and population survey data and report writing for a Barbados Burden of Illness study.

Belize
- Provided technical assistance for a workshop on improving integrated foodborne diseases (FBD) surveillance and data sharing, followed-up on Belize’s integrated FBD surveillance action plan; and assessed and initiated preparation activities for conducting a burden of food borne illness study.
- Conducted training in the isolation of priority foodborne pathogens and provided technical assistance for finalizing the Belize burden of illness study protocol.

Bermuda
- Conducted laboratory training in Salmonella serotyping and norovirus isolation; Burden of Illness (BOI) sensitization meetings and population survey administration workshops; and provided technical assistance for the preparation and launch of the Bermuda BOI study.

British Virgin Islands
- Provided technical assistance with the revision of the British Virgin Islands National Surveillance Manual.

Cayman Islands
- Provided in-country training for implementation of the NCD Minimum Data Set and training on the eSTEPS methodology to facilitate planning and implementation of a risk factor survey.
- Conducted an evaluation and data audit of the communicable disease surveillance system.
- Conducted a review of the HIV surveillance system and assisted with the preparation for implementation of HIV case-based surveillance.

Dominica
- Provided technical assistance for a Burden of Illness (BOI) Data Dissemination meeting and Integrated FBD Surveillance Workshop.
- Provided technical assistance for Dominica’s Food Safety Policy workshop.
- Facilitated Dengue and Leptospirosis IgM ELISA training for two laboratory technologists

Grenada
- Downloaded data collected in a non-communicable diseases risk factor survey and conducted training for analysis of data and
report writing.
- Provided assistance with surveillance data collection and training in Epi-Info software.
- Provided technical support for a Data Dissemination Meeting on the Grenada Burden of Illness Study.
- Conducted training on and did trouble shooting for analysis of data collected by the Epidemiology Unit, Ministry of Health.
- Reviewed and updated the HIV patient monitoring system and evaluated requirements for HIV case-based surveillance.
- Conducted an evaluation of the collection of hospital discharge data.

Guyana
- Conducted a training workshop for 23 persons on mortality coding using the International Statistical Classification of Diseases and Related Health Problems (ICD-10) mortality coding guidelines and the rules governing the selection of the underlying cause of death (UC). In addition, mortality data for 2007 was reviewed, the Guyana mortality surveillance system was evaluated and the most recent version of Mortbase was shared with Ministry of Health, Guyana.
- Co-facilitated in the Integrated Management Strategy (IMS) Dengue workshop sponsored by PAHO.
- Provided technical assistance for the finalisation of Guyana's BOI report; preparation and conduct of an integrated FBD surveillance workshop; and a Burden of Illness Data Dissemination Workshop.
- Facilitated in the Dengue Integrated Management Strategy (Dengue IMS) February 28th - March 4th, 2011
- Co-facilitated in a workshop on Mosquito typing
- Co-facilitated in the Dengue Integrated Management Strategy (Dengue IMS) February 28th - March 4th, 2011

Jamaica
- Co-facilitated on a National Surveillance Training.
- Provided technical assistance for the conduct of Jamaica's BOI Data Dissemination Workshop; Workshop on investigative procedures regarding FBD outbreaks; and reviewed FBD laboratory surveillance at the national public health laboratory in Jamaica.
- Conducted an evaluation of and provided technical assistance for HIV Case-based surveillance.

St. Kitts and Nevis
- Provided technical assistance to help prepare study materials for a serosurvey for hepatitis B and other selected communicable diseases among pregnant women.
- Provided in-country training for implementation of the NCD Minimum Data Set and training on the eSTEPS methodology to facilitate planning and implementation of a risk factor survey in Nevis.

St. Lucia
- Co-facilitated on a National Consultation on the Implementation of International Health Regulations.
- Co-facilitated in a workshop on Mosquito typing
- Provided training on the installation and use of the Automated Medical Mortality Data System (MMDS).
- Provided technical assistance for the conduct of BOI Data Dissemination and Integrated FBD Surveillance workshops.

St. Vincent and the Grenadines
- Provided in-country training on the eSTEPS methodology to facilitate planning and implementation of a risk factor survey.

Suriname

Trinidad and Tobago
- Conducted training for analysis of data collected in a National Risk Factor Survey and report writing.
- Co-facilitated in the Integrated Management Strategy (IMS) Dengue workshop sponsored by PAHO.
- Provided technical assistance for the conduct of BOI Data Dissemination and Integrated FBD Surveillance workshops.

Turks and Caicos Islands
- Provided technical assistance to the National Tuberculosis programme.

Regional and Sub-Regional
- Co-facilitated on a two-day Community Mitigation Workshop in Trinidad and Tobago. There were 31 participants from eight countries, namely, Aruba, Bahamas, Barbados, Belize, Bermuda, Jamaica, St. Lucia and Trinidad and Tobago.
- Co-facilitated training on Improved Preparedness for Cholera and Outbreak of Other Diarrhoecal Diseases;
• Co-facilitated on a three-day workshop held in Barbados entitled ‘Improved Preparedness and Response for Health Emergencies: Cholera and Other Outbreaks of Water-borne Disease’. There were seventy participants from 20 CAREC Member Countries.
• Hosted the 11th Meeting of Caribbean National Epidemiologists and Laboratory Directors in Trinidad and Tobago. All 23 CAREC member countries had representatives participating in the five-day meeting.
• Participated in a two-day PAHO sub-regional Meeting on Preventing the Reintroduction of Malaria in Non-Endemic Countries in Barbados. Thirteen countries were represented, namely Anguilla, Bahamas, Barbados, Cayman Islands, Dominica, Grenada, Jamaica, Montserrat, St. Kitts and Nevis, St. Lucia, St. Maarten, St. Vincent and the Grenadines and Trinidad and Tobago.
• Hosted the second meeting of the Caribbean Regional Health Emergency Response Team (RHERT) in Trinidad and Tobago, with participants from 17 CAREC member countries, namely Anguilla, Antigua and Barbuda, Belize, Bermuda, British Virgin Islands, Cayman Islands, Dominica, Grenada, Guyana, Jamaica, Montserrat, St. Kitts and Nevis, St. Lucia, St. Maarten, Suriname, Trinidad and Tobago and Turks and Caicos Islands.
• Participated in a two-day PAHO Regional Meeting on the Implementation of the International Health Regulations (IHR) in the Americas in Mexico. There were 16 representatives from 15 CAREC member countries, namely Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, British Virgin Islands, Cayman Islands, Dominica, Grenada, Jamaica, St. Kitts and Nevis, St. Lucia, St. Maarten, St. Vincent and the Grenadines, and Trinidad and Tobago.
• Participated in a three-day PAHO regional workshop on “Lessons learnt and next steps in the implementation of SARI surveillance” in Colombia. There were three Caribbean countries participating in the sentinel respiratory illness surveillance system participated in the workshop, namely Jamaica, Suriname and Trinidad and Tobago.
• Participated in a two-day PAHO sub-regional workshop on International Health Regulations (IHR) 2005 legislation in Barbados. Fifteen countries were represented at this workshop, namely Anguilla, Antigua and Barbuda, Bahamas, Barbados, Belize, Bermuda, Cayman Islands, Dominica, Grenada, Jamaica, Montserrat, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines and Suriname.
• Co-facilitated a Burden of Illness Analyses and Writing for Publication Workshop for six countries (Dominica, Grenada, Guyana, Jamaica St Lucia and Trinidad and Tobago) in Guelph, Canada.
• Co-facilitated a sub-regional laboratory surveillance workshop on isolation of Vibrio cholera and AGE surveillance for 17 countries in Trinidad and Tobago.
• Facilitated a workshop on Biorisk Management for the Laboratory and Infectious Substance Shipping Training.

Collaborative Visits:
• Attachment at the Instituto Adolfo Lutz, Sao Paulo Brazil from 24th October – 4th November 2011. Identification and Serotyping of S. pneumoniae, H. influenza and N. meningitidis
• Participated in a WHO Consultation on Global Tools and Surveillance Manual on Influenza in Geneva.
• Participated in the Joint PAHO/WHO-CDC Initiative on Strengthening Quality Management Systems for Medical Laboratories in a Step-Wise Approach toward Accreditation in the Caribbean, Technical Workshop on Developing the Criteria and Check-List for each tier Pilot Document June 2011
• Participated in a workshop to plan and programme PAHO/WHO’s sub-regional technical cooperation in the Caribbean, with focus on the countries covered by the PWR-ECC in Barbados.
• Participated in the Nineteenth Meeting of Chief Medical Officers in Guyana.
• Participated in the 56th Annual Council Meeting and Conference of Caribbean Health Research Council in Guyana.
• Participated in the Seventh Meeting of the Steering committee of the Caribbean Public Health Agency (CARPHA) in Guyana.
• Participated in the 21st Meeting of the Council for Human and Social Development (COHSOD) in Guyana.
• Participated in a three-day PAHO Regional Meeting of the Global Outbreak Alert and Response Network (GOARN) in Brazil.
• Participated in a UNAIDS Regional HIV Estimates Training Workshop in Trinidad and Tobago.
• Participated in a Meeting of the Caribbean
Technical Working Group for Surveillance in Trinidad and Tobago.

- Participated in the last Caribbean Public Health Agency (CARPHA) Steering Committee Meeting and the Inaugural CARPHA Executive Board Meeting in Washington DC.
- Participated in the 20th Meeting of the Caribbean Caucus of Ministers responsible for Health in Washington DC.
- Participated in a two-day Workshop for the Caribbean Public Health Agency (CARPHA) Transition in Trinidad and Tobago.
- Participated in the Second Caribbean Public Health Agency (CARPHA) Executive Board Meeting in Trinidad and Tobago.
- Participated in a two-day PAHO meeting on Joint Malaria Efforts in Non-endemic Countries of the Caribbean in Trinidad and Tobago.
- Collaborated with the Health Analysis Unit (PAHO HQ/HA) to complete training in the use of the software used to develop the PAHO regional mortality database and subsequently the CAREC sub-regional mortality database. During the visit, discussions to finalize the establishment of a functioning Virtual Private Network (VPN) connection between PAHO and CAREC to allow for synchronization of the databases were also successfully completed.
- Participated in a meeting facilitated by the Office of the Caribbean Program Coordination (OCPC), on the development of a roadmap to design a framework of guidelines and recommendations for national health information systems for the Caribbean sub-region.
- Participated in the PAHO Professional Staff Development Course “Practical-based Epidemiology using Activ-Epi”, Washington DC, USA.
- Participated in the Regional Provac Workshop on cost-effectiveness of HPV vaccination and screening strategies for the prevention and control of cervical cancer, Colombia, Mexico.
- Participated in a workshop to pilot test training materials developed for the Intensified Surveillance of Severe Acute Respiratory Infections (SARI), Washington, DC, USA.
- Participated in the Standardized Molecular Subtyping of FBD Bacterial Pathogens by Pulse Field Gel Electrophoresis (PFGE) and the BioNumerics Software PFGE Analyses for PulseNet Training Workshops in Atlanta, USA.
- Participated in the 9th Annual Meeting of the PulseNet Network for Latin America and the Caribbean (PNLAC) in Chile.
- Participated in the VII Regional Meeting of TB/HIV Collaborative Activities and a Meeting on scaling-up the implementation of collaborative TB/HIV activities in the Region of the Americas in Panama.
- Participated in the 3rd CHART-CCAS-CDC Joint Meeting; 8th CCAS HIV/AIDS Workshop; and 1st CCAS-CMLF Collaborative Meeting in Jamaica
- Participated in the Caribbean HIV conference in Bahamas.
- Training in Pulse Field Gel Electrophoresis (PFGE) for Salmonella subtyping at the Centers for Disease Control (CDC), Atlanta, USA (February 2011).
RESPONSES TO THE RESOLUTIONS
OF THE XXXV COUNCIL MEETING OF
THE CARIBBEAN EPIDEMIOLOGY
CENTRE (CAREC/PAHO/WHO)
THE MEETING:

Conscious of the continued negative effect of the global economic crisis on the fragile economies of the sub-region and the need to protect Public Health gains,

Recognizing the threats of re-emerging diseases and the deleterious health effects of natural disasters on our vulnerable tourism-based economies.

Acknowledging the continued progress made with regard to the establishment of the Caribbean Public Health Agency (CARPHA) and the roll out of CCHIII; and PAHO’s support and continued advocacy for these processes and commitment to technical cooperation through the sub-regional cooperation strategy.

The council expressed its appreciation and gratitude to:

1. Director of PAHO for the urgency with which the appointment of the Director of CAREC was made.

2. CAREC in their coordinated and effective response in supporting Member Countries in the response to the Pandemic H1N1.

3. The new Director and staff of CAREC on the progress made in following through on the recommendations of 34th council (in terms of mandate and preparations for CARPHA transition) and the improvements to the physical environment.

4. The Director on the completion and smooth implementation of the HR Plan

5. encouraged by the demonstration of commitment by Governments to partners at the recent meeting as expressed to Partners by Governments to maintain their present quota contributions to support CARPHA.

RECOMMENDATIONS:

1. Endorses the amendments to the existing CAREC Staff Rules and compensation package.

Response: CAREC staff rules are fully implemented. Revisions will be done as necessary.

2. Urges for speedy recruitment to the post of Director of CAREC Laboratory

Response: This activity was completed and the Director of Laboratory is expected to be at post by September, 2011.

3. Urges that CAREC should place more emphasis on implementing an integrated (Epidemiology and laboratory) approach to public health surveillance and thus will streamline the functions to meet the proposed CARPHA.

Response: To further strengthen integrated approach, joint planning exercises are being done for technical staff for epidemiology and laboratory divisions.

Epidemiology and Laboratory Divisions of CAREC are working
together to deliver the CAREC package of surveillance services.

The 11th meeting of Caribbean National Epidemiologists and Laboratory Directors was recently hosted by the Centre. The Centre also has a CARPHA transition team consisting of epidemiology and laboratory sub-committees.

4. Requests that CAREC undertakes an inventory of the existing capacities in both laboratory and epidemiology at the national level of Member Countries and identify with countries the gaps to be filled (determining with CAREC how these will be filled).

**Response:** Existing epidemiology capacity in the area of communicable diseases in countries was determined during evaluations of surveillance systems in compliance with IHR. CAREC has subsequently been working with countries to conduct activities in their respective IHR plans of action for surveillance system strengthening.

Survey re needs assessment of national laboratories was conducted in 2011. The results were presented at the 11th meeting of Caribbean National Epidemiologists and Laboratory Directors.

5. Urges CAREC to complete the discussions initiated re developing regional networks of surveillance and laboratories working together to identify existing strengths in capacities in the region on which Centres of Excellence may be built.

**Response:** The proposal for developing regional networks was presented at the 19th Meeting of Chief Medical Officers. Challenges and limitations were identified and further discussions are planned.

The survey on needs assessments provides information on existing capacities, strengths and opportunities for capacity building.

6. CAREC/PAHO continues negotiation with PHAC with some urgency to establish the BSL3 at CAREC in order to restart those critical laboratory services which have been temporarily suspended.

**Response:** Discussion continues with PHAC and since the Council meeting an evaluation team from PHAC visited in November, 2010. The proposal for the modular BSL3 laboratory at CAREC will be submitted to (DFAIT) another agency of the Canadian Government.

7. Encourages CAREC to define its reference laboratory services by determining the resources that need to be mobilized and by strengthening links with international reference laboratories and networks.

**Response:** With support from the Regional Public Health Advisor, PAHO, the 8 core functions of the CAREC’s laboratory have been defined and the discussions have started re proposed structure (interim and final) to support the functions.

8. Urges CARICOM to form a strategic alliance with PAHO in future discussions with the government of Trinidad and Tobago on CARPHA and more specifically requests the Director of PAHO to lend her support, expertise and technical experience on the discussions between CARICOM and the Government of Trinidad and Tobago.

**Response:** The Director of PAHO had discussions with the Minister of Health and officials, Trinidad and Tobago in September, 2010 at PAHO HQ. She also visited in April, 2011 where further discussions were held. The PWR, Trinidad and Tobago and Dr Ernest Pate, CPC also do advocacy work with the Government of Trinidad and Tobago.

9. Urges PAHO/CAREC, Steering Committee of CARPHA, Government of Trinidad and Tobago to continue dialogue to help facilitate the smooth transition of CAREC
10. Encourages Governments to clearly define their financial commitment to CARPHA to donors.

Response: Was completed at the last Partners Meeting for CARPHA in June 2010.

11. Council thanks the Director of PAHO for the ongoing financial support to CAREC and urges the Director to continue the mobilization of resources both human and financial to ensure that CAREC can continue to provide Technical Cooperation to Member Countries.

Response: CAREC continues to provide technical cooperation to countries.

12. Urges Director to work with CARICOM Secretariat to encourage countries to maintain payment of their agreed contributions: and urges the Director to enter agreement with countries to develop innovative mechanisms to address the outstanding arrears.

Response: Activity is ongoing. The approved increase of 7.3% in quota contribution became effective in 2010. Two countries did not pay their contributions in 2010, eight paid partial contributions and all others (11) paid full contribution.

The total arrears - USD 3,559,285; 72% owed by Jamaica but they have been paying the annual quota contribution.

13. Noting with pleasure the work done by CAREC on the internal communication plan and urges the implementation of the plan, Council urges the Director of CAREC to develop and implement a more effective external communication strategy and taking advantage of modern technology.

Response: CAREC’S external communication strategy with countries has utilized both Elluminate system and advocacy visits.

CAREC has also developed a digital newsletter which will be disseminated to the Caribbean Community and other stakeholders to keep them informed.

14. Endorses the proposal for the use of building fund 2010-2011 as presented and urges CAREC to continue the discussion with the Government of Trinidad and Tobago on the maintenance of the existing facility.

Response: CAREC has executed activities for 50% of the authorized amount to be used from the building fund. The other activities will be implemented in 2011.

15. Council noting the existence of the regional plan for the integrated management of Dengue urges Director of PAHO to support Member Countries in building national capacity in implementing their national integrated management plans with particular emphasis on integrated vector control.

Response: The PAHO regional communicable disease advisor and team (Costa Rica) together with CAREC have been working with countries to implement their national plans. Ministries of Health of countries were sent reminder letters and national workshops (3) have been held with technical cooperation from Costa Rica team and CAREC.

16. Urges PAHO to develop an operational plan for the smooth transition of CAREC to CARPHA.

Response: Official discussions/activities of the operational plan of PAHO are ongoing. CAREC has also formed an internal transition taskforce with subgroups. Plans with timelines have been developed and implemented.

17. Requests Director of PAHO to complete the legal discussion with Netherlands
Excellence in Public Health Surveillance

Antilles to address the membership status (of the soon to be autonomous states of Curacao and St Maarten in addition to Aruba).

**Response:** Office of Legal Council (LEG) has been addressing the membership status of Aruba, Curacao, and St Maarten. An information paper has been prepared by LEG which outlines the membership possibilities available in PAHO for the newly autonomous countries of the Kingdom of the Netherlands. This paper was presented to the Embassy of the Netherlands in Washington in April 2011. The PAHO/WHO Representatives in Venezuela also visited the new Prime Minister of Curacao in May 2011 and the issue of membership for Curacao was among the issues discussed.

18. Encourage CAREC to collaborate with Universities to provide field experience particularly in the area of outbreak investigations for CARICOM participants pursuing postgraduate degrees in Public Health, giving priority to Caribbean

**Response:** CAREC has sent an official invitation to UWI, for students of UWI to be placed on attachment at CAREC. We have been told by UWI St. Augustine, that it was too late for students to be assigned to CAREC in 2011. Attachments were offered to 3 three students (from Non-UWI Universities), and one is currently based at the Centre.

19. Urges CAREC to facilitate the rotation of Public Health workers through the Centre

**Response:** CAREC is willing to facilitate rotation of Public Health workers at the Centre.
Recommendations:

1. Urges CAREC to resolve the issues surrounding case-based surveillance drawing on best practices from member states and taking into consideration the concerns raised by others.

2. Recommends that CAREC continue to work with the Public Health Agency of Canada in the establishment of the BSL 3 status of the laboratory.

3. Requests that CAREC and PAHO work with member states in developing integrated Health Information Systems that would facilitate standardization and harmonization of data and promote reporting in a timely manner to ensure transferability and easy comparison within and between countries and with regional and international organizations.

4. Urges PAHO to develop a policy framework on Health Information Systems for the sub region and on mobilizing resources for this purpose.

5. Requests that CAREC and PAHO develop a mechanism to merge the port health and surveillance components of the International Health Regulations (IHR) and develop a matrix of the status of member states' IHR implementation to identify the gaps and provide training and resources to fill these gaps.

6. Urges the Director of CAREC to continue strengthening the laboratory in these critical areas of quality management, good laboratory practices and specialized testing and to continue the transfer of technology and resources to member states for laboratory testing, while supporting improvement in quality standards for strengthening of regional laboratory network.

7. Requests that CAREC assist countries in strengthening their sampling strategies to ensure that adequate specimens are sent to CAREC for testing.

8. Recognizing that in the organization's transition issues may arise that require extra funds, urges reserve funds for emergencies.

9. Urges the Center to continue its focus on strengthening its capacity in its core functions and requests that it aligns its human resources to undertake these with efficiency and effectiveness.

10. Urges the Director of PAHO to engage the Interim/Implementation Team of CARPHA in the transfer of the Core functions of CAREC to CARPHA.

11. Urges PAHO to ensure the provision of technical expertise to the regional lab advisory group for CARPHA through the participation of the regional PH advisor for laboratories and CAREC.

12. Requests that CAREC strengthen its Non-Communicable Disease (NCD) surveillance system and assistance to member states in this area recognizing that NCDs are now high on the global health agenda.

13. Requests the Director of CAREC with PAHO to prepare a proposal for the region-wide use of PCV 13 in view of its efficacy and cost-effectiveness to present to the Caucus of Health Ministers in September 2011.

14. Urges the Director with PAHO to prepare a Plan of Action for presentation to Ministers on the introduction of HPV vaccine in the region.

15. Urges member states to continue their timely payment of quota contributions to the institution.

16. Encourage CAREC to collaborate with Universities to provide field experience...
Excellence in Public Health Surveillance

particularly in the area of outbreak investigations for CARICOM participants pursuing postgraduate degrees in Public Health, giving priority to the Caribbean.

17. Urges CAREC to facilitate the rotation of Public Health workers through the Centre.

18. Request PAHO to continue discussions with Government of Trinidad and Tobago on the relocation and re-building of CAREC lab alongside the new NPHL to ensure complementarity and cost-effectiveness of functions.

19. Council requests the CARICOM secretariat to enhance effective communication between the implementation team and stakeholders, namely RHIs, member states and international partners.
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>AFP</td>
<td>Acute Flaccid Paralysis</td>
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<td>AGE</td>
<td>Acute Gastroenteritis</td>
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<td>AIDS</td>
<td>Acquired Immunodeficiency Syndrome</td>
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<td>ARI</td>
<td>Acute Respiratory Infections</td>
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<td>BCP</td>
<td>Business Continuity Plan</td>
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<td>BES</td>
<td>Bonaire, Saba &amp; St. Eustatius</td>
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<tr>
<td>BOI</td>
<td>Burden of Illness</td>
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<td>BSL</td>
<td>Biosafety Laboratory</td>
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<td>CAREC</td>
<td>Caribbean Epidemiology Centre</td>
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<td>CARICOM</td>
<td>Caribbean Community</td>
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<td>CARPHA</td>
<td>Caribbean Public Health Agency</td>
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<td>CASA</td>
<td>CAREC Staff Association</td>
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<td>CCH3</td>
<td>Caribbean Cooperation in Health</td>
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<td>CDC</td>
<td>U. S. Centers for Disease Control and Prevention</td>
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<td>CDs</td>
<td>Communicable Diseases</td>
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<td>CEHI</td>
<td>Caribbean Environmental Health Institute</td>
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<td>CFNI</td>
<td>Caribbean Food and Nutrition Institute</td>
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<td>CHR</td>
<td>Caribbean Health Research Council</td>
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<td>CMCs</td>
<td>CAREC member countries</td>
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<td>CMV</td>
<td>Cytomegalovirus</td>
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<td>COHSOD</td>
<td>Council for Human and Social Development</td>
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<td>CPC</td>
<td>Caribbean Program Coordinator</td>
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<td>CRS</td>
<td>Congenital Rubella Syndrome</td>
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<td>DFAIT</td>
<td>Department of Foreign Affairs and International Trade, Canada</td>
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<tr>
<td>DHF</td>
<td>Dengue haemorrhagic fever</td>
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<td>DSS</td>
<td>Dengue shock syndrome</td>
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<td>ELISA</td>
<td>Enzyme-Linked ImmunoSorbent Assay</td>
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<td>EPI</td>
<td>Expanded Programme on Immunization</td>
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<td>EOA</td>
<td>External Quality Assessment</td>
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<tr>
<td>ESAVI/AEFI</td>
<td>Event Allegedly Attributable to Vaccination or Immunization/Adverse Effects Following Immunization</td>
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<td>EIW</td>
<td>European Immunization Week</td>
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<td>FBD</td>
<td>Food-borne Diseases</td>
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<td>FDA</td>
<td>Food &amp; Drug Association</td>
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<td>GFN</td>
<td>WHO-Global Food Borne Infection Network</td>
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<td>GSU</td>
<td>General Services Unit</td>
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<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
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<td>HPV</td>
<td>Human Papillomavirus</td>
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<td>HQ</td>
<td>Headquarters</td>
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<td>IDRC</td>
<td>International Development Research Centre</td>
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<td>IEC</td>
<td>International Expert Committee</td>
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<td>IHR</td>
<td>International Health Regulations</td>
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<td>ILI</td>
<td>Influenza-like Illness</td>
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<td>ISO</td>
<td>International Standard Organization</td>
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<td>IMS</td>
<td>Integrated Management Strategy</td>
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<tr>
<td>INCIENSA</td>
<td>Costa Rican Institute for Research and Education in Nutrition and Health</td>
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<td>ITC</td>
<td>Information Technology Service</td>
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<td>KMC</td>
<td>Knowledge Management and Communications</td>
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<td>LABIS</td>
<td>Laboratory Information System</td>
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<td>MAT</td>
<td>Microscopic Agglutination Test</td>
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<td>MDRTB</td>
<td>Multi-Drug Resistant TB</td>
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<td>MMDS</td>
<td>Mortality Medical Data System</td>
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<td>MMR</td>
<td>Measles Mumps rubella</td>
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<td>MTB</td>
<td>Mycobacterium Tuberculosis</td>
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<td>NCDs</td>
<td>Non-Communicable Diseases</td>
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<td>NCHS</td>
<td>National Centre for Health Statistics</td>
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<td>NFP</td>
<td>National Focal Point</td>
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<td>NPEV</td>
<td>Non-Polio Enterovirus</td>
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<td>NPHL</td>
<td>National Public Health Laboratory</td>
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<td>OECS</td>
<td>Organization of Eastern Caribbean States</td>
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<td>PAHO</td>
<td>Pan American Health Organization</td>
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<td>PCR</td>
<td>Polymerase Chain Reaction</td>
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<td>PDAs</td>
<td>Personal Digital Assistants</td>
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<td>PED</td>
<td>Area on Emergency Preparedness and Disaster Relief</td>
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<td>PHAC</td>
<td>Public Health Agency of Canada</td>
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<td>PHEC</td>
<td>Public Health Emergencies of International Concern</td>
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<td>PN Lac</td>
<td>PulseNet Latin America and the Caribbean</td>
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<td>PTS</td>
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<td>PWR</td>
<td>PAHO/WHO Representatives</td>
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<td>QMS</td>
<td>Quality Management System</td>
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<td>RHERT</td>
<td>Regional Health Emergency Health Response Team</td>
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<td>RIF</td>
<td>Resistance to Rifampicin</td>
</tr>
<tr>
<td>RSV</td>
<td>Respiratory Syncytial Virus</td>
</tr>
<tr>
<td>SARI</td>
<td>Severe Acute Respiratory Infection</td>
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<tr>
<td>SE</td>
<td>Salmonella Enteritis</td>
</tr>
<tr>
<td>SGU</td>
<td>St Georges' University</td>
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<tr>
<td>SIREVA</td>
<td>Regional System for Vaccines in the Americas</td>
</tr>
<tr>
<td>SOPs</td>
<td>Standard Operating Procedures</td>
</tr>
<tr>
<td>STIs</td>
<td>Sexually Transmitted Infections</td>
</tr>
<tr>
<td>T&amp;TEC</td>
<td>Trinidad and Tobago Electricity Commission</td>
</tr>
<tr>
<td>TAG</td>
<td>Technical Advisory Group</td>
</tr>
<tr>
<td>TB</td>
<td>Tuberculosis</td>
</tr>
<tr>
<td>TORCH</td>
<td>Toxoplasmosis Rubella Cytomegalovirus and Herpes</td>
</tr>
<tr>
<td>UNAIDS</td>
<td>The Joint United Nations Programme on HIV/AIDS</td>
</tr>
<tr>
<td>USA</td>
<td>United States of America</td>
</tr>
<tr>
<td>UWI</td>
<td>The University of the West Indies</td>
</tr>
<tr>
<td>VAT</td>
<td>Value Added Tax</td>
</tr>
<tr>
<td>VWA</td>
<td>Vaccination Week in the Americas</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
<tr>
<td>WHO/GOARN</td>
<td>WHO Global Outbreak Alert and Response Network</td>
</tr>
</tbody>
</table>
PICTORIAL APPENDIX

Staff of the Laboratory Division

Human Resources: Binta Dalrymple, HR Assistant; Jocelyn Chandler, HR Coordinator.

Knowledge Management and Communications/information Technology
First row from left: Ms Nicole Bovell-Arthur, Mr. Gabriel Garcia, Ms. Angela Hinds; Back row: Ms. Victoria Cruickshank-Taylor, Mr. Damian Mayers.

Emelda Williams, Health, Safety & Security Officer.

Procurement: Anthony Seunarine, Procurement Officer; Giselle O'Brien, Procurement Assistant.
Staff of the Administration Division

General Service: Front row: Mr. William Bannister, Maintenance Assistant; Ms Catherine Eastman, General Services Coordinator; Mr. Welde Briggs, Maintenance Assistant; Second row: Mr. Emile Pouchet, Motor Vehicle Driver; Ms Gloria Abdool-Drake, Office Assistant/Cleaner; Mr. Ahmad Abdool, Maintenance Assistant Last row: Mr. Kamil Khan, Maintenance Chargehand; Mr. Mervyn Julien, Motor Vehicle Driver. Missing: Mr. Aziz Ali, Motor Vehicle.
Excellence in Public Health Surveillance

Ana Maria Frixone, 15 years’ service; Lorraine Francis, 10 years’ service; William Bannister 20 years’ service; Catherine Eastman, 20 years’ service; Melina Joseph, 10 years’ service.

Junita Browne, Master of Medical Science (Pathology); Binta Dalrymple, Master of Business Administration (HR); Angela Hinds, Master of Science (Applied Statistics).

Mr. Wallace Meissner, PAHO Ombudsman addresses CAREC Staff.

Budget and Finance: Abdul-Marine, Administrative Assistant; Melina Joseph, Finance Officer; Sumatee Seetaram, Payroll.

Staff listens attentively to the facilitator.

Staff participates in WeConnect.

Staff of the UN Offices in Trinidad and Tobago attends the Common Services Workshop held at CAREC.

Staff prepares to depart CAREC for the WeConnect activity.