Pan American Health Organization
Regional Office of the World Health Organization

Immunization Unit
Family and Community Health Area

TWENTY-FOURTH MEETING OF THE CARIBBEAN EPI MANAGERS

FINAL REPORT

TRINIDAD AND TOBAGO
12-16 NOVEMBER 2007

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ACRONYMS

AFP	Acute Flaccid Paralysis
BCG	Bacille Calmette-Guérin
CAREC	Caribbean Epidemiology Centre
CARICOM	Caribbean Community
CCH	Caribbean Co-operation in Health
CMC	CARICOM Member Country
CPHA	Canadian Public Health Association
CRS	Congenital Rubella Syndrome
CSF	Cerebrospinal fluid
DALY	Disability-adjusted life-year
DTP	Diphtheria-tetanus-pertussis vaccine
DTP3	Third dose of diphtheria-tetanus-pertussis vaccine
dT	Reduced diphtheria-tetanus vaccine
EPI	Expanded Program on Immunization
FCH/IM	Family and Community Health Area/Immunization Unit
GIS	Geographical information system
GIVS	Global Immunization Vision and Strategies
GSK	GlaxoSmithKline
Hep B	Hepatitis B
Hib	*Haemophilus influenzae* type b
HPV	Human papillomavirus
HHV	Human herpes virus
IPV	Inactivated polio vaccine
ISIS	Integrated Surveillance Information System for Vaccine-preventable Diseases
MESS	Measles Elimination Surveillance System
MMR	Measles-mumps-rubella vaccine
MR	Measles-rubella vaccine
MOH	Ministry of Health
NGO	Non Governmental Organization
NRA	National Regulatory Agency
OPV	Oral polio vaccine
PAHO	Pan American Health Organization
PASC	Pan American Sanitary Conference
PCR	Polymerase Chain Reaction
PESS	Poliomyelitis Surveillance Elimination System
RGD	Regional Health Service
RF	PAHO Revolving Fund for Vaccine Procurement
RIVS	Regional Immunization Vision and Strategy
RV	Rotavirus
TAG	Technical Advisory Group on Vaccine-preventable Diseases
TORCH	Toxoplasma gondii; other viruses (HIV, measles, and more); rubella (German measles); cytomegalovirus; and herpes simplex
UNICEF	United Nations Children's Fund
VWA	Vaccination Week in the Americas
WCBA	Woman of childbearing age
WHO	World Health Organization

TWENTY FOURTH CARIBBEAN EPI MANAGERS' MEETING

I. INTRODUCTION

The 24th annual meeting of the Caribbean EPI Managers was convened at the Hilton Tobago Golf and Spa Resort in Tobago from 12-16 November 2007. This meeting was attended by over 120 persons from 21 CAREC Member countries as well as Martinique, Canada, and the USA. The meeting commenced with an opening ceremony, which was addressed by the Deputy Permanent Secretary of the Ministry of Health of Trinidad and Tobago; the Director of the PAHO Caribbean Epidemiology Center; representatives of collaborating agencies and partner organizations, including United Nations Children's Fund (UNICEF), the US Centers for Disease Control and Prevention (CDC), and the Canadian Public Health Association (CPHA). The objectives of the meeting were reviewed and a keynote address given by the Chief Secretary of the Tobago House of Assembly, Mr. Orville London.

Mr. London reflected on the reality that the emergence and re-emergence of specific infectious diseases has been linked to international tourists and travel and noted that, in spite of our successes as being the first sub-region, globally, to eradicate indigenous poliomyelitis and measles, we could not afford to become complacent. We needed (1) to sustain and improve our programmatic performance; (2) to continue to create and strengthen those international partnerships, which have been so invaluable to our immunization success; and (3) to continue to advocate for strong and steadfast government commitment to assure the availability of financial resources and other support.

Dr. Ruiz Matus, Chief of the Immunization Unit, reviewed the Regional Immunization Vision and Strategy for the Americas (RIVS), within the wider context of the Global Immunization Vision and Strategy (GIVS), which consists of four major strategies, namely, reaching more persons through family immunization; expanding our technical and strategic thinking through partnerships; promoting global interdependence through assured vaccine supplies; and introducing new vaccines to reduce the morbidity and mortality due to rotavirus and pneumococcal infections.

The major aim of the regional strategy is to articulate a comprehensive approach within the context of the vision and strategy for Family and Community Health, while maintaining the importance of vaccines as one of the best public health prevention strategies. The fundamental pillars of this regional strategy revolve around (1) protecting the achievements we have made to date in immunization by ensuring the continued eradication and elimination of poliomyelitis and indigenous measles transmission, respectively, and the reduction in morbidity and mortality attributable to diphtheria, pertussis, *Haemophilus influenza* b, and hepatitis B; (2) completing the unfinished agenda through ensuring greater uptake and utilization of yellow fever, influenza, and pentavalent vaccines, and finishing the work required for rubella and CRS elimination by 2010; and (3) confronting new challenges such as the introduction of rotavirus, pneumococcal, and human papillomavirus vaccines as supported by Resolution CD47.R10 of the 47th PAHO Directing Council.

Other key principles of the RIVS include the following:

- Transitioning of the immunization program from a childhood to a family-based focus in order to provide a broader protection of more segments of the population.
- Strengthening the national capacity for evidenced- based decision-making.
- Expanding the legislative and fiscal mechanisms for sustaining immunization programs in both the short and long term.
- Promoting solidarity and commitment of countries to the Revolving Fund.
- Building on our successes such as Vaccination Week, which resulted in a broader initiative to adopt a global Immunization Week.

Dr. Jon Andrus in his additional commentary on the RIVS noted that this strategic vision should act as a road map for technical cooperation and assistance to the countries. In addition, RIVS will provide a rallying point around which countries can maintain solidarity and their commitment for the Revolving Fund. As regards highlighting our successes and building on them, the Vaccination Week in the Americas model has already been adopted by countries of the European Union and discussions are currently underway to have a worldwide vaccination week.

The Chairman, Dr Peter Figueroa, endorsed the regional vision and strategy, indicating that it could be fully endorsed by the countries of the Caribbean Community. He further suggested that transitioning from childhood to family immunization could be effectively achieved through partnerships at the local, national, sub-regional, and regional levels. With regard to new vaccines, there was need for expansion of our legal and fiscal spaces to support their introduction together with sound evidence regarding economic costs of the disease burden, vaccine cost-effectiveness, costs benefit, etc.

Dr. Rudolph Cummings of the Caribbean Community Secretariat gave a brief historical overview of the Caribbean Co-operation in Health from 1985-2003, noting that the certification of polio-free status as well as the elimination of indigenous measles transmission in the Caribbean both benefited greatly from cooperation in health. He also pointed out some of the new features of CCH-III, which will cover eight strategic areas and will extend over the period, 2008-2015. The major theme of CCH-III is “Investing in Health for Sustainable Development”.

The delivery of the services of the immunization program fits within the strategic area defined as Stages of Life or Family Health, while the surveillance components is contained in the strategic area of Communicable Diseases. As regards immunization, CCH-III will focus on strategies for marketing new vaccines and for addressing the issues of vulnerable populations. It was noted that every attempt should be made to vaccinate undocumented aliens and thus minimize their contribution to increasing numbers of susceptible populations.

The Chairman emphasized that the EPI was a stellar example of Caribbean regional cooperation, supported by coordinated leadership and management, well defined goals and objectives, and clear articulated policies and plans**.**

II. OBJECTIVES OF THE MEETING

The purpose of each of the annual sub-regional meetings of the Immunization Program were defined as follows:

1. To share experiences and lessons learned at the regional, sub-regional, and national levels in order to enrich our collective understanding, to build on the successful lessons learned and to refine our strategies, when weakness are detected;

2. To provide scientific, technical and programmatic updates in order to ensure that we remain on the cutting edge of the issues and information and that we are, therefore, always positioned to answer relevant questions from our Ministries and other stakeholders; and

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

The specific objectives of this 24th annual meeting of the Caribbean EPI Managers were first summarized under the rubric of protecting our achievements, addressing the unfinished agenda, and confronting new challenges, and then individually outlined as follows:

- To analyze the status of measles elimination;
- To evaluate the status of rubella and CRS elimination at the national level;
- To evaluate program efforts to sustain the eradication of wild poliovirus in each country;
- To finalize issues regarding polio certification and poliovirus containment for the region;
- To analyze the status of the EPI program in each country;
- To maintain heightened surveillance for influenza and severe acute respiratory infections (SARI) in selected countries;
- To discuss the proceedings and outcomes of the HPV Stakeholders' Policy and Planning Meeting;
- To discuss the introduction of vaccines such as influenza and rotavirus in the EPI in countries;
- To discuss the status of surveillance for adverse reactions to vaccines;
- To set 2008 national targets and objectives in relation to immunization coverage and the reduction of morbidity and mortality from the EPI diseases;
- To provide updated information on selective scientific topics of common interest to countries in relation to immunization, service delivery, and surveillance of measles/rubella and other EPI diseases;
- To discuss the status of implementation of the rotavirus surveillance system in selected countries;
- To develop an action plan with a specific budget for each activity to enable each country to achieve the targets and objectives set for 2008.

III. IMMUNIZATION AND VACCINE-PREVENTABLE DISEASES

A. OVERVIEW OF THE EXPANDED PROGRAM ON IMMUNIZATION - 2007

The delivery of vaccination services has continued through the child health clinics in the primary health care systems of countries together with the private health care systems. All countries are currently offering immunization services to all population segments, including infants, children, adolescents, adults, and elderly. The commitment of governments, health practitioners, and the wider population has greatly contributed to the immunization successes, while timely and effective surveillance and response have ensured that these successes are maintained.

PROTECTING OUR ACHIEVEMENTS AND GAINS

1. Vaccines and Vaccination Coverage

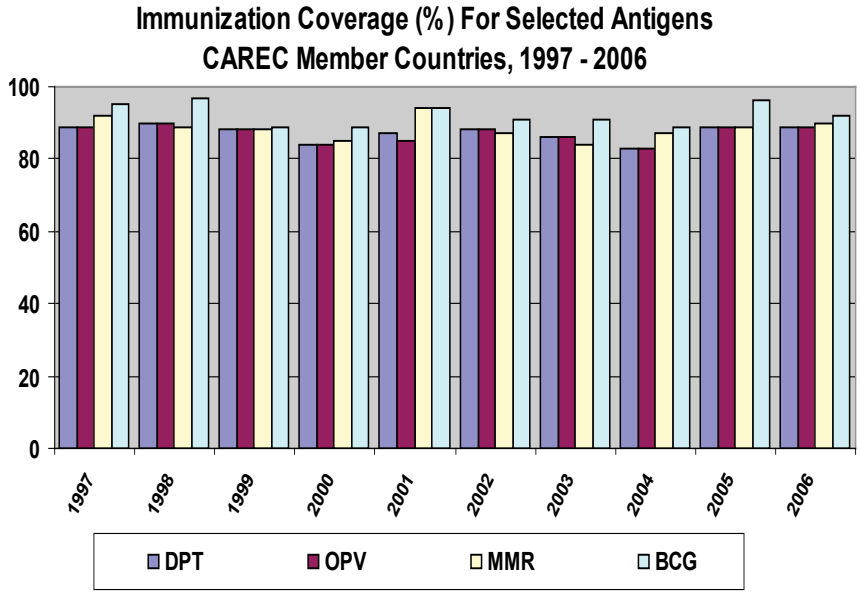
All countries have incorporated *Haemophilus influenzae* type b (Hib) and hepatitis b vaccines into their public sector infant immunization schedules. Seventeen countries are currently administering the pentavalent combination vaccine (DTP/Hep B/Hib), while two are using DTaP/IPV/Hib.

The main goal of the immunization program is to achieve equity in the provision of vaccination services in countries, with the specific objectives being:

1. To achieve a national coverage rate of 95% or greater for each administered vaccine; and
2. To achieve coverage rate of 95% or greater at sub-national jurisdictions such as regions, districts, parishes, or zones, etc.

In 2006, the average coverage for 3rd doses of vaccines in the Caribbean sub-region was as follows: DTP-89%, OPV-89%, Hib-89%, Hepatitis B-89% and 1st dose, MMR-90%, and BCG-92% (**FIGURE 1)**.

FIGURE 1



The vaccination coverage for all administered antigens has remained unchanged over the past year. Eleven (11) countries have vaccination coverage rates for 3rd dose DTP at 95% or greater, while all countries had coverage rates greater than 80% for all antigens (**Table 1**).

TABLE 1

DISTRIBUTION OF VACCINATION COVERAGE (%), CARIBBEAN SUB-REGION: 2006 AND 2005

Coverage (%) in children 0-11 months	DPT X 3		TOPV X 3		MMR(12-23mths)	
	2006	2005	2006	2005	2006	2005
<50	0	0	0	0	0	0
50 - 79	0	0	0	0	0	0
80 - 89	4	4	5	4	7	3
90 -94	4	4	4	4	5	6
≥95	11	11	10	11	8	10
Sub-regional Coverage	89	91	89	89	90	89

SOURCE: MOH REPORTS TO EPI/CAREC

Belize, together with ten countries, has attained coverage rates of over 90% for all antigens in all districts of the country. As regards MMR vaccination coverage, 2 of 10 regions in Guyana, 1 of 14 parishes in Jamaica, and 4 of 9 counties in Trinidad and Tobago had achieved coverage rates greater than 95% in their sub-national jurisdictions.

In 2006, a vaccination coverage survey was conducted in Suriname focusing on Paramaribo and the border areas of Suriname and French Guiana. It was found that although children were being vaccinated, this was occurring at ages later than those mandated in the schedule. A vaccination coverage survey is proposed for Belize and Guyana.

GENERAL RECOMMENDATION

All countries should attain coverage levels for all administered antigens at 95% or greater at national and sub-national levels.

2. Surveillance

Surveillance of vaccine-preventable diseases has continued in all countries and reporting occurs on a weekly basis. During 2006 and 2007 (as of week 43), no case of diphtheria was reported, the last case having occurred in 1994. Two cases of neonatal tetanus were reported from Suriname in 2006 and this same country had previously reported 3 cases. An anthropological study will be conducted in the affected geographic area to determine current practices and develop solutions for improved management of the problem. Cases of non-neonatal tetanus continued to occur in countries, mainly in adults and the elderly. There were 13 cases reported both in 2005 and 2006, while as of Week 43, 2007, 4 cases had been notified from 2 countries. Seven (7) cases of pertussis-like syndrome were reported in 2006, while 71 cases were notified as of Week 43, 2007. All of these cases were associated with an outbreak. Between July and September 2007, sporadic cases of a pertussis-like cough were reported in Region 1, a remote area in Guyana. Sixty nine of these cases, residing in seven villages, were epidemiologically-linked, while another two were laboratory confirmed being culture positive for *Bordetella pertussis*. Prevention and control measures, including vaccination were implemented in all of the villages. No additional cases of pertussis-like cough have been recorded since October 2007.

RECOMMENDATIONS

1. All health care providers are strongly encouraged to administer tetanus containing vaccines boosters to at-risk adults, such as farmers, carpenters, gardeners, etc, every 10 years, utilizing all contacts with health care system as potential opportunities for vaccination**.**

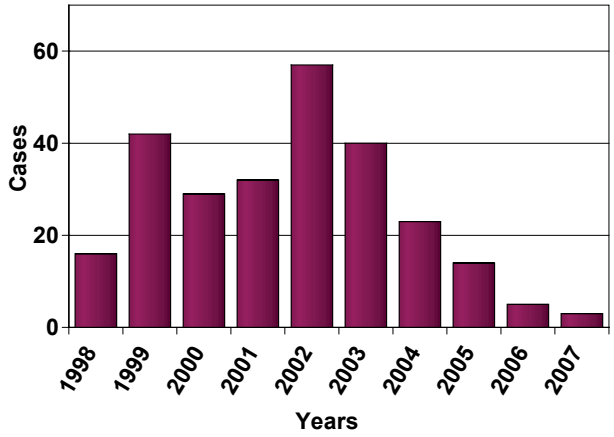
2. CAREC's laboratories should urgently explore the feasibility of establishing a PCR diagnostic capability for *Bordetella pertussis*, similar to that used by the laboratories at the US-CDC.

Haemophilus influenzae Surveillance

Since the inception of the invasive bacterial infection surveillance (IBIS) in 1998, 253 cases of Hib meningitis have been notified during the period from 1998-2005. The largest number of cases was reported in 2002. Five cases were notified in 2006 and 3 cases in 2007 as of Week 43 (**FIGURE 2**)**.**

FIGURE 2

Reported Cases of Hib Meningitis 1998 -2007 (Wk 43)
Caribbean Subregion



B. PROGRESS WITH MEASLES AND RUBELLA ELIMINATION

1. Measles, Rubella and CRS - A Regional Perspective

In the Americas, the last case of endemic measles transmission occurred in Venezuela in November 2002. Since that time, sporadic cases and outbreaks have continued to occur related to importations from other regions of the world. The main risks posed by these importations include the reestablishment of endemic virus transmission; the perception of failure of the measles and rubella elimination strategies; the loss of public confidence; and unanticipated expenditures incurred for outbreak control activities.

Recent outbreaks have highlighted the importance of implementing the vaccination strategies recommended by PAHO, namely, achieving MMR coverage rates of ≥95% in the routine programs in every municipality and conducting effective follow-up campaigns, when there is indication of a sufficiently large accumulation of susceptibles. Even though the reported routine MMR coverage at the regional level was high (94%) in 2006, 35.6% of the districts in Latin America and the Caribbean did not achieve 95% coverage. Furthermore, not all countries are conducting follow-up campaigns as recommended by PAHO. Some of them, that include a second opportunity for measles and rubella vaccination in their routine programs, either do not report MMR2 coverage or report coverage levels well below 95%.

The implementation of the measles elimination strategies unmasked the burden of rubella and congenital rubella syndrome (CRS). In 2003, the Directing Council of the Pan American Health Organization (PAHO) passed a Resolution calling for the elimination of rubella and CRS from the countries of the Americas by the year 2010. In 2006, this goal was reinforced by another resolution urging PAHO Member States to implement those policies and operational strategies that were necessary to achieve the rubella and CRS elimination target by 2010. The strategy recommended by PAHO to achieve rubella and CRS elimination includes the following:

1. Using rubella-containing vaccines as measles-mumps-rubella vaccine (MMR) in the routine childhood program and aiming to reach >95% coverage in all municipalities;
2. Conducting periodic follow-up campaigns with MR vaccine;
3. Conducting a one-time mass campaign targeting adolescents and adults (men and women);
4. Integrating measles and rubella surveillance; and
5. Implementing CRS surveillance.

Between 1998 and 2006, a reduction of almost 98% in the number of reported rubella cases had been achieved in the Americas. This has been mainly due to the implementation of mass measles-rubella vaccination targeting adolescents and adults, both male and female, to rapidly interrupt transmission. Countries that only vaccinated women have experienced large rubella outbreaks and will now conduct vaccination campaigns to target susceptible groups. Integrated measles and rubella surveillance indicators are being monitored, but the proportion of cases with adequate investigation and samples, and the proportion of samples reaching the laboratory within 5 days are not at optimal levels. CRS surveillance is also weak and most suspected cases come from a few countries in South America (97% from 3 countries in 2007). Finally, the available data on rubella genotypes is limited.

In 2007, the 27th Pan American Sanitary Conference (PASC) congratulated health care workers for the progress made with rubella elimination, acknowledged all participating and supporting entities, and urged Member States to finalize the implementation of vaccination strategies while strengthening integrated measles/rubella surveillance and CRS surveillance. The PASC also requested that PAHO convene an international Expert Committee to be charged with the responsibility for documenting and verifying the interruption of endemic measles virus and rubella virus transmission in the Americas. Countries are encouraged to review their measles and rubella data, including vaccination strategies used, coverage rates achieved, and the performance of their measles/rubella and CRS surveillance systems.

2. Progress of Measles, Rubella, and CRS Elimination in Canada

An overview of Canada's progress with measles and rubella elimination was provided on the basis of a working definition of elimination, which included (i) interruption of indigenous transmission and (ii) failure to re-establish indigenous transmission following disease importation. Significant reduction in disease incidence has occurred since the introduction of publicly funded vaccines programs, including 1-dose MMR in 1983 and 2-dose MMR in 1996-97 together with catch up campaigns using measles or measles-rubella vaccines in most provinces/territories during the same years. Prior to a 2007 outbreak of measles in an under-vaccinated population, surveillance data suggested that measles had been mostly eliminated from Canada, with almost all cases representing importation or importation-related infections. The 2007 outbreak data show that cases are limited to non-immunized or under-immunized persons and, despite over seven months of outbreak activity, there has been no extension of cases into the general population and no spread beyond the affected province. This relative containment of outbreak cases to under-vaccinated pockets suggests that vaccine coverage is sufficiently high to prevent re-establishment of endemic transmission in the general population. Likewise, a 2005 outbreak of rubella in an unvaccinated religious community, that opposes vaccination, did not spread to the general population over four months of outbreak activity. Nevertheless, maintenance of disease elimination in the absence of global eradication requires sustained high vaccine coverage rates and continued vigilance in surveillance for early detection of imported/importation-related cases and appropriate response for rapid interruption of transmission.

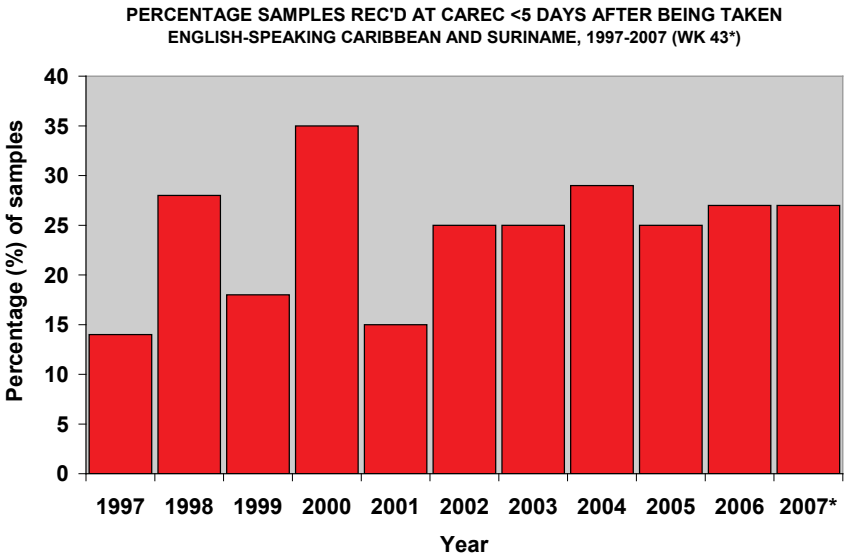
3. Measles, Rubella, and CRS Elimination in the Caribbean– System Performance

Case Reporting

In 2007, reporting of measles, rubella, and CRS is being generated from over 700 sites in countries. Nearly all (99%) of these sites are reporting on a weekly basis. Reporting occurs from public and private health sector facilities with public sector sites accounting for about 85-90% of total sites. Routine reporting of febrile rash illness continues from French Guiana, while the Netherlands Antilles have recommenced their reporting in 2007.

The proportion of febrile rash samples reaching CAREC's laboratory within less than five (5) days after collection was 27% in both 2006 and 2007 (Wk 43) (**Figure 3**).

FIGURE 3



Challenges

The external airline courier systems in current use are inadequate to meet the surveillance system demands for rapid specimen transport. Specimen transport within countries was also tenuous on occasion, as there is often no formal or funded mechanism to guarantee their reliable transport. Airport clearance remained problematic, in spite of some improvements. Payment for the collection and testing of clinical specimens, in the private sector of some countries, was compromising adequate case investigation. There is need for an expansion in the number of private sector practitioners, who would contribute to the surveillance network.

Classification of Cases

The measles/rubella or fever/rash surveillance system has also functioned as an alert system for dengue fever in the countries. Of the 6,681 cases that have been reported between 1991 and 2006, laboratory testing was conducted in over 99% of them.

Over the period from 2000-2006, 2,127 suspected cases were reported through the febrile rash illness surveillance system and of these, twenty-seven (27) were laboratory confirmed as rubella infection and one hundred and ninety-five (195) as dengue fever.

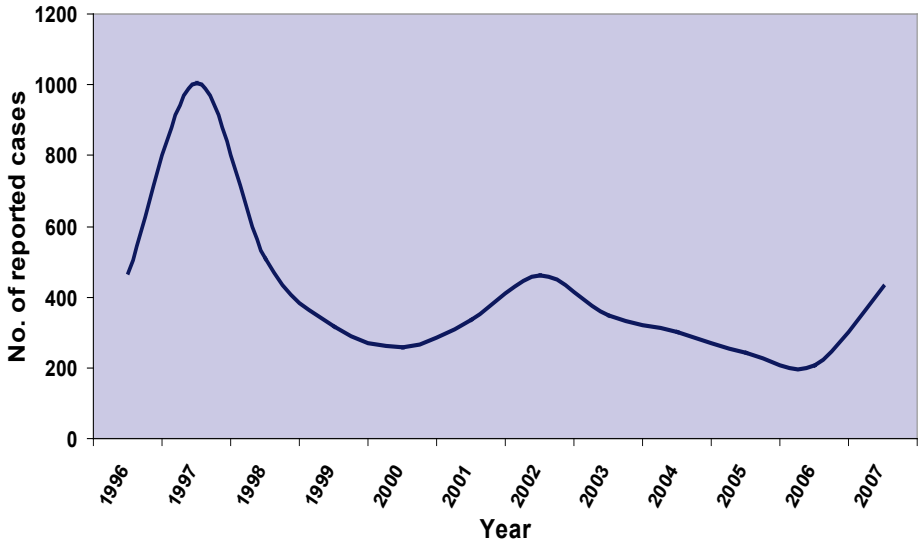
No confirmed case of measles was identified in any of the laboratory tested specimens, while1,905 cases tested negative for measles, rubella, and dengue fever. Of these negative cases, fifty were laboratory confirmed as due to human herpes Virus type 6 (HHV-6). There were other clinical diagnoses such as scarlet fever and allergic reactions.

The last laboratory confirmed case of measles in the Caribbean sub-region occurred in 1998 in a tourist from Europe.

As of Week 43, 2007, four hundred and twenty-nine (429) cases of febrile rash illness were reported, representing a cumulative increase of 273% over case reports for the corresponding period in 2006. This increase was due to heightened dengue fever virus activity (**FIGURE 4**).

FIGURE 4

Reported Cases of Fever with Rash
All CAREC Member Countries, 1996 - 2007(Wk 43)

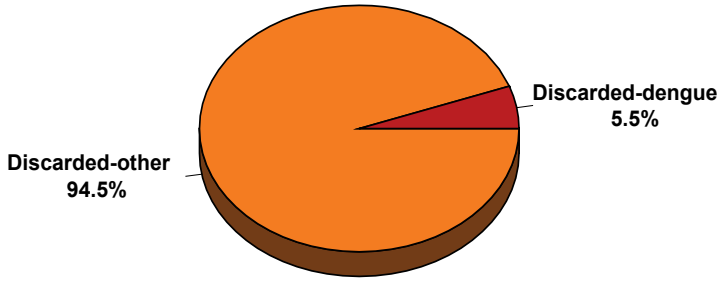


Sixty percent of these cases were recorded in Jamaica, while 90% of reported cases were jointly notified by Belize, Guyana, and Jamaica. These countries were experiencing dengue fever outbreaks. Twenty- three (23) cases were laboratory confirmed as due to dengue virus infection, while three hundred and ninety-eight (398) cases were discarded as negative for measles, rubella and dengue fever. Eight (8) cases are still under investigation (**Figure 5**). There was no laboratory confirmed case of rubella or measles in 2007.

Of the fever rash cases that were reported, 49% were less than 5 years of age; 40% were between 5 and 14 years; and 11% were 15 years or older.

FIGURE 5

CLASSIFICATION OF SUSPECTED MEASLES CASES
2007(Wk 43)
English Speaking Caribbean & Suriname



Source:Ministries of Health reports to EPI/CAREC

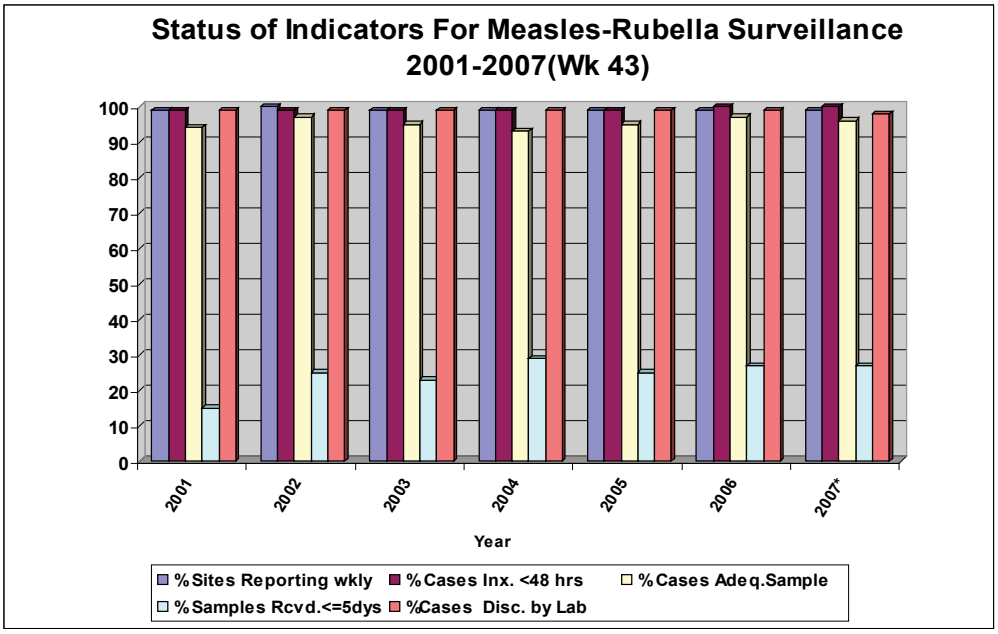
Of those cases with test results that were negative for measles and rubella, specimens from 91 cases less than 15 years of age were tested for human herpes virus type 6 (HHV-6/roseola). Fifty cases (55%) were confirmed as HHV-6 on the basis of their IgM positivity.

In addition to the cases reported by the CAREC member countries, French Guiana and Netherlands reported a total of 60 fever/rash cases, none of which were laboratory confirmed as measles, dengue or rubella.

Surveillance Indicators

In 2006, ninety-nine percent (99%) of surveillance sites reported on a weekly basis with 100% of cases being investigated within 48 hours. Ninety-six percent (96%) of cases had adequate samples taken and 91% received laboratory results in less than 4 days. Nearly all cases (99%) were discarded on the basis of laboratory testing. Only 27% of samples arrived at the CAREC laboratory in less than 5 days post collection (**FIGURE 6**). As of Week 43, 2007, ninety-nine percent (99%) of sites had been reporting on a weekly schedule and 100% of cases were investigated within 48 hours. Adequate samples had been collected from 96% of cases and 96% had received laboratory results in less than 4 days. Ninety eight percent of specimens were classified as discarded by laboratory testing. Only 27% of samples arrived at the CAREC laboratory within less than 5 days after collection.

FIGURE 6



Impact of the Rubella Vaccination Programme

Since mass rubella vaccination activities conducted in countries between 1997 and 1999, there has been no confirmed rubella case during the period, 2002 to 2007 (Wk 43) the last cases having been recorded in 2001.

In 2007 (Wk 43), a total of 75 cases were evaluated for CRS, of which five were referred as suspected CRS and 70 for TORCH (toxoplasmosis, rubella, cytomegalovirus, and herpes) studies. In 2006, one (1) suspected case of CRS was referred for testing and 83 cases for TORCH laboratory evaluation. All specimens were laboratory confirmed as rubella negative. The last indigenous CRS case in CAREC member countries was recorded in 1999.

Status of Measles and Rubella Surveillance System - Belize

The surveillance system was established in 1991 with an emphasis on the reporting of rash and fever, acute flaccid paralysis, and neonatal tetanus. Subsequently in 1997, after an outbreak of rubella in 1996, an integrated surveillance system for measles, rubella, and CRS was instituted.

This integrated system was simultaneously implemented with the introduction of the MMR vaccine in 1997. To date, nearly 600 cases of rash and fever have been investigated, of which, 6 cases have been positive for rubella and 5 cases confirmed as CRS. A total of sixty sentinel sites report on a weekly basis, with 20% of these sites being in the private health sector. Samples are sent to CAREC through the DHL courier services. Currently, five of the six surveillance indicators are being almost fully met. Transportation of samples from Belize to CAREC within 5 days after collection remains the greatest challenge for this surveillance system.

Efforts to eliminate measles and rubella lead to the implementation of mass vaccination of the female and male populations, aged 5-35 years old, with MMR vaccine in the years 1997, 2000, and 2004. Following these mass vaccination campaigns, a second dose of MMR vaccine was introduced into the routine immunization program and this has achieved very good coverage. There has been no confirmed case of measles since 1991, no cases of CRS since 1997, and no case of rubella since 2001.

Status of Measles and Rubella Surveillance System - Jamaica

The last laboratory confirmed case of measles in Jamaica and the Caribbean occurred in 1991, while the last case of rubella was notified in Jamaica in 2000. The integration of measles and rubella surveillance was achieved in Jamaica during 1999. Surveillance for fever and rash is undertaken both actively and passively and this illness is categorized as a Class 1 notifiable event. Jamaica has satisfied 3 of the 4 main surveillance indicators. Timely submission of clinical samples to CAREC remains a challenge, even though some improvement has been made in forwarding specimens to CAREC within five days. There is the need to strengthen non-sentinel surveillance sites and increase the participation of private medical practitioners in this surveillance system. The timeliness of investigating reported cases as well as evaluating laboratory specimens needs to be improved.

Status of Measles and Rubella Surveillance System - St. Maarten

The EPI service of St. Maarten is supervised by the Island Government, with vaccination and surveillance activities being executed by the public and private health sectors. MR vaccines were first introduced between 1981-1991 for certain selected population sub-groups, and subsequently for all groups from 1991. In 2006, MMR coverage was measured at 93.4%. MMR 2 was introduced in 1998. Calculation of immunization coverage remains a challenge due to inconsistent denominator data. Although there were a few suspected cases of rubella and measles, there were no laboratory confirmed cases of measles, rubella, and CRS.

C. POLIOMYELITIS ERADICATION EFFORTS AND AFP SURVEILLANCE

1. AFP Surveillance - A Regional Perspective

The last case of poliomyelitis associated with a wild poliovirus was reported in the Americas in 1991, and our Region was certified free of circulating, indigenous wild poliovirus in 1994. Even though the World Health Assembly established a goal of global eradication of poliomyelitis in 1988, the virus is still circulating in eleven countries at the time. However, most importations arise from the only four countries in the world that have never been able to eliminate polioviruses and these are, namely, India, Afghanistan, Pakistan and Nigeria. The spread of polioviruses around

the world underscores the urgent need to maintain adequate surveillance for Acute Flaccid Paralysis (AFP).

The last case of poliomyelitis was recorded in the Caribbean in 1982 and AFP surveillance has been maintained in all countries. The annual rate of AFP cases per 100,000 population under 15 years of age is below the rate recommended by the Technical Advisory Group of the Immunization Program. The collection rate of adequate stool specimens was only 38 percent, far below the recommended level of 80 percent (**FIGURE 7**). The annual AFP rate is 1.6 (**Figure 8**). Adequate stool specimens are those that are collected within the first 14 days after the onset of paralysis and transported in a timely manner and under appropriate conditions of temperature to the laboratory. Both indicators are directly related to the probability of early detection of importations of wild polioviruses from the endemic regions of the world. At the same time, an early detection of any importation will improve the chances of stopping transmission long before wild polioviruses have spread to the whole population and have caused many paralytic cases of poliomyelitis.

Containment of wild polioviruses housed in laboratories is a requirement of the Global Commission for the Certification of the Eradication of Poliomyelitis. Although the Caribbean countries have made significant progress towards completing this goal, country reports from the Bahamas, Turks & Caicos Islands, Barbados and Trinidad & Tobago remain outstanding and are being awaited in order to prepare the final report for the Sub-Regional Commission.

FIGURE 7

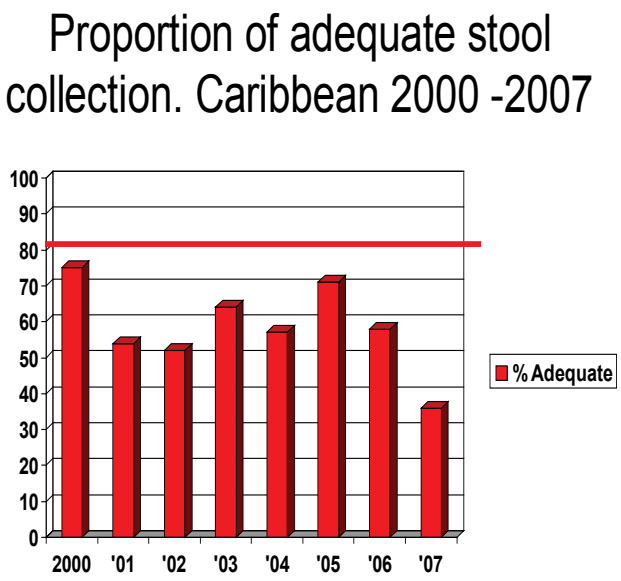
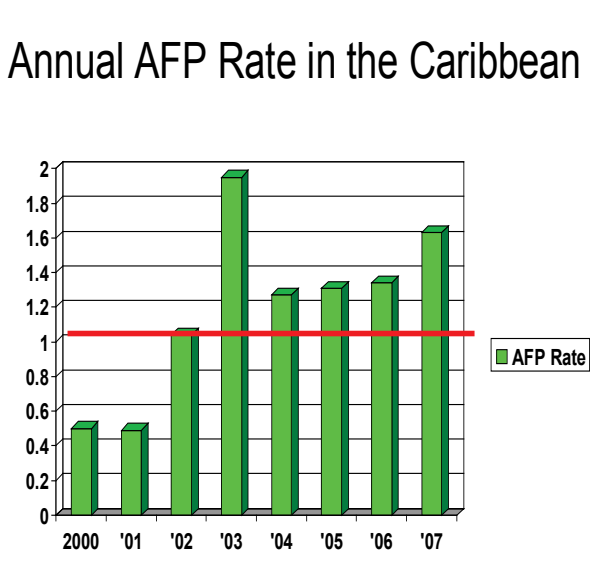


FIGURE 8



CLARIFICATION

The PAHO-Caribbean EPI epidemiologist, Dr. Beryl Irons, indicated that the countries of the Caribbean Community reported on all cases of acute flaccid paralysis regardless of age. Therefore, the indicators (**Figures 7, 8**) apply to AFP cases of all ages and not cases less than 15 years of age.

RECOMMENDATIONS

1. The Caribbean countries must improve their AFP surveillance, paying special attention to the detection of AFP cases and the adequate collection of clinical specimens.

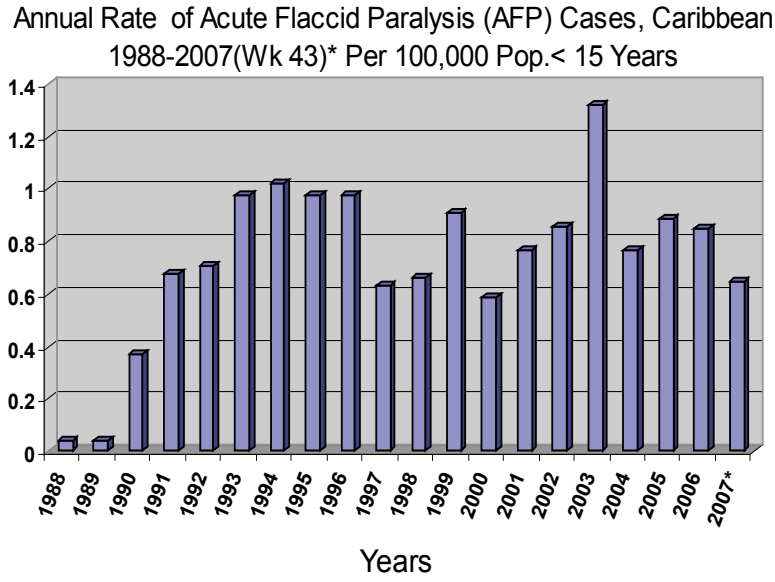
2. Caribbean epidemiologists are strongly encouraged to fully investigate all cases of AFP and ensure that they are appropriately classified. On the rare occasion when final classification is not possible by the epidemiologists, such cases should be referred to the appropriate Classification Committee for resolution of these cases. This recommendation also has significant international and regional implications as there are 7,304 and 2,717 global cases pending classification in 2006 and 2007, respectively, of which 471 and 452 are from the Region of the Americas.

2. AFP Surveillance - A Caribbean Perspective

AFP reporting is generated from **493** sites within the countries. Ninety-nine percent (99%) of these sites have been reporting on a weekly basis in 2007 (Week 43).

During the period from 1994-2006, two hundred and forty-one (241) AFP cases, less than 15 years of age, were notified from more than ten countries. Annual AFP rates were recorded at 0.86 and 0.65 per 100,000 population less than 15 years of age in 2006 and 2007 (Week 43), respectively (**FIGURE 9**).

FIGURE 9

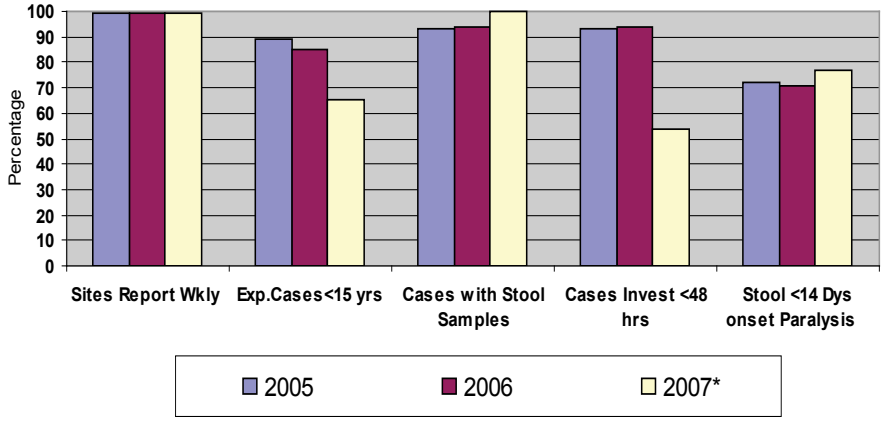


In 2006, twenty eight (28) AFP cases ranging in age from 9 months to 83 years were reported. Eighteen of these (64%) were less than 15 years of age and were notified from Guyana, Jamaica, Suriname, and Trinidad and Tobago. Ninety four percent of the cases were investigated within 48 hours and stool samples were submitted for 17 of the 18 cases less than 15 years of age. Eighty seven percent of the cases had stool specimens collected within 14 days of the onset of paralysis. Guyana and Jamaica satisfied all of the 4 surveillance criteria.

In 2007 (Week 43), thirty-three (33) AFP cases ranging in age from 1 to 76 years were reported from 7 countries, namely, Bahamas, Barbados, Belize, Guyana, Jamaica, Suriname, and Trinidad and Tobago. Of these 33 cases, 13 (65%) were less than 15 years of age and 10 [77%] of the 13 cases were investigated within 48 hours.

Stool samples were submitted from all of the cases less than 15 years of age. Ten [77%] of the cases had specimens collected within 14 days of the onset of paralysis (**FIGURE 10**). Bahamas, Belize, Barbados, Guyana, and Suriname satisfied all of the 4 surveillance criteria.

FIGURE 10
AFP Surveillance Indicators 2005-2007(Wk 43)
Caribbean Subregion



D. SURVEILLANCE - IMMUNIZATION SAFETY

There was one case report of a serious adverse event associated with vaccination in 2007. It was an infant death occurring within 5 days of vaccination. However, investigations and autopsy revealed that the cause of death was aspiration. Training updates and audits in relation to adverse event surveillance were conducted in a number of countries.

E. VACCINE AND LOGISTICS PROCUREMENT

In 2007, interruption of the vaccine supply in countries has been minimal. All countries have had an adequate supply of syringes and needles.

F. FIFTH VACCINATION WEEK IN THE AMERICAS

1. Overview of the Americas

Five years have passed since the PAHO Directing Council adopted Resolution CD44.R1, which urged Member States to implement an annual vaccination week premised on the underlying principles of equity, access, and Pan Americanism. Over the last five years, Vaccination Week in the America has steadily grown in size and its activities have continued to target vulnerable populations with limited access to vaccination; populations located in remote areas and along urban fringes and borders; populations residing in low coverage municipalities; and indigenous communities.

In 2007, the countries of the Americas vaccinated more than 47 million people as a result of VWA. Influenza and yellow fever were the most commonly administered antigens in 2007 with 18,724,234 doses of influenza and 9,306,090 doses of yellow fever vaccines being delivered.

Additionally, more than 8 million doses of polio, 7.6 million doses of MR, and more than 2 million doses of Td were administered around the Region. Social communication campaigns were conducted in the majority of Caribbean countries as well as in the US and Canada. Other selected accomplishments from 2007 include:

2. Working Towards the Unfinished Agenda

- Brazil and Paraguay prioritized their vaccination activities for indigenous communities, immunizing 138,369 and 15,321 individuals, respectively, against influenza, yellow fever, tetanus, hepatitis B, pneumococcus, and chickenpox**.**
- Bolivia, Ecuador, and Peru conducted yellow fever prevention campaigns vaccinating a combined total of 9,264,305 individuals.
- Eleven countries, including the Bahamas and Grenada, vaccinated against seasonal influenza, targeting groups such as those older than 65 years of age, the chronically ill, pregnant women, and health workers.
- Guatemala vaccinated more than 7 million individuals against measles and rubella as part of the regional objective of rubella and CRS elimination by 2010. Haiti implemented a pilot campaign and vaccinated 99,526 individuals aged 1-19 years, against these diseases. Paraguay, Nicaragua, and the Dominican Republic, among others, all worked towards tetanus elimination by vaccinating at-risk groups such as WCBAs, indigenous and border populations.

3. Protecting the Achievements

- Eighteen countries administered polio vaccine to more than 8 million individuals. Twenty-two countries vaccinated children aged 1 year, young people and adults with MR or MMR vaccine, and countries such as Brazil, Colombia, Costa Rica, Dominican Republic, Honduras, Nicaragua, Panama, Paraguay, Peru, and Venezuela administered all the antigens in order to immunize children whose vaccination schedules were incomplete.
- The EPI managers recognized that the Cricket World Cup was a key opportunity to protect their immunization achievements and to prevent the importation of vaccine-preventable diseases.
- Jamaica vaccinated 9,120 people against measles and rubella, including hotel workers, before the Cricket World Cup. The Bahamas vaccinated 611 people against measles and rubella. In addition Suriname vaccinated 502, St. Kitts & Nevis, 490, and Guyana 210 people.

Suriname

The focus of the 2007 VWA in Suriname was “Reaching the Unreached”. The Regional Health Services identified 4,605 dropouts in their clinical registers. Visits to 3195 children were conducted and 1,090 (34.12%) were vaccinated. Some children had died, changed their address, or did not need vaccinating at all. The Medical Mission identified 78 dropouts of 2 health clinics, 53 (76.9%) were vaccinated. One constraining factor was the fact that the VWA was held in the same week as the Easter Holidays and, as a result, many children were not home. Flooding of the roads due to heavy rainfall also made houses and clinics less accessible.

Dominica

Recognition of health care workers and immunization of children aged 1-5 years with hepatitis B vaccine were the main focus of this year’s activities. The week was formally opened with an address by the Minister of Health in which personal compliments were paid not only to the health workers but all the stakeholders for their valued contributions to the success of the programme. The honourees included the retired EPI Manager, the Supplies Manager, drivers, and janitors.

Of the targeted 5,378 children in the 1-5 years age group, 3,944 received hepatitis B vaccine. The hepatitis B vaccination activities were temporarily interrupted by WHO due to WHO investigation of hepatitis B vaccine adverse event in South-East Asia. The overall activities for the week could be considered a success.

4. Meeting Future Challenges

- Panama introduced the hepatitis A vaccine and 5,590 children, aged less than 2 years, were vaccinated.
- Venezuela reintroduced the rotavirus vaccine, administering it to 47,217 children, less than 6 months of age.

Following the signing of the Paramaribo Declaration during the 23rd Caribbean EPI meeting in November 2006, countries of the English-speaking Caribbean took advantage of VWA 2007 to strengthen epidemiological surveillance and prevent the importation of vaccine-preventable diseases during the Cricket World Cup.

As in previous years, PAHO designed communication materials in order to assist participating countries with VWA mass communication and to send a clear and uniform vaccination message through the Region. Countries throughout the Region also designed more local strategies in order to elicit a positive response to vaccination in their communities. Canada, the English-speaking Caribbean countries, the Netherlands Antilles, the United States, and Uruguay planned and implemented separate awareness campaigns regarding the importance of vaccination which were targeted towards parents, health workers, decision-makers, opinion-makers, and others.

Finally, in 2007 the Dominican Republic, Haiti, Honduras, Mexico, Nicaragua, and Panama were able to couple the activities of VWA with other important primary health care activities. These included the administration of vitamin A, anti-parasitic supplements, oral rehydration solutions, iron, and folic acid.

Following the example set by the Americas, the European Region held its second annual Immunization Week from 16-22 April with the participation of 25 countries. In 2008, EIW will coincide with Vaccination Week in the Americas and a bi-Regional videoconference is being planned to unite the two initiatives.

RECOMMENDATIONS

1. Countries must continue to use VWA as a strategic initiative to strengthen immunization programs throughout the Region, and increase visibility and advocacy of vaccination in the political agenda.

2. VWA interventions should be targeted to population groups traditionally underserved during routine activities, such as indigenous people, and populations living in marginalized and border areas.

3. VWA should be used as an opportunity to strengthen interagency and inter-sector cooperation.

4. Countries should guarantee the sustainability of the VWA by including it in their EPI Plans of Action.

5. Countries should improve the definition of goals, objectives, and target populations, as well as the information system to assess VWA impact (indicators).

6. Countries should improve their timely reporting to PAHO of the number of people vaccinated by population groups and by antigen, as well as the percentage of people interviewed who were aware of VWA communication activities.

7. Countries must complete the documentation of lessons learned and best practices.

G. THE PAHO REVOLVING FUND: DOING MORE WITH LESS

The PAHO Revolving Fund has nearly 30 years experience serving countries to ensure a supply chain of safe, affordable vaccines that is linked simultaneously with high-quality technical assistance. This stable vaccine supply chain has been critical for countries of the Caribbean to achieve their disease reduction targets of polio eradication, measles and rubella elimination, while adding new vaccines.

The purpose of this presentation was to present results of recent assessments of the Revolving Fund and the supply chain of vaccines to PAHO member countries. The results highlighted operational errors, in particular those involving on-time shipment, purchase orders, and payment of orders. The studies identified strengths in cold chain adequacy that included adequate overall capacity, but weaknesses in terms of better forecasting of capacity for the introduction of new vaccines. Strengths of the vaccine distribution system included a national plan for distribution, but weaknesses were that the plan is not necessarily implemented. Also, inventory procedures such as limits for minimum and maximum inventory need to be set, and inventory forms are systematically used and analyzed. Weaknesses in control of vaccine wastage were: lost quantities are often not recorded, data is insufficient to analyze consumption of vaccine, and quantities of vaccine received and used are not often reconciled.

The plan of action to address deficiencies was discussed. For inventory management issues, countries should access software being promoted by WHO and UNICEF, as well as revitalize their overall inventory management systems. For vaccine distribution, countries were asked to evaluate their cold chain problems, in particular, and to share these experiences with other countries and consider the use of Freeze-Tags. All these issues should be addressed in the country assessments routinely conducted by Ministries of Health with support from PAHO.

DISCUSSION AND RECOMMENDATIONS

The EPI Managers recognized the role of the Revolving Fund in the immunization programme. This fund has been used by the countries of the Caribbean Community to acquire affordable vaccines.

The meeting urged PAHO to continue to maintain its technical support through the Revolving Fund in order to ensure access to safe and affordable vaccines. A resolution to protect and maintain the Revolving Fund was proposed, developed, and signed by the EPI Managers (**Annex I**).

Regarding discussions on vaccine supply, countries were advised to keep a 25 percent reserve in order to cushion or cover any interruptions such as late arrival of vaccines or vaccine recalls.

COMPLETING THE UNFINISHED AGENDA

H. UNDERUTILIZED AND NEW VACCINES

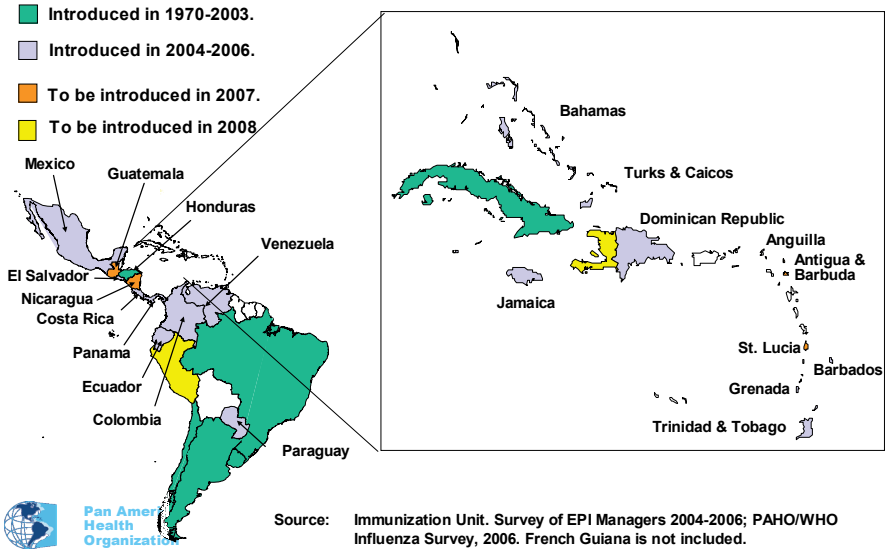
1. Seasonal Uptake of Influenza Vaccine: Regional Perspective and Preparedness Planning

Influenza is one infectious disease that is able to generate a large disease burden owing to the occurrence of seasonal epidemics. Influenza can also produce pandemics, resulting in extreme social disruption and economic loss, globally. The Spanish influenza pandemic of 1918 caused between 20 and 40 million deaths worldwide.

The systematic vaccination of at-risk groups with seasonal influenza vaccines is being progressively carried out in the Region. As of 2007, 29 countries are using this influenza vaccine in their public sectors (**Figure 11**).

Figure 11.

Introduction of Seasonal Influenza Vaccine in Latin America and the Caribbean, 1970-2007



In the Caribbean, 14 countries have already introduced the influenza vaccination. They are, namely, Anguilla, Antigua, Aruba, Bahamas, Barbados, Bermuda, the British Virgin Islands, the Cayman Islands, Grenada, Jamaica, the Netherlands Antilles, Saint Lucia, Trinidad and Tobago, and the Turks and Caicos Islands. Priority groups for immunization include adults over 60 years of age, health workers, individuals with chronic diseases, and pregnant women. More widespread use of the seasonal influenza vaccine will make it possible to diminish the disease burden and improve productive capacity for a pandemic vaccine.

In light of an imminent influenza pandemic, most likely due to the strain A/H5N1, WHO has developed technical guidelines for national preparedness plans. In the event of a pandemic, vaccination will be one of the most effective interventions available for disease control. However, it is well recognized that the availability of the pandemic vaccine will be very limited during the first wave of pandemic, not only in developed countries, but also in the developing world.

RECOMMENDATIONS

1. Countries should continue to strengthen their epidemiological surveillance for influenza in order to determine the characteristics of virus circulation, the cost-effectiveness of introducing the influenza vaccine, and the influenza burden. In particular Caribbean countries should increase the number of specimens referred to CAREC for laboratory diagnosis and this will in turn enhance knowledge about type-specific virus circulation in this sub-region.

2. For countries without national vaccination policies, it is recommended that the disease burden and the economic impact of the annual epidemics be evaluated as a basis to

formulate and apply influenza prevention policies in the context of other national health priorities. Further, the costing and economic analysis tools developed through the ProVac Initiative should also employed by countries to assist with building of relevant evidence on this topic.

3. Countries using the vaccine should generate vaccination coverage data and document their experiences and lessons learned from targeting high-risk groups.

4. Countries are urged to maintain updated pandemic preparedness plans. The involvement of EPI managers is critical in the implementation of pandemic preparedness plans at a local level, including timely delivery of vaccines, if available.

COMMENTS ON THE DISCUSSION

Following the presentation there was a discussion on the composition of the seasonal vaccine and of differences between cell types and manufacturing methods for the seasonal vaccine and the pandemic vaccine.

Both Northern Hemisphere and Southern Hemisphere seasonal influenza vaccines contain three types of inactivated viruses designated influenza A/H1N1, A/H3N2, and influenza B. Although the two vaccines have been similar, in recent years, there are frequently slight differences in their composition. Further characterization of additional specimens collected in the Caribbean sub-region is needed to determine which vaccine is most appropriate for the area. New types of vaccines based on split-cell antigens and sub-unit vaccines may be available in the near future. Finally, the push for additional vaccine production capacity for pandemic influenza vaccines has led to the development of cell-culture production methods that can also be adapted to the production of seasonal vaccine, thereby eliminating potential vaccine shortages as well as the risk of allergic reactions to egg protein found in the current influenza vaccines that are grown in eggs.

2. Caribbean Perspective - Influenza

Surveillance for influenza disease exists in the countries, but reporting has been based on clinical rather than laboratory diagnosis. In 2007, as part of the routine immunization programme, approximately 14 countries had seasonal influenza vaccine for select at risk population. For 50% of the countries this was the first introduction of the vaccine in the public sector health schedule. Because of the threat of influenza pandemic and avian influenza, countries have been asked to enhance influenza surveillance. The emphasis is for as many influenza cases as possible to be laboratory diagnosed and appropriate epidemiological information collected. The proposed enhanced surveillance will involve sentinel surveillance sites in 7 countries. The surveillance system for severe acute respiratory infection (SARI) has started in 4 countries in 2007.

RECOMMENDATIONS

1. All countries should strengthen the surveillance for influenza and pneumonias.

2. EPI Managers of the 7 countries, proposed as study sites for enhanced influenza surveillance, are to be asked to assist in coordinating this study.

3. All Ministries of Health of countries are being encouraged to offer annual seasonal influenza vaccine to populations deemed high risk of the disease.

3. Varicella

Varicella vaccine is part of the public sector schedule in two countries and in one country, the vaccine is offered to health care workers. Many countries are desirous to introduce the varicella vaccine in the public health sector, but they have found the cost of the vaccine prohibitive.

RECOMMENDATION

Where funds are available countries should try to vaccinate their at-risk susceptible population.

CONFRONTING NEW CHALLENGES

I. VACCINES – CHARTING THE WAY FORWARD

Over the past decade, many new vaccines have become available and criteria have to be used by Ministries of Health to define the vaccines to be introduced. Some criteria that should be used for introducing new vaccines are their availability, their affordability, whether persons and staff accept them; whether alternatives exist; the disease burden; whether they are effective, cost-effective; and the feasibility of introducing them (A4DEF vaccine score 0-7). Is it worth it? (epidemiology, effort, cost), is a question that needs to be answered. The score system was suggested.

High mortality has been suggested as a rationale for immunization interventions and disease related criteria (such as morbidity, mortality, DALYs) have been used for categorization by WHO.

Some factors to be considered for the introduction of new vaccines are policy issues (example, disease burden, public health priority, cost effectiveness) and programmatic issues such as programme capacity, supply availability, and logistic issues. Economic and financial issues are extremely important for countries such as those of the Caribbean Community since budgetary constraints always exist.

The way forward requires a revolutionary shift in policy to recognize the true value of vaccination programmes, an evidence-based approach, new financing mechanisms to be developed, getting the insurance companies to buy in, and sustaining immunization programmes in the context of overall health programmes. A special task force needs to be established to marshal the evidence, commission the research, and prepare a strategy to convince policy makers of the value of introducing the new and under utilized vaccines.

1. The ProVac Initiative

The foundation of the ProVac Initiative encompasses the relationship between the potential health gains of new vaccines and the financial and logistical resources required to introduce these vaccines in a sustainable manner. While the use of new vaccines presents additional opportunities to reduce morbidity, mortality, and health inequities, they will demand significant increases in the budgets of national immunization programs. Policy-makers challenged with the question of how best to commit resources to health in their country must have the evidence necessary to balance the numerous factors that determine the optimal interventions to meet their health priorities. With the new, more expensive vaccines becoming available to tackle important public health priorities, such as the prevention and control of cervical cancer, the breadth of evidence necessary to make informed decisions about their possible introduction must be much

broader and more comprehensive. The ultimate objective of ProVac is to ensure that the decisions regarding new vaccine introductions are supported by all necessary evidence and that their outcomes result in the greatest sustainable health impact with the resources available.

To that end, PAHO will be supported by its current base of partners, such as the Bill and Melinda Gates Foundation, to implement a plan of action that will assist countries to address these issues.

Accordingly, this initiative seeks to accomplish the following objectives over a five-year period:

- **Strengthening infrastructure or process:** Countries will have functional advisory boards of national experts for immunization and vaccine introduction.
- **Developing tools for the analyses:** Countries will have methodologically sound and peer-reviewed frameworks and models for estimating disease burden, program costs, and cost-effectiveness available, and the necessary training materials and technical expertise for their use.
- **Strategizing sub-regional impact:** Sub-regional strategies should be defined so the minimum burden of research is able to provide comprehensive evidence for all countries. Countries should not feel obligated to do all analyses for all vaccines, but rather select those for which regional or sub-regional evidence is not sufficient to foster national decisions.
- **Collecting data collection and analysis:** Countries are collecting the essential national or sub-regional data to allow for the estimation of disease burden, program costs, and cost-effectiveness analyses using standardized methods.
- **Making evidence-based decisions:** Countries are making decisions considering the different components of the framework for vaccine introduction decision-making.
- **Effectively planning for introduction:** Countries have comprehensive costed plans for new vaccines that incorporate a plan for sustaining finances to support introduction.
- **Promoting partnerships:** Durable partnerships will be built to provide ongoing support to countries long after project determination.

2. Rotavirus Vaccines

Two rotavirus vaccines, namely, Rotarix and Rotateq, are licensed and are currently available for use in young children. To date, eight countries in the Americas have introduced these antigens in their national immunization schedules. More than 2.7 million doses of rotavirus vaccine have been administered in Brazil, El Salvador, Mexico, Nicaragua, Panama, and Venezuela, since March 2006. The observed rate of intussusception associated with these vaccines is currently within acceptable limits of 1 case per 10,000 doses of vaccine administered. Although both rotavirus products are highly efficacious in reducing the severity of rotavirus gastroenteritis, this only represents a fraction (40% or less) of the total diarrhoeal burden occurring in countries. Extensive review of the scientific literature as well as the regional rotavirus surveillance system indicates that although P[8]G1 is the most frequent circulating rotavirus genotype in Latin America and the Caribbean, there are some unusual types, such G12 P[6] which are not contained in the vaccines, but circulate in the Caribbean. In order to continue to build an effective rotavirus surveillance platform, the PAHO-CAREC EPI team has requested the full support and co-operation of the Regional Immunization Unit with the provision of the appropriate laboratory diagnostic kits.

It is strongly suggested that Caribbean countries should continue to use preventive modalities, including the promotion of oral rehydration therapy as well as the education of mothers and other childcare givers about oral hydration, while governments attempt to improve water availability and sanitation.

RECOMMENDATION

At this time, there will be no sub-regional recommendation for rotavirus vaccine introduction. However, for countries, such as Guyana, where sanitation and water availability are challenging, it is recommended that feasibility and cost effectiveness studies be undertaken, in order to gather appropriate evidence to inform decisions regarding rotavirus vaccine introduction.

Given the challenges associated with the collection of stool samples in general, laboratories should attempt to increase their testing efficiency by screening more broadly for enteroviruses rather than less narrowly for rotaviruses only.

Overview of Rotavirus Surveillance in CAREC Member Countries

Analysis of the data generated by the prospective surveillance rotavirus gastroenteritis in sentinel hospitals in the countries of Guyana, Suriname, and St. Vincent and the Grenadines, as well as outbreak investigation in Haiti, Jamaica, St. Lucia, and Trinidad and Tobago was presented and summarized as follows:

Acute gastroenteritis in children under 5 years of age represents 13% of all outpatient visits and 17% of all hospital admissions in St. Vincent and the Grenadines. Similarly, in Suriname 24% of all admissions were attributed to gastroenteritis.

The analysis of 892 specimens collected from 2006 to July 2007 indicated that rotavirus was responsible for 24% of gastroenteritis in hospitalized children. This is a reliable indicator of the significance of the disease from the medical and economic point of view. Children from 6 months to 36 months of age experience the highest frequency of rotavirus gastroenteritis that requires hospitalization. The temporal distribution of rotavirus follows the expected pattern for tropical countries, with peak periods between May to August. The rotavirus serotypes prevalent in the sub-region were G1P [8], G9P [8] G3P [8]. Globally, these are among the more prevalent serotypes. Two rare serotypes, G8P [8] and G12 P [6], circulated in Suriname from 2004-2006 but were replaced by G1P [8] G2P [6], G2P [4]. These results provide very useful information on rotavirus epidemiology in the Caribbean and may influence health care providers and policymakers in deciding whether to include rotavirus in the childhood vaccination schedule.

Rotavirus Study - Suriname

A prospective study is being conducted to investigate the burden of acute gastroenteritis in children less than 5 years of age and determine the rotavirus serotypes circulating in Suriname

Two hundred and seventy five stool specimens along with clinical data were collected from hospitalized children with acute gastroenteritis in two sentinel hospitals in Paramaribo from August 2004 to May 2006. Specimens were tested for rotavirus group A using antigen ELISA and genotypes identified by RT-PCR using specific primers.

Acute gastroenteritis represented 15% of the outpatient visits and 18% of all admissions of children less 5 years of age. Rotavirus group A was found in 22.2% of the hospitalized children with a peak incidence (63%) between the second and third years of age. Rotavirus was detected in almost all months during the study period with a strong peak between May to July 2005. The most frequent genotype identified were G8[P8] (75%) followed by G12P[6] (20.8%).

The finding of two novel rotavirus genotypes (which are not included in the available vaccines) prevalent in Suriname demonstrates the need for continued monitoring of the dynamics and global distribution of different rotavirus strains.

3. Pneumococcal Surveillance and Vaccine Use

WHO estimates that pneumococcal disease causes 1.6 million deaths annually, of which 800,000 occur among children aged <5 years. Therefore, pneumococcal disease ranks as one of the greatest public health priorities. Pneumonia is one particular presentation of invasive pneumococcal disease that accounts for most of the disease burden.

However, the challenge of the diagnosis of pneumonia and other invasive presentations and then attributing the cause to pneumococcal infection is critical to understand when considering the results of the vaccine efficacy trials. The end points used for measuring vaccine efficacy range from serotype results of cultures (the most specific but less sensitive) and case definitions limited to clinical data (more sensitive and less specific).

The currently available pneumococcal vaccine is a combination of 7 serotypes (of the known 90) polysaccharides individually conjugated to carrier proteins. In the United States of America (USA), the 7 serotypes contained in the vaccine account for >80% of the disease burden of invasive pneumococcal infection. Controlled, clinical trials have been conducted in Northern California, Finland, and Native American populations of Alaska and the Southwest USA. Efficacy against invasive pneumococcal disease caused by serotypes contained in the vaccine is >93%. Protection against pneumonia documented by consolidation on an X-ray was found to be 20.5%. Efficacy among Native Americans against pneumonia with clinician intent to treat was 83%.

In the USA the vaccine was licensed in February 2000, followed subsequently in the same year by recommendations for administration to all children aged <2 years and high-risk children aged 2-4 years. The initial stages of vaccination was complicated with vaccine supply shortages from August 2001 to May 2003. By 2004, 73% coverage had been achieved in the USA. As a consequence, invasive pneumococcal disease among infants aged <1 year declined 77% from baseline levels, declined 82% among infants aged 1 year, and 75% among 2 year-olds. Data also suggested a substantial decline in isolates resistant to penicillin. Secondary benefits through herd immunity were also documented as a 34% reduction in invasive disease incidence among 65+ year-olds, and 48% reduction among 18-39 year-olds.

Surveillance data from PAHO's SIREVA Plus network of laboratories throughout the Caribbean and Latin America suggests that the 7-valent vaccine could potentially prevent 59% of all isolates detected from patients with invasive disease. In these countries, it has been estimated that 2 children aged <5 years die every hour. Therefore, the currently available vaccine could potentially prevent at least one of those deaths every hour. It is expected that WHO will pre-qualify the vaccine for Revolving Fund purchase by the end of this year.

RECOMMENDATION

The introduction of pneumococcal vaccine should be governed by the guiding principles of ProVac, which helps ensure sustainable immunization approaches to addressing public health priorities. Surveillance is a key underpinning of this process. The GAVI Alliance has already committed to providing resources to PAHO's GAVI-eligible countries for the introduction of pneumococcal vaccine.

4. Pneumococcal Serotypes & Antibiotic Resistance in CAREC Countries (1999–2006)

The invasive bacterial infection surveillance system was implemented in 5 countries of the sub-region, in 1998. The focus of this surveillance was on invasive bacterial diseases mainly pneumonia, meningitis, and septicemia. As of 2000, the countries were required to report, weekly and annually, all cases of bacterial meningitis, Hib meningitis, *Neisseria meningitidis* meningitis,

non-specific meningitis, bacterial pneumonia, streptococcal pneumonia, Hib pneumonia. In addition to reporting, countries are referring pneumococcal isolates for characterization or serotyping.

The data from passive surveillance of invasive bacterial diseases gathered over a 7-year period in the Caribbean can be used to address the two key questions, which are, namely, (1) does the Caribbean need to adopt the pneumococcal conjugated vaccine for children under 2 years of age? and (2) would the current 7-valent vaccine be effective against the serotypes currently circulating in the sub-region?

An examination of 185 clinical specimens containing *Streptococcus pneumoniae* shows that antibiotic resistance is a growing problem in the Caribbean. Among children under age 6, which includes the target population for routine immunization, 34% of the isolates were partially or completely resistant to penicillin. For older children in the 6 to 14 year-old age group, resistance was even higher, at 63%. In addition, this age group also showed the greatest increase in resistance over the 7-year period of surveillance. In general, antibiotic resistance was greater in specimens from children than from adults.

The most common serotype found in the Caribbean specimens was 14, which was the most common serotype among all age groups. The next most common serotypes were 6B and 23F. All three of these serotypes are found in the 7-valent vaccine. Overall agreement between the circulating serotypes and the vaccine serotypes was highest for younger children, 79%, and for older children, 72%.

Only 2 countries have implemented routine use of the 7-valent conjugate vaccine. Some countries are using the 23-valent polysaccharide vaccine for at-risk populations. The major limitation to routine use of the 7-valent conjugate vaccine, in childhood EPI programmes, is the cost of the vaccine. In most other countries, the conjugate vaccine is available in the private sector for those with the ability to pay.

RECOMMENDATIONS

1. Every effort should be made to ensure that all admitted suspected cases of pneumonia with bacteremia have a blood culture and sensitivity (c/s) and Chest X-ray (CXR) done (usual management) prior to antibiotic treatment. All suspected cases of bacterial meningitis should have blood c/s and CSF gram stain and c/s.

2. All isolates of Hib, *Streptococcus pneumonia* and *Neisseria meningococcus* should be referred to CAREC for characterization (serotyping) if this cannot be done at country level. Where these tests can be performed in country, then the summary results should be forwarded monthly.

3. The sub-region should rationalize the use of the pneumococcal conjugate vaccine for high risk children.

4. Surveillance should continue to assess circulating types and antibiotic resistance patterns.

5. Human Papillomavirus Vaccine

Two HPV vaccines, namely Merck's Gardasil and GSK's Cervarix, are currently available in the global marketplace. Both of these products have excellent safety and tolerability profiles; both have demonstrated high immunogenicity and high efficacy to prevent genital infection and disease caused by specific HPV types; and the public health application of both has been deemed to be very cost-effective. Even though the public sector price of these vaccines is

unknown at this time, it is likely that their costs will be significantly higher than that of other new vaccines, such as rotavirus and pneumococcal vaccines. Hence, the issues of financing and financial sustainability will be critical to any discussions about the introduction of these vaccines.

In order for informed decisions on this matter, countries must gather and analyse pertinent evidence on the epidemiologic burden of HPV infections and associated disease; the economic costs of this burden; the introduction of HPV vaccines and their cost-effectiveness; the costs of other currently available preventive interventions and programs, etc. Additionally, countries will need to (1) build partnerships and consensus around the issue of comprehensive cervical cancer prevention and control; (2) heighten awareness across all population sectors about cervical cancer and its preventability through education and social communication; and (3) advocate for the allocation of resources to ensure that the new technologies for cervical cancer prevention (vaccination and screening) are available, affordable, and accessible by all women.

The Ministries of Health of the Caribbean Community are very interested in the HPV vaccine introduction, as this sub-region bears the highest cervical cancer burden in the Americas. However, the need for clear evidence to guide our public health decisions in this area is well recognized. Against this background, the Caribbean countries are planning the following:

- To undertake specific cost-benefit, cost-effectiveness, and cost of illness studies so as to generate a sub-regional perspective on the pertinent issues;
- To undertake HPV DNA prevalence studies in general populations of women residing in Trinidad and Tobago and Jamaica;
- To evaluate HPV type-specific prevalence in a consolidated Caribbean sample of cervical cancer cases, utilizing tissue blocks from cancer registries and pathologists

RECOMMENDATION

The Regional Immunization Unit should mobilize resources to assist the sub-region with gathering the required evidence for informed decision-making regarding HPV vaccine introduction.

IV. OTHER TOPICS

A. REGIONAL STAKEHOLDERS HPV MEETING, BARBADOS, 12-14 JUNE 2007

The regional stakeholders meeting was held to discuss issues related to the HPV vaccine introduction into the regular vaccination schedule in the countries of the Sub-Region. The objectives, methodology, and topics presented and discussed were highlighted. For the meeting, the participants were divided into four working groups with each tasked to discuss a specific topic and to develop recommendations.

The topics assigned were as follows: Policy issues - Gathering the evidence re introduction of HPV vaccine, Proposed HPV vaccination programme and policy, Improving cervical cancer information systems, and Proposed HPV laboratory network and research studies.

Following deliberations, recommendations were made and the way forward was mapped out. This can be highlighted as the following:

- Cervical cancer prevention and control must be a high priority programme in the CMCs since cervical cancer is a leading cause of mortality and presents a high burden of disease.

- HPV vaccination as a primary prevention strategy should be used as a catalyst to improve the programme and so ensure that necessary conditions for its introduction will be supported by all governments.

- The summary of the presentations, group work, and crucial discussions and proposed studies to ensure evidence-based decisions are detailed in the report of the meeting which should be sent to all relevant stakeholders for their information and necessary action.

- Countries are expected to initiate discussions with stakeholders and define the plan of action for appropriate data collection.

All EPI managers were encouraged to take an active role in the process towards introduction of the HPV vaccine into the regular vaccination schedule.

CONCLUSION

The immunization programme continues to make progress, although facing major challenges of increasing and sustaining high vaccination coverage. Effective management and supervision of the programme remain major goals of the programme. We would like to acknowledge the tireless efforts, which have been made by the committed and dedicated health practitioners to reach and protect all children of the region.

B. THE PREVALENCE STUDY OF HIGH RISK TYPES OF HPV AMONG WOMEN IN TRINIDAD AND TOBAGO PILOT PHASE 2007

Cervical cancer is a public health challenge in Trinidad and Tobago. The advent of an HPV vaccine approved by the FDA and the growing interest of the population in HPV and the vaccine, stimulated the development of a partnership among the Ministry of Health, the Caribbean Epidemiology Centre, The University of the West Indies (Eric Williams Medical Sciences Complex), the Trinidad and Tobago Cancer Society, and the Public Health Agency of Canada to carry out a study. The study aimed at determining the high-risk HPV types prevalent in the female population. To prepare for this, a precursor pilot study was undertaken to assist in the calculation of sample size, refine study logistics and assess laboratory readiness.

A convenience sample of three hundred and ten (310) women, between the ages of 18 and 65 years, from three different sites, was enrolled in the study. Pap smears and materials for HPV studies were taken. The PAP smears were read in Trinidad as were the HPV Digene and PCR. The PCR was repeated in Canada where DNA sequencing was also done. All participants received their results and those requiring follow-up, received, and kept appointments with the gynaecologist.

Purchase of equipment and laboratory consumables as well as payment of staff amounted to approximately US $80,000. The study is on schedule and the final report will be available by March 2008, as planned. The results will be disseminated locally and published internationally.

Advances regarding HIV Vaccines

Aspects of the epidemiology, virus replication, immunology, and preventive strategies in relation to HIV infection were discussed. The Caribbean has the second highest HIV prevalence rate in the world after sub-Saharan Africa, with a HIV prevalence of 1.2%. Men who have sex with men have the highest risk for infection. HIV vaccine development has been extremely challenging due to diversity resulting from mutations and genetic recombinations.

Haiti, the Dominican Republic, Jamaica, and Puerto Rico were participants in an HIV vaccine trial utilizing the Ad5 HIV vaccine, which was produced by the Merck Company. This vaccine trial was recently terminated when it was demonstrated that the vaccine could neither reduce HIV acquisition nor reduce viral load. Whole inactivated, live attenuated, and live bacterial vector HIV vaccines have been ruled out as possible vaccine candidates. New HIV vaccine candidates must be developed and new trials must go ahead in order to find an effective HIV vaccine.

C. EPI MEETING OF ARUBA AND THE NETHERLANDS ANTILLES

The annual EPI meeting of Aruba and the Netherlands Antilles coincided with another PAHO organized meeting held in Aruba, with the main focus being measles, rubella, and CRS elimination activities in the Dutch territories. The type and quality of vaccine coverage and surveillance data needed to document the elimination of these diseases were presented and discussed prior to the specific discussions regarding immunization activities in each of the six territories. Immunization programs in all territories are functioning well in spite of certain constraints. The data presented by the countries strongly suggests that there is an absence of transmission of both measles and rubella viruses.

Surveillance for measles, rubella, and CRS needs additional strengthening. Reporting of cases and testing of specimens could be better coordinated with PAHO/CAREC. Susceptible groups for measles and rubella may exist in each territory and this needs to be studied further. The criteria for documentation and verification of the absence of measles, rubella, and CRS should come from PAHO, while the process for achieving those criteria should be developed within the Dutch territories and the Caribbean. This task will overwhelm the capacity of most territorial staffs and should therefore be conducted by Caribbean teams established through PAHO/CAREC prior to constitutional changes for the Netherlands Antilles due in December 2008.

DISCUSSION AND RECOMMENDATIONS

One of the major discussion areas of the EPI Meeting in Aruba and the Netherlands Antilles was the verification of measles and rubella elimination in the islands.

Verification of Measles and Rubella Elimination

1. Documenting the interruption of transmission and absence of measles, rubella, and CRS in the countries of the sub-region is essential for all the countries and necessary for the Netherlands Antilles before December 2008. The criteria for the verification process for the elimination of measles and rubella need to be developed by FCH/IM and the process to document the elimination require further discussion. Countries have to prepare the necessary data and documents ahead of time for the verification team. High vaccination coverage coupled with timely and effective surveillance system is required for maintenance of elimination.

2. St. Maarten requires a vaccination coverage survey for validating the accuracy of their coverage information.

3. The verification process may include the formation of international regional and sub-regional committees and national commissions where possible. Each country may not be able to form national commission, so establishing a sub-regional committee would be the best option for the Caribbean. The procedure similar to that used for the certification for poliomyelitis eradication could be used for the verification process.

4. The methodology used for the evaluation of the EPI could be used for the verification process in countries and if at all possible, other EPI activities should be integrated with the verification process. The EPI Managers would be part of the team and the implemented activities should not be more than 2 weeks.

It was suggested that the process be first implemented in the larger countries compared to the smaller countries. Technical and financial support is required for the completion of the proposed activities.

D. TRANSITION TO FAMILY IMMUNIZATION

The Public Health services in Barbados has gradually changed from the delivery of traditional public health care in the 1950's, with emphasis on maternal and child health care, to the delivery of family health services. This is a fundamental shift in the philosophy of health care. Public health care in Barbados is now delivered from a life cycle perspective. Groups that were previously marginalized, such as men and women outside of the childbearing age, and services which were not sufficiently delivered in the past, are now included as part of the regular service delivered by the public clinics.

The family immunization approach in Jamaica is similar to that in Barbados, using the life stages. It will be implemented via a systematic approach where all individuals have their immunization status assessed and given the necessary required vaccines.

There is the need for the development of the immunization packages for each stage and the re-orientation of all health care workers to family immunization as well as sensitization of the population.

While in Bermuda the programme seeks to be creative and harmonized the public and private sector programmes, the adult/seniors immunization schedule is being drafted. The areas of consideration are vaccine versus age and that the schedule should be easily understood, not only by the professionals, but also by the lay persons. The present information system will need to be amended to incorporate the additional data such as vaccination coverage and surveillance information.

E. STRATEGIES FOR INCREASING VACCINATION COVERAGE IN CARICOM MEMBER COUNTRIES

Attaining and maintaining high vaccination coverage will eliminate and reduce susceptible pool of persons and therefore, vaccine preventable diseases will not cause morbidity and mortality in the population. The strategies to increase vaccination coverage have to target areas such as frequency of vaccination services, access to service delivery, collaboration with partners in public and private sectors, monitoring system in place to review vaccination status and attrition rate, and the review of the evaluation system at all levels of the programme.

Some of the challenges to the programme are human resources, financial resources, and appropriate logistics for the terrain in countries. Requirements for success will entail that adequate human and financial resources, appropriate technology and infrastructure are in place to address the problems.

F. VACCINATION COVERAGE SURVEY – SURINAME

In order to assess the current status of vaccination coverage, detect discrepancies between actual and reported coverage figures and to look for possible solutions, the health authorities, with technical support from FCH/IM/PAHO and CAREC, implemented a vaccination coverage survey.

1. **Marowijne River Area in the Hinterlands (East Suriname).**

The target group of the children to be assessed was children older than one year and younger than 5 years of age. The general finding is that children are vaccinated later than the stated age on the vaccination schedule. The delay has resulted in the low vaccination coverage.

The survey also investigated the reasons mentioned for why the child did not complete the required vaccination schedule. The main reason mentioned for not completing the schedule was "No Personnel" (14.4%). Comparison of the officially reported vaccination coverage and that found from the survey, shows minimal differences between the figures for 3rd dose Pentavalent (DPT/HepB/Hib) that is, (83.4 versus 84.3%) and third dose OPV (84.0 versus 84.7%) respectively.

2. **Paramaribo (25 October – 2 November 2007)**

The strategy applied was survey of a random cluster of primary caretakers of children 12-23 months old, comparing the findings with official records to determine actual vaccination rates, and calculation of the vaccine coverage for this group.

Of the surveyed children, 91.5% had a vaccination card, while 4.4% did not have a vaccination card and 4.1% did not answer.

The general finding is the same as in the Marowijne survey, that children are vaccinated later than the stated age on the vaccination schedule. The children are not seen in the clinic when the vaccination is due.

In comparing the officially reported coverage figures by the RGD with the coverage figures found in the survey, a slight positive difference is seen between the official coverage figures and the percentages derived from the survey, for PEN-3 and OPV-3. A similar finding is observed for the coverage for MMR-1.

RECOMMENDATIONS

- Further investigation is required for the reasons for delay in the uptake of vaccination each time a vaccination is due.
- Identify the children with incomplete vaccination status using the vaccination register, in order to find and vaccinate them.
- Finalize the national vaccination administration system that is compatible with the systems of RGD and Medical Mission. This system will be able to keep track of the children born in Paramaribo but lost to follow-up when the family moves to the interior. Compatibility of the databases of the Medical Mission, RGD and the Bureau of Public Health should make it easier to track the children who were lost to follow-up.
- Implement appropriate actions to motivate parents to bring their children to the clinic when the vaccination is due. A well functioning vaccination registration and follow-up system at the clinic level would alleviate this problem.

Strong program management at all levels of the system is a prerequisite for major improvement of program performance.

G. NEW TOOLS: GEOGRAPHIC INFORMATION SYSTEMS

The participants were provided with a brief overview of the uses of a GIS software package (how to link a map with data), which could support both coverage and surveillance information from the immunization program. The current plan is to first train a member of the PAHO-CAREC team, while a survey is undertaken to asses current in-country GIS capacity; the location of that capacity, whether in the Ministry of Health or not; the types of maps available and training needs. It is envisaged that this process should be rolled out over a two-year period.

V. SURVEILLANCE AND IMMUNIZATION AWARDS

An 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, namely, 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.

Belize is the recipient of the 2007 Surveillance Award. Awards for the second and third places went to Dominica and Barbados, respectively.

The Henry C. Smith Immunization Award is 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 sub-region. His service in the region spanned 18 years. The immunization trophy is awarded to the country that has made the most improvement in EPI.

Participants at the 24th 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.

The 25th Caribbean EPI Managers' meeting will be held in November 2008.