THE EXPANDED PROGRAMME ON IMMUNISATION (EPI)

Henry Smith (with additional notes by Beryl Irons)

Introduction

The Expanded Programme on Immunisation (EPI) was established in the Americas at the XXV Meeting of the Directing Council of the Pan American Health Organization (PAHO) in September 1977. The initiative was to reduce morbidity and mortality due to common vaccine preventable diseases by developing and expanding permanent immunisation services within primary health care. These services existed to administer smallpox, tuberculosis, diphtheria, pertussis, tetanus and poliomyelitis vaccines, but the management system in the countries was unable to expand coverage to levels that would interrupt transmission of the vaccine preventable diseases. One exception was smallpox which was eliminated some decades before 1977 due to sustained compulsory vaccination over many years. In addition, vaccination coverage rates were neither recorded nor known, as there was no estimate or denominator of the population to be vaccinated. There was inadequate attention to ensure the vaccines were protected through a well-organised cold chain system to guarantee effectiveness when administered. Techniques of applying the vaccines were not always acceptable which resulted in unnecessary side effects and compromised immune response. Supervision was lacking and surveillance was not in place to determine impact of immunisation on the reduction of diseases for which vaccines were offered. Finally, there was no evaluation system in place to detect what progress was being made in increasing vaccination coverage to reach the target population.

Organisation

Shortly after the Resolution was passed by the PAHO/WHO Directing Council, Dr Ciro de Quadros, a PAHO/WHO Director of the Smallpox Eradication Programme in Ethiopia, was transferred in 1977 to set up and direct the first Expanded Programme on Immunisation Unit out of the PAHO/WHO Regional Office in Washington, DC. Among other responsibilities the office had to provide technical advice, administrative support and general guidance to the EPI programmes which were to be organised in the Region of the Americas, including the Caribbean.

In August 1977, Mr Henry Smith (Fig. 10.1), a WHO Technical Officer who had organised and managed a programme which successfully eliminated smallpox from Kenya in East Africa, was transferred to PAHO/WHO. He spent one month in PAHO/WHO Washington's office where he was briefed and asked to develop a plan to organise and implement what was to be the birth of the Expanded Programme on Immunisation (EPI) in the Caribbean sub-region.

The late Dr Patrick Hamilton was Director of the Caribbean Epidemiology Centre (CAREC) in Port of Spain, Trinidad and Tobago at the time. He was contacted and welcomed the idea to house the EPI Office at CAREC. He agreed to provide support and cooperation in every way possible. He further reiterated that CAREC with its laboratory and epidemiological capabilities would be essential to the programme for analysis of specimens and assistance in the surveillance of the targeted diseases. He also agreed to provide some administrative support in addition to the office space.

Mr Henry Smith arrived in September 1977 and took up his assignment as Immunisation Officer for the Caribbean based at CAREC, Port of Spain, Trinidad and Tobago. The countries for which he was responsible was the same nineteen countries for which CAREC was established to serve viz: Anguilla, Antigua and Barbuda, The Bahamas, Barbados,

Fig. 10.1. Mr Henry Smith, Immunisation Officer

Belize, Bermuda, British Virgin Islands, Cayman Islands, Dominica, Grenada, Guyana, Jamaica, Montserrat, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines, Suriname, Trinidad and Tobago and the Turks and Caicos Islands. Outbreaks of paralytic poliomyelitis were detected in the Dominican Republic and the Bahamas in 1977. This was an opportune time for CAREC with the Immunisation Officer to mount a special display at the Caribbean Conference of Ministers for Health in Guyana, alerting them to the role of the EPI in disease control. This made an impact and support for the EPI in the Caribbean was increased.

Management

After evaluating the country programmes in 1978, the Immunisation Officer found that the following management requirements should be put in place and function routinely:

- Each country should designate an Expanded Programme on Immunisation Manager (EPI Manager). This person would be responsible for the management of the National Programme on a routine basis and work in close collaboration with the Immunisation Officer at CAREC. The individual should preferably be a senior public health nurse or doctor who was already working in maternal and child health care at the national level with management and supervisory skills. This was accepted and by the end of 1978, all the countries gradually designated their EPI Managers and submitted their names to CAREC. It should be noted that this individual was already a Ministry of Health staff who did not received extra remuneration for this designation.
- The target population for immunisation should be estimated at the beginning of each year in each country. The figure should then be used at monthly intervals to monitor the progress of immunisation coverage rate and take action for improvement when progress was less than expected.
- Major efforts were made to ensure vaccines arrive from their manufacturers through a well-organized system which ensured they maintain their recommended low storage and handling temperatures at all times, prior to, and during administration (the cold chain system).
- There were occasions when children had to be turned away from health centres because vaccines were not in stock. It was therefore, necessary to carefully plan and order vaccines at the national level in sufficient quantities for distribution to all levels in a timely and orderly manner.
- Vaccine storage facilities and temperatures were inadequate and had to be improved and brought up to accepted standards.
- Cold boxes, vaccine carriers and other supplies required for transportation and storage of vaccines were insufficient, unsuitable and in some cases non-existent. This was an area where much was required to obtain funds and eventually necessary supplies. However, it should be noted that there was always a shortage of equipment and supplies in this particular area in many of the country programmes. This shortage was resolved in most cases by maximising the utilisation of what was available.
- Handling, storage and distribution of vaccines did not guarantee that efficacies were preserved, therefore, vaccine indicators and thermometers were required to monitor the process.
- Syringes, needles and sterilisation procedures were in some cases unsatisfactory. Disposable syringes with needles were gradually introduced into the various country programmes. By 1982, all countries were using disposable syringes and needles.

Yellow fever outbreak

In 1978, a yellow fever outbreak occurred in Trinidad. This resulted in the rapid introduction of yellow fever vaccine to persons living in the forested areas where the disease was detected and subsequently, within three months, over 85% of the total population of Trinidad was immunised and the outbreak had ceased. During the outbreak, the Government of Trinidad and Tobago, PAHO/WHO, CAREC and the EPI established an emergency committee, which implemented and coordinated all outbreak control measures. Weekly bulletins of progress were officially released in Trinidad and Tobago, to all Caribbean countries, and to PAHO/WHO for wider circulation.

Visitors travelling to and from Trinidad and Tobago were required to be immunised against yellow fever. PAHO/WHO, through CAREC, donated 30,000 doses of yellow fever vaccines, which were divided and distributed within seven days to all CAREC member countries to immunise would-be travellers to Trinidad. This was made possible

by Leeward Island Air Transport (LIAT) and British West Indies Airline (BWIA) who relaxed some of their rules to allow the Immunisation Officer to travel with and deliver the vaccine packages to the newly designated EPI Managers at their respective airports.

Since 1978, yellow fever vaccine became incorporated into the routine EPI in Trinidad and Tobago and so far, there has not been any further outbreak of yellow fever in humans. Prior to 1978, local official records show that yellow fever outbreaks occurred in Trinidad every ten to 15 years.

PAHO/WHO revolving fund

During the same year (1978) the PAHO Revolving Fund became operational. This fund was set up by PAHO to pool vaccines required for South and Central America as well as the Caribbean. The vaccine requirements for the entire region of the Americas, including the Caribbean, were estimated and ordered in advance by PAHO through a tender system from various reputable manufacturers. This initiative resulted in a significant reduction in the cost of vaccines. In some cases, the cost of some vaccines was reduced by 90% and the countries were assured of good quality vaccines delivered on time. In addition, the fund became a permanent system through which vaccines are still routinely purchased.

Vaccine cold chain

In addition to the PAHO/WHO Revolving Fund for the purchase of vaccines, it was imperative to ensure that the vaccines arrived in the countries through a well-organised cold chain system. This required that the vaccines be packed and shipped from the manufacturers to the countries at their recommended low temperatures. This was done. Manufacturers would inform countries through the PAHO/WHO Revolving Fund system three days in advance of the date when the vaccine would arrive in the country. The time and flight number of the airline on which their vaccines arrived would be forwarded to the country. In this way, vaccines could be collected promptly on arrival in their low temperature packages and taken to their respective cold chain storage facilities to ensure potency. From this point, countries distributed and administered their vaccines in a way that guaranteed potency and efficacy.

The first sub-regional meeting of senior nurses and EPI Managers was convened in St Kitts and Nevis in 1979 to explain the concept of EPI, targets and objectives, as well as to introduce and discuss in detail the contents of the five EPI Training Modules, viz: Introduction of the six targeted diseases, Vaccines, Cold Chain, Management and Evaluation. The EPI concept started with expanding immunisation services to include six diseases which were responsible for morbidity and mortality all over the world, mainly among children. The objectives were to eliminate or reduce these diseases through immunisation to the lowest levels possible. The six diseases were: diphtheria, pertussis, tetanus, poliomyelitis, measles and tuberculosis. The programme could further expand to include other diseases which were problematic in the countries and for which a safe effective vaccine was available.

Measles vaccine introduction and USAID assistance

Single antigen measles vaccine was introduced in the Caribbean EPI in 1979 and by 1980, all countries were administering this vaccine as part of their routine EPI effort. Also in 1979, USAID provided assistance to purchase cold chain equipment in 15 selected CAREC member countries that were unable to provide these essential requirements on a timely basis. In subsequent years (1980-1982), all nineteen countries received cold chain equipment provided through USAID.

First EPI Managers meeting

The first meeting for EPI Managers was held in Jamaica in 1981. This became an annual event held in a different country each year (Fig. 10.2.). The purpose of these meetings was to review their national plans of action using the group discussion approach, identify problems which affected progress, and develop new plans for the following year. Presentations and scientific updates were also given to acquaint managers with relevant developments in the area of immunisation.

The graphic chart

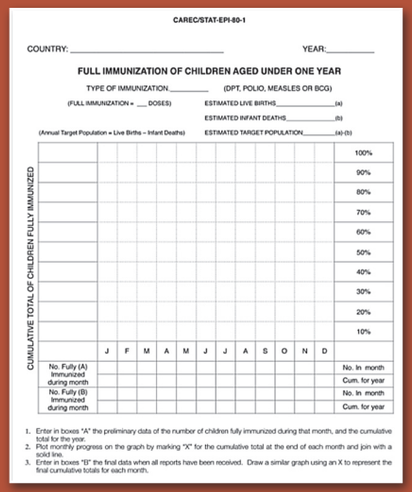
A graphic chart labelled CAREC/STAT-EPI-80-1 to monitor monthly immunisation coverage at all levels of the programme was developed in 1980 by the PAHO/WHO Immunisation Officer at CAREC. It has been accepted by PAHO/WHO as a useful tool to track and monitor immunisation coverage and was subsequently published in several PAHO/WHO documents and used in EPI programmes in many parts of the world. It has been used since 1981 to monitor immunisation coverage on a monthly basis in the Caribbean. (Table 10.1)

Poliomyelitis outbreak

An outbreak of poliomyelitis occurred in Jamaica in 1982 where were 58 reported cases. These were the last known cases of wild polio virus in the Caribbean sub-region. Prompt immunisation containment actions in collaboration with the Government of Jamaica and PAHO/WHO and EPI-CAREC, resulted in a successful termination of the outbreak during the same year 1982.

Fig. 10.2. Participants of the Sixth Sub-regional Meeting of EPI Managers held Barbados in 1989. The first meeting was held from 14 to 18 September 1981 in Kingston, Jamaica. Photo: Henry Smith.

Fig. 10.3. Dr Ciro de Quadros, Director of the immunisation programme for the Western Hemisphere for PAHO/WHO at the podium giving his opening address at the Annual EPI Manager's meeting in the French Island of Guadeloupe in the Caribbean, 1992. Mr Smith is seated to the right. (Photo: courtesy Mr Smith).



CAREC/STAT-EPI-80-1

COUNTRY: _____ YEAR:_____

FULL IMMUNIZATION OF CHILDREN AGED UNDER ONE YEAR

TYPE OF IMMUNIZATION_____ (DPT, POLIO, MEASLES OR BCG)

(FULL IMMUNIZATION = ___ DOSES) ESTIMATED LIVE BIRTHS_____(a)

ESTIMATED INFANT DEATHS_____(b)

(Annual Target Population = Live Births – Infant Deaths) ESTIMATED TARGET POPULATION_____(a)-(b)

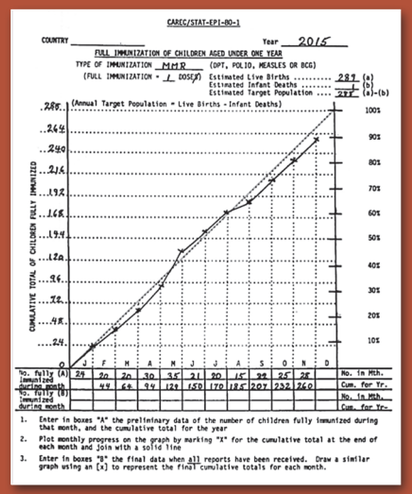
CUMULATIVE TOTAL OF CHILDREN FULLY IMMUNIZED

100% 90% 80% 70% 60% 50% 40% 30% 20% 10%

	J	F	M	A	M	J	J	A	S	O	N	D	
No. Fully (A) Immunized during month													No. In month
													Cum. for year
No. Fully (B) Immunized during month													No. In month
													Cum. for year

1. Enter in boxes "A" the preliminary data of the number of children fully immunized during that month, and the cumulative total for the year.
2. Plot monthly progress on the graph by marking "X" for the cumulative total at the end of each month and join with a solid line.
3. Enter in boxes "B" the final data when all reports have been received. Draw a similar graph using an X to represent the final cumulative totals for each month.

Table 10.1. A chart designed by the immunisation officer for use in countries. Blank chart at the top, theoretical (filled-out) chart below.



CAREC/STAT-EPI-80-1

COUNTRY _____ Year 2015

FULL IMMUNIZATION OF CHILDREN AGED UNDER ONE YEAR

TYPE OF IMMUNIZATION MMR (DPT, POLIO, MEASLES OR BCG)

(FULL IMMUNIZATION = 1 DOSE) Estimated Live Births ..... 287 (a)
Estimated Infant Deaths ..... 7 (b)
Estimated Target Population .... 281 (a)-(b)

(Annual Target Population = Live Births - Infant Deaths)

CUMULATIVE TOTAL OF CHILDREN FULLY IMMUNIZED

288 264 240 216 192 168 144 120 96 72 48 24 0

100% 90% 80% 70% 60% 50% 40% 30% 20% 10%

	J	F	M	A	M	J	J	A	S	O	N	D	
No. fully (A) immunized during month	24	20	20	30	35	21	20	15	28	25	25		No. in Mth.
		44	64	94	129	150	170	185	207	232	260		Cum. for Yr.
No. fully (B) immunized during month													No. in Mth.
													Cum. for Yr.

1. Enter in boxes "A" the preliminary data of the number of children fully immunized during that month, and the cumulative total for the year
2. Plot monthly progress on the graph by marking "X" for the cumulative total at the end of each month and join with a solid line
3. Enter in boxes "B" the final data when all reports have been received. Draw a similar graph using an (X) to represent the final cumulative totals for each month.

Poliomyelitis eradication launched

In 1985, PAHO/WHO launched the initiative to eradicate poliomyelitis from the Americas by 1990 (Fig.10.4). CAREC's laboratory service was extended to include all Caribbean countries which required support in diagnosis through analysis of specimens. Suspected cases were investigated with containment actions as soon as possible (within 48 hours) and stool specimen submitted to CAREC within five days, if possible.

Fig. 10. 4. A child being immunised against poliomyelitis by a nurse at a Health Centre, Port of Spain, Trinidad.

Each country was expected to provide to EPI/CAREC a report indicating whether or not poliomyelitis was suspected at the end of each week. When no suspected cases were detected, a nil report to EPI CAREC was required to certify that there were no cases in that particular week. This was the beginning of an active sensitive surveillance system - Polio Eradication Surveillance System (PESS) - to standardise epidemiological surveillance with hospitals, health centres, health posts, etc., geographically distributed all over the countries to detect, report and investigate suspected cases with laboratory analysis and to implement necessary control measures. As a result of high vaccination

Fig. 10.5. George Street Health Centre in Port of Spain, Trinidad. Educational films and talks are given to promote the advantages of immunisation against diseases and deaths. Mothers and children assembled on these routine occasions, asked questions and have their children immunised.

coverage and the active sensitive surveillance, polio was last confirmed in Jamaica, and also in the Caribbean sub-region in 1982. Subsequently, PAHO/WHO certified polio eradication from the Region of the Americas, including the Caribbean, in 1994.

Measles elimination launched

In 1988, CARICOM Ministers of Health resolved to eliminate indigenous measles from the Caribbean by 1995. The Minister of Health of the Bahamas played a catalytic role. Immediately, the sub-regional office EPI/PAHO started to develop a Plan of Action with the necessary resources to achieve the objective.

One year later, in 1989, the Plan of Action was approved by the Immunisation Technical Advisory Group (TAG) of PAHO/WHO. It included promotional and social mobilisation activities to involve all health staff and communities. All children from 9 months to less than 14 years of age were to be vaccinated with the measles vaccine during the month of May 1991 irrespective of prior immunisation history or having suffered from measles. The term “Big Bang” was used by the Immunisation Officer to describe the largest number of children (1.9 million) ever targeted for immunisation within a short period (one month) in the Caribbean. During the two weeks from 1 to 15 June 1991 the countries used the time to revisit areas where children were missed due to illness or other reasons. In this way, mop-up vaccination was conducted and measles vaccination coverage was further increased. The resulting coverage was that 94% of the 1.9 million target population of children 1-14 years of age were vaccinated. Because measles transmission was occurring in the Caribbean among the children of this age group it was thought that if they were all vaccinated in the shortest possible time with measles vaccine, there would be no susceptibles remaining to sustain transmission of the disease.

After a month of promotional and social mobilisation activities by all members of the health teams, the launching took place at a special meeting held in Barbados during the last week of April 1991. Several Ministers of Health were present from the countries, as well as representatives from the EPI (PAHO) in Washington, DC, and CAREC/PAHO. Mr Paul Keens-Douglas, a well-known talk-show comedian in the Caribbean, made a humorous presentation and the Minister of Health, Barbados then formally launched the campaign.

In September 1991, an active Measles Surveillance System (MESS) of patients with fever and rash illness was set up in all the countries in addition to the already 1987 on-going polio surveillance. These two systems received reports of suspected polio and measles at weekly intervals with laboratory specimens, case investigation forms as well as actions taken by all the member countries at weekly intervals. EPI-CAREC then summarised the reports with laboratory results and submitted them to PAHO Headquarters.

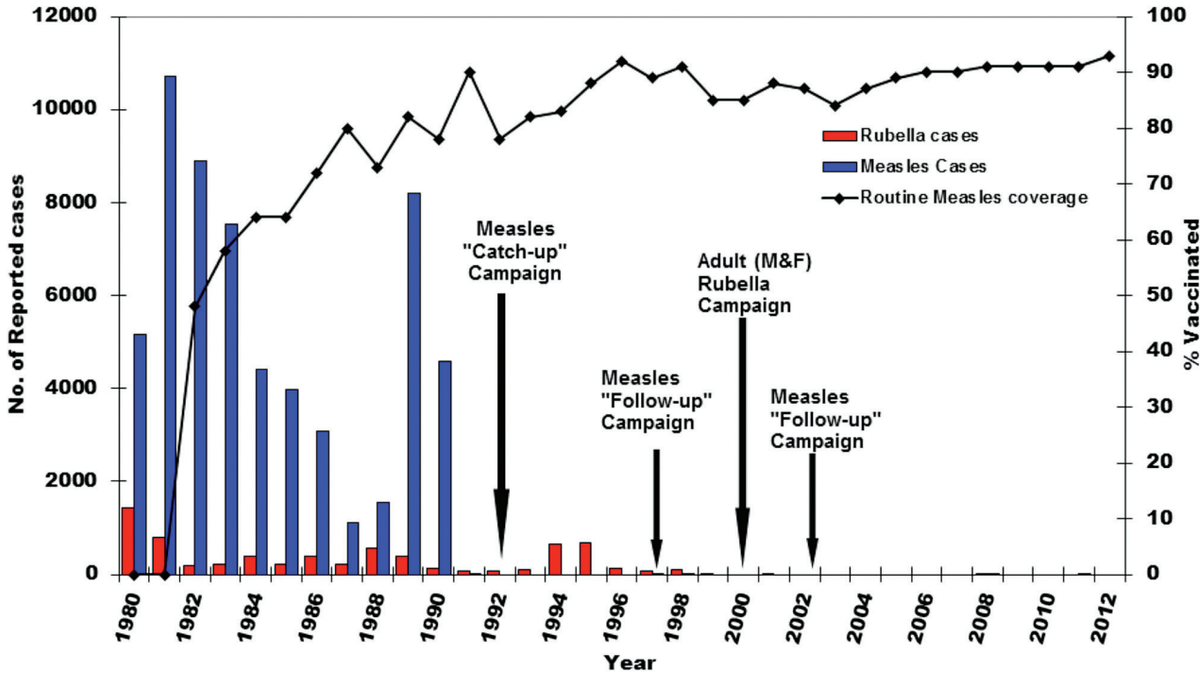
The summary reports were also distributed weekly to all the countries. As a result of the campaign and measles vaccination mop-up activities, the last cases (472) of indigenous measles in the sub-region were confirmed from 12 countries in 1991 (Table 10.2).

Jamaica implemented their campaign activities in a different manner compared to other countries in 1988/89. Jamaica had an outbreak of measles in school children

Table 10.2. Last Known And Reported Indigenous Measles by Country in 1991

COUNTRY	NUMBER OF CASES
Anguilla	1
Turks and Caicos Islands	8
British Virgin Islands	4
Bermuda	2
Dominica	6
Grenada	2
St Lucia	2
Belize	7
Barbados	2
Guyana	12
Trinidad and Tobago	118
Jamaica	308
TOTAL	**472**

Fig. 10.6 Impact of Rubella and Measles Elimination Strategies in CAREC Member Countries 1980-2012



Source: Rubella & Measles cases reported to EPI-CAREC.

and conducted measles mass campaigns (review and vaccination activities) in response. Therefore, in May 1991, they ensured that all children 9 months to 14 years had received at least one dose of the measles vaccine. There were no indigenous measles cases after vaccination activities in 1991 (Fig. 10. 6).

Immunisation coverage

In 1978, an attempt was made to access information on immunisation coverage by country, but it was either very poor or unavailable as can be seen on Table 10.3. Subsequently, in 1994, coverage with the same vaccines in the same countries had made significant improvements as shown in Table 10.4.

Table 10.3. Routine Immunisation Coverage in the English-Speaking Caribbean and Suriname 1978 *(CHILDREN ONE YEAR OF AGE)*

COUNTRY	CHILDREN ONE YEAR OF AGE % COVERAGE			
	BCG X 1	DPT X 3	POLIO X 3	MEASLES X 1
ANGUILLA	-	28	77	-
ANTIGUA and BARBUDA	-	60	53	-
BAHAMAS	90	94	99	45
BARBADOS	22	36	32	17
BELIZE	44	55	45	22
BERMUDA	-	40	37	*60
BRITISH VIRGIN ISLANDS	-	80	95	*85
CAYMAN ISLANDS	-	36	31	-
DOMINICA	-	55	20	-
GRENADA	…	…	…	15…
GUYANA	21	47	46	
JAMAICA	…	…	…	…
MONTSERRAT	96	65	63	98
ST KITTS and NEVIS	…	…	…	…
ST LUCIA	32	24	32	-
ST VINCENT and the GRENADINES	-	5	5	-
SURINAME	…	…	…	…
TRINIDAD and TOBAGO	…	…	…	…
TURKS and CAICOS ISLANDS	…	…	…	…

- Denotes vaccine not being administered in the Programme
… Information was not available
+ Measles vaccine was introduced in 1981
** MMR vaccine was in use*

Diseases reduction

Table 10.4 Routine Immunisation Coverage in the English-Speaking Caribbean and Suriname – 1994 *(CHILDREN ONE YEAR OF AGE)*

COUNTRY	% COVERAGE			
	BCG X 1	DPT X 3	POLIO X 3	MEASLES X 1
ANGUILLA	100	94	92	99
ANTIGUA/BARBUDA	-	100	100	92
BAHAMAS	-	91	91	88
BARBADOS	>5	90	91	97
BELIZE	90	88	83	X 90
BERMUDA	-	89	89	93
BRITISH VIRGIN ISLANDS	97	100	100	100
CAYMAN ISLANDS	97	95	96	93
DOMINICA	99	99	99	99
GRENADA	-	91	95	X 87
GUYANA	94	90	90	X 83
JAMAICA	100	93	93	X 82
MONTSERRAT	100	100	100	100
ST KITTS/NEVIS	>5	100	100	100
ST LUCIA	99	93	93	92
ST VINCENT and the GRENADINES	99	100	100	100
SURINAME	-	74	71	X 69
TRINIDAD and TOBAGO	100	85	85	86
TURKS and CAICOS ISLANDS	100	100	100	100

> 5 Denotes vaccine given to children 5 years and above in school
3. = Vaccine is not used in the national programme
X = MR vaccine was in use. All others used MMR
Target group for measles coverage was children 12 – 23 months of age.

Table 10.5. Cases of Tuberculosis, Diphtheria, Pertussis Tetanus, Poliomyelitis and Measles Reported in 1981.

COUNTRY	TUBERCULOSIS	DIPHTHERIA	PERTUSSIS	TETANUS	POLIO	MEASLES
ANGUILLA	…					
ANTIGUA/ BARBUDA	3	-	-	1	-	247
BAHAMAS	71		8			45
BARBADOS	3	9	12	7	-	1
BELIZE	31	9	12	7	-	1
BERMUDA	2	-	-	-	-	4
BRITISH VIRGIN ISLANDS	-	-	-	-	-	…
CAYMAN ISLANDS	2	-	-	-	-	2
DOMINICA	26	-	7	-	-	27
GRENADA	1	-	-	3	-	9
GUYANA	117	-	-	11	-	4
JAMAICA	104	16	18	9	-	5620
MONTSERRAT	…					
ST KITTS/NEVIS	4					
ST LUCIA	39	-	471	3	-	134
ST VINCENT/ GRENADINES	11	-	1	-	-	19
SURINAME	81	4	-	…	-	720
TRINIDAD AND TOBAGO	…	2	9	14	-	3601
TURKS AND CAICOS ISLANDS	-	-	18	-	-	16
TOTAL	**495**	**31**	**603**	**52**	**-**	**10,724**

- Denotes: No cases
… Insufficient information

Based on reports received at CAREC

Table 10.5 shows the cases of tuberculosis, diphtheria, pertussis, tetanus, poliomyelitis and measles reported in 1981. Table 10.6 shows the number of cases of the same diseases reported in 1994. With an active, weekly, high quality surveillance system in place to detect cases, it was possible to confirm that some diseases were no longer occurring. Poliomyelitis has not occurred since 1982, measles, since 1991, congenital rubella syndrome (CRS) since 1999 and rubella in 2001. Table 10.6 also shows no cases of tuberculosis or diphtheria detected and only six cases of tetanus and 16 cases of pertussis were reported in 1994. It is therefore, obvious that the high immunisation coverage which the countries achieved and sustained had the expected impact on disease reduction and elimination.

Expansion of the programme

Mr Henry Smith retired in 1995 after 30 years of service. He was given the PAHO/WHO Award of Excellence for serving and managing successful immunisation PAHO/WHO programmes (Fig. 10.7).

Fig. 10.7 Mr Henry Smith (right) is giving his "thank you" speech after receiving his PAHO/WHO award. Seated to Mr Smith's right is Dr F White, (CAREC's Director, Minister of Health (Trinidad and Tobago) Mr John Eckstein and other dignitaries. Photo courtesy Henry Smith.

Dr Abdelmalik M Hashim took over direction of the Programme from 1996 to April 1997. He successfully ensured through his administration,

Table 10.6 Cases of Tuberculosis, Diphtheria, Pertussis, Tetanus, Poliomyelitis and Measles Reported in 1994.
- Denotes: Reports submitted to CAREC, but no cases were found.

COUNTRY	CASES					
	TUBERCULOSIS	DIPHTHERIA	PERTUSSIS	TETANUS	POLIO	MEASLES
ANGUILLA	-	-	-	-	-	-
ANTIGUA and BARBUDA	-	-	-	-	-	-
BAHAMAS	-	-	-	-	-	-
BARBADOS	-	-	-	-	-	-
BELIZE	-	-	3	-	-	-
BERMUDA	-	-	3	-	-	-
BRITISH VIRGIN ISLANDS	-	-	-	-	-	-
CAYMAN ISLANDS	-	-	-	-	-	-
DOMINICA	-	-	-	-	-	-
GRENADA	-	-	-	-	-	-
GUYANA	-	-	5	-	-	-
JAMAICA	-	-	-	-	-	-
MONTSERRAT	-	-	-	-	-	-
ST KITTS and NEVIS	-	-	-	-	-	-
ST LUCIA	-	-	-	-	-	-
ST VINCENT and the GRENADINES	-	-	-	-	-	-
SURINAME	-	-	-	1	-	-
TRINIDAD and TOBAGO	-	-	5	5	-	-
TURKS and CAICOS ISLANDS	-	-	-	-	-	-
TOTAL	**-**	**-**	**16**	**6**	**-**	**-**

coordination and expertise from CAREC/PAHO, that all the EPI programmes in the sub-region continued to achieve their expected goals. After his tenure, Dr Beryl Irons (Fig. 2.9) took over in 1997. The Programme was expanded by the introduction of vaccines such as DPT/HepB/Hih (pentavalent) and pneumcoccal. Other vaccines such as HPV were also considered, but the cost was prohibitive for the Governments of the countries. Most countries have now provided protection against at least 10 diseases in their national immunisation programmes. The ten diseases targeted were: tuberculosis, diphtheria, pertussis, tetanus, polio, measles, rubella, mumps, Congenital Rubella Syndrome and hepatitis B. Others such as haemophilus influenza type B invasive disease were also introduced.

Dr Irons subsequently became Director of CAREC in January 2010, but continued to support the EPI programme. She was assisted by Mr Primnath Ritoe from Suriname and together they ensured the EPI programme maintained goals achieved and continued to progress.

After the measles mass vaccination campaign in 1991, and the two follow-up campaigns in 1996 and 2001 for children 1 – 5 years of age, it became evident that indigenous measles was eliminated (Tables 10.7 and 10.8). However, rubella persisted after 1991 in seven countries: Barbados, Belize, Bahamas, Guyana, Jamaica, Suriname, and Trinidad and Tobago. This could be attributed to rubella vaccine in the form of MR or MMR only being introduced during 1991 in some countries; and it was not until 1995 that all countries could afford to incorporate it in their national programmes. Therefore, most children had received measles vaccine up to 14 years of age, but not rubella. Consequently, rubella occurred in the children who did not receive MR or MMR. This pool of susceptibles infected a few younger ones who had no protection against rubella.

Table 10. 7. Measles and Rubella Coverage by Campaigns

YEAR	CAMPAIGN	AGE GROUP	COVERAGE %	VACCINE USED
1991	Measles Catch-up	9 months – 14 years	94	Measles, MR
1996	Measles Follow-Up	1 – 5 years	88	Measles, MR, MMR
1997 – 2000	Measles Follow-Up	1 – 5 years	94	MMR
1997 – 2001	Mass Rubella	20 – 39 years	86	MR; MMR

A mass rubella campaign was launched in 1997 to 2001 for adults 20 – 39 years of age to catch up on those who were born before the introduction of rubella vaccine. This had an impact as the last indigenous case of rubella occurred in 2001 in Belize. The last case of CRS occurred in 1999 in Suriname.

Rubella prevalence data, rubella and CRS cost-benefit analyses and cost-effectiveness of the mass campaign were presented to the officials of the Ministries of Health of the Caribbean Community in April 1998. The Council for Human and Social Development of CARICOM, resolved that every effort would be made to eradicate Rubella and prevent the occurrence of new cases of CRS in the Caribbean Community by end of the year 2000.

The surveillance system for CRS was enhanced in 2004 when TORCH testing was added to increase sensitivity of the system. The TORCH test measures the levels of an infant's antibodies against five groups of chronic infections: toxoplasmosis, rubella, cytomegalovirus (CMV), herpes simplex (HSV) and other infections,.

The Integrated Surveillance Information System (ISIS) for Vaccine-Preventable Disease was designed to provide a mechanism for data collection, initially for cases of polio, measles, and rubella. The objective of the ISIS is to facilitate availability of epidemiological information through development of specific modules, standardised databases, reports and indictors, and electronic information transfers between different levels and countries. It also provides epidemiological analysis at different levels, promoting the use of standardised variables for person, time and place, and facilitates dissemination of epidemiological information for timely decision making.

The six new member countries

In addition to the original nineteen CAREC member countries, the following six Dutch-speaking islands became new members in 1999-2000: Saba, St Eustatius, Bonaire, Aruba, Curaçao and St Maarten. Becoming one of the CAREC member Countries enabled them to access the technical cooperation in health that CAREC provided, such as laboratory services, epidemiology and immunisation. The 6th Annual Mini-EPI Managers' Meeting of the Dutch Caribbean was held in September 2012 in St Maarten.

Current Status

The Immunisation Programme remains a priority programme of the countries of the Caribbean Community and health practitioners continue to provide the required service to achieve set goals.

The major emphasis for the last five years was the documentation and verification of the elimination of Measles, Rubella and CRS. Other areas receiving high priority for the region include:

- Maintaining and attaining vaccination coverage of 95% or greater in administered antigens.
- Advocacy for the introduction of new and under-utilised vaccines, (e.g. pneumococcal), assistance with preparatory activities and plans for introduction as necessary, and maintaining and enhancing an effective, timely surveillance system to identify suspected cases for Mumps, Rubella, CRS and Acute Flaccid Paralysis (AFP).

Table 10.8 Summary of Achievement of Vaccination Strategies for Measles Elimination by CAREC Member Countries

COUNTRY	CAMPAIGN 9 mths-14 yrs (Catch - up)		AVERAGE ROUTINE COVERAGE 2001-2009 (Keep Up)(%)	2000-2001 CAMPAIGN 1-4 yrs (Follow-up)		INTRODUCTION OF ROUTINE MMR2
	Year	Coverage (%)		Year	Coverage (%)	Year
ANGUILLA	1991	99	97	2000	99*	2001
ANTIGUA and BARBUDA	1991	96	99	2000	91*	1997
ARUBA	Not done		93	2001	97**	1992
BAHAMAS	1991	87	91	2001	96	1997
BARBADOS	1991	96	91	2001	91	2001
BELIZE	1991	82	95	2000	95	2004
BERMUDA [a]	The group was already vaccinated		89	2001	85*	2005
BONAIRE	Not done		98	2001	83**	2001
BRITISH VIRGIN ISLAND	1991	90	92	2000	95*	1997
CAYMAN ISLANDS	1991	95	87	2000	90	1991
CURAÇAO	N/A		93	2001	97**	1991
DOMINICA	1991	95	99	2000	100	2000
GRENADA	1991	98	95	2000	88	2001
GUYANA	1991	98	92	2000	92	2000
JAMAICA	1991	84	84b	2000	95	2002
MONTSERRAT	1991	99	98	2000	99*	1997
SABA	Not done		98	2001	100**	1992
ST EUSTATIUS			98	2001	100**	1997
ST KITTS and NEVIS	1991	98	98	2000	99	1992
ST LUCIA	1991	97	94	2000	89	1999
ST MAARTEN	Not done		99	2001	96**	1998
ST VINCENT and the GRENADINES	1991	98	98	2000	90*	2001
SURINAME	1991	89	83	2000/1	96	2000/1
TRINIDAD and TOBAGO	1991	95	91	2001	96*	2001
TURKS and CAICOS	1991	100	95	2000	88*	2001

a Bermuda started using MMR vaccine in the 1970's and did not conduct a "catch-up" campaign
b For Jamaica coverage in 2003 and 2007 was less than 80%, mop-up activities were done in 2008. Data not included in the calculation.
*For countries not conducting "follow up" campaigns, coverage is calculated for *routine 2nd dose and MMR 1 dose for the Dutch Antilles***

The initial 19 English-speaking countries and Suriname continue to report surveillance data on a weekly basis. French Guyana started in 2003 and continues to report on time. The Dutch-speaking islands started in 2001, while the French-speaking islands, including St Martin started weekly reporting in 2010.

There are 728 reporting sites in the CAREC Member Countries. The surveillance indicators for 2011 revealed that:

- 99% sites reported weekly
- 99% received laboratory results in less than 4 days
- 97% of specimens of specimens discarded by laboratory testing
- 99% of cases were investigated within 48 hours
- 96% had adequate specimens taken
- 35% had specimens received at CAREC in less than five days

Surveillance and immunisation awards

An annual Caribbean Surveillance Award was established to recognise countries that had performed outstandingly on the surveillance component of their programme 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 EPI Managers' meeting.

The Henry C Smith Immunisation Award was established in 2004 in honour of Mr Henry C Smith, the first PAHO-EPI technical officer for the Caribbean sub-region. His service in the sub-region spanned 18 years from 1977 to 1995. The immunisation trophy is awarded to the country that has made the most improvement in EPI and is presented at the end of the EPI Managers' Meeting each year. The award was established in 2001 by EPI-CAREC on behalf of the Family and Community Health, Immunisation Unit at PAHO.

In September 1994, at the PAHO/WHO Regional Office in Washington, DC, the declaration of poliomyelitis eradication from the Region of the Americas, including the Caribbean, was announced by Dr Frederick Robbins, Chairman of the International Expert Committee for Poliomyelitis Eradication.

Donor agencies

There is no doubt that the EPI office at CAREC is a success story in providing technical assistance and coordinating CAREC Member countries in improving their immunisation programmes. The countries have also benefitted significantly from donor agencies through CAREC. PAHO/WHO provided technical staff and guidance from its Regional Office in Washington, DC, as well as funding. UNICEF provided many supplies and much equipment, USAID assisted with vaccines and some cold chain supplies, Rotary International provided polio vaccines for a number of years to all the countries, and the Canadian Public Health Association (CPHA) provided a specially equipped Land Rover with amenities such as hand-washing, designed for mobile outreach vaccination programmes. (Fig.10.8). In addition,

Fig. 10.8. Outreach Immunisation Programme in Trinidad, 1993. The Land Rover was specially fitted with sanitary hand-washing facilities, loud speakers, etc. A mobile team of vaccinators is sent to remote and hard-to-reach villages so that remote populations can receive their immunisations. The vehicle was specially designed and donated by the people of Canada to the Immunisation Programme in the Caribbean.

some financial assistance was provided for exchange visits and technical cooperation within and among the countries. There was also the Christian Children's Fund which contributed vaccine supplies through the PAHO/WHO Washington office. These donor agencies must be thanked for their generous donations. Their contributions have assisted significantly in making the EPI in CAREC Member Countries one of the leading programmes in the world. Poliomyelitis has been eliminated from the Caribbean since 1982 and eradicated from the region of the Americas since 1994. Indigenous measles was last confirmed in 1991, congenital rubella syndrome in 1999 and rubella in 2001. Tuberculosis, diphtheria, pertussis, and tetanus are virtually unknown in the CMCs.

Conclusion

Governments and populations are to be commended for their commitment and for ensuring that the vaccines are provided for its people, and in maintaining their countries free of indigenous cases of Measles, Rubella and CRS. The EPI continues to make progress while facing major constraints to increase and sustain high coverage for administered vaccines. Introduction of new and underutilised vaccines are major priorities, but the financial status of countries is a limiting factor.

Countries need, too, to be on the alert for the risk for the re-emergence of Measles and Rubella, and in this regard, the recommendations from the documentation and verification for the elimination of Measles, Rubella and CRS will be implemented. All healthcare providers will be involved in regular updates and sensitisation on the surveillance system.

Epi Milestones in the CAREC-Served Caribbean Area 1977 to 2012

1977 September	The Expanded Programme on Immunisation (EPI) was started with the appointment of an immunisation officer to organise, coordinate and provide technical assistance and cooperation to the countries.
1978 October	Revolving fund for EPI was approved to be established by PAHO. By the end of 1978, 13 countries from the English-speaking Caribbean had become members of the fund.
1978 December	All countries designated a manager to implement and coordinate the effort at the national level.
1979 December	First EPI Course in planning, management and evaluation was held for 34 senior nurses from 5 to 14 December in St Kitts. Sub-regional workshop for programme managers held at CAREC, Trinidad from 9-13 June 1980. The main objective was to improve immunisation coverage through better planning, management and evaluation procedures. Introduction of monitoring form for immunisation coverage throughout the English Speaking Caribbean and Suriname.
1981 September	First EPI Managers' Meeting was held in Jamaica from 14 to 18 September. Suriname - last vaccine associated case of poliomyelitis in the sub-region.
1982 June	Jamaica - last confirmed case of poliomyelitis reported in the sub-region.
1985	PAHO/WHO launched initiative to eradicate poliomyelitis from the Americas by 1990. CARICOM Ministers of Health resolve to eliminate indigenous measles by 1995. Plan of Action for measles elimination in the Caribbean approved by PAHO Technical Advisory Group. Jamaica - social mobilisation plans developed to support the measles elimination initiative.
1991 May	Measles Mass Vaccination Month "the Big Bang" to eliminate indigenous measles from the sub-region
1991 August	Last two confirmed cases of indigenous measles reported in the sub-region.
1991 September	Measles Surveillance System was established, commencement of weekly reporting of suspected measles cases. First measles-free year in the English Speaking Caribbean and Suriname.
1994 May	The sub-region certified Polio Free by PAHO/WHO.
1994 September	The Western Hemisphere certified Polio Free by PAHO/WHO.
1996 September	Five years without confirmed transmission of indigenous measles.
1998 April	CARICOM Ministers of Health resolve to eliminate rubella and congenital rubella syndrome (CRS) by the year 2000.

2008	Since the last indigenous case of measles, seven (7) imported cases have occurred to date, 2008.
2012	CAREC Member Countries continue to remain free of measles, rubella and congenital rubella syndrome, with a high quality active surveillance system in place.

Appendix

FIRST MEETING OF EPI MANAGERS IN JAMAICA IN 1981	
COUNTRY	EPI MANAGER
ANGUILLA	Nurse Vida Lloyd
ANTIGUA and BARBUDA	Nurse Inita Wallace
BAHAMAS	Dr Cora Davis
BARBADOS	Dr Vaughan Wells
BELIZE	Dr William Harley
BERMUDA	Nurse Diane Simons
BRITISH VIRGIN ISLANDS	Nurse Tatica Scatliffe
CAYMAN ISLANDS	Nurse Jacqueline Creary
DOMINICA	Nurse Olivia Williams
GRENADA	Nurse Cynthia Telesford
GUYANA	Nurse Enid Cholmondley
JAMAICA	Dr Alma Dyer
MONTSERRAT	Nurse Florence Daley
ST KITTS and NEVIS	Nurse Diana Francis-Delaney
ST LUCIA	Nurse Noreen Goddard
ST VINCENT and the GRENADINES	Nurse Stacey McKie
SURINAME	Dr R Godfried-Kranenburg
TRINIDAD and TOBAGO	Dr Norma Andrews
TURKS and CAICOS ISLANDS	Nurse Thelma Taylor
Note: All are first designated EPI managers	