

MEASLES IN DOUALA

B. Peters<sup>1</sup>, A. Delas<sup>2</sup>

INTRODUCTION

Douala, the largest city in Cameroon, is located on the coast and serves as the principal port for the country. It is primarily a commercial-industrial city which attracts people for business purposes for visits to relatives, and often for medical attention, from a radius of at least 100 kilometres. Measles is thus constantly being re-introduced into the city from distant towns and villages as children come to Douala to be treated or arrive in the city while incubating the virus.

The population of the city is estimated to be between 250,000 and 300,000. The population in the six month to six year age group is thought to be about 62,500 (25% of the population), and there are estimated to be 14,000 births annually.

History of measles prior to the campaign

As in other areas of West Africa, measles has, in the past, been one of the leading causes of childhood morbidity and mortality in the city. In 1965 and 1966, measles was responsible for 21% of all hospital admissions for transmissible disease. It ranked second only to malaria as a cause of death in children.

The pattern of measles in Douala prior to the introduction of the measles control programme can be seen in figure 1, which shows the number of cases hospitalized monthly at the Hopital Laquintinie from May 1959 to April 1968. The peak of the curve is usually reached during the dry season, between January and April, with a decline until the end of the year. Every two to three years the epidemic peaks are higher than in the intervening years. Over a seven year period prior to the vaccination campaign in Douala, the average number of cases admitted to this hospital was 322. This probably represents a little more than 2% of all cases occurring in the city.

Vaccination Campaign

In November 1966 the first measles vaccination campaign was conducted in Douala by the Service des Grandes Endemies and the PMI (Maternal-Child Health Centre). This is an out-patient centre opened in May 1965 which treats children from birth through the age of six years and sees about 25,000 children monthly. Following the mass campaign, the maintenance phase was turned over to the PMI which conducts monthly vaccination sessions at the Centre.

Table 2 shows the number of vaccinations given in Douala, by month, since the beginning of the programme. During the initial eleven day mass campaign, 47,816 measles immunizations were given. In this campaign, about 80% of the six month to six year age group of the target population was vaccinated.

During the following year, 1967, 10,315 maintenance vaccinations were given; in 1968, 20,581 children were vaccinated. It is estimated that 50% of these maintenance vaccinations were not effective for measles control since they were given to children who had already been vaccinated to those who had already experienced the disease, or to children who were visiting Douala from distant towns.

<sup>1</sup>Medical Officer Adviser NCDC/USAID, Yaounde, Cameroon

<sup>2</sup>Directeur des Grandes Endemies et de la Medecine, Cameroon

### Measles-since the mass campaign

Measles cases are seen and reported from two centres in Douala, the PMI and the Hospital Laountinie. Figures 1 and 2 show the curves for measles cases recorded at these two centres. From figure 1 one would have expected 1967 to be a particularly severe year for measles in Douala since it followed a year of relatively low incidence. However, during this year, which immediately followed the mass campaign, only seven cases of measles were admitted to the hospital, 2% of the average number of cases for the preceding seven years. The number of measles deaths fell from an average of 32 per year to nil. At the PMI, the number of cases which were seen also dropped to 2% of the preceding year. Thus, the mass campaign had an immediate and spectacular effect on measles morbidity and mortality in the city.

In 1968 there was a resurgence of measles. The epidemic curve was similar to that seen in the years before the campaign, with the peak occurring in the early months of the year. The cases numbered roughly 40% of the average number in years preceding the campaign.

During the first three months of 1969, cases were more numerous than in 1967, but they were still only about 15% of those seen in the years prior to the vaccination campaign.

The resurgence of measles in Douala in 1968, after a year of excellent control in 1967, can be explained both by the cases which came into the city from outlying, occasionally unvaccinated areas, (about one-third of the total), and by the steadily increasing number of susceptibles in the city.

### The measles susceptibles

In figure 2 we have presented estimates of the monthly increase in the proportion of measles susceptibles in Douala. Of the estimated 62,500 six month to six year old children in Douala, 47,816 were vaccinated in the mass campaign of November 1966, leaving approximately 14,000 unvaccinated. Of these 14,000, at least half were considered to be immune due to natural disease. One year later 14,000 new susceptibles had been added by birth to this pool. The Director of the PMI estimated that only 5,000 of the 10,000 vaccinations administered in 1967 were given to susceptible children resident in Douala. The remainder were given to children who were already immune or who were only visiting Douala. This means that of the 14,000 new susceptibles 9,000 remained so at the end of the year. These 9,000 were in addition to the 7,000 susceptibles remaining after the mass campaign. At the end of 1967 then there were an estimated 16,000 measles susceptible children in Douala comprising about 25% of the six month to six year age group. This susceptible pool was large enough to permit the resurgence of measles. It is noted that at the end of 1966 when only 11% of this age group was susceptible, there was good measles control for one year. It would appear that to maintain good measles control in this urban setting, one would probably have to maintain the susceptible pool somewhere below 2%.

Two facts should be noted concerning the cases which have occurred since the beginning of 1968.

1. The age of measles cases has decreased.

Workers at the PMI noted that the average age of those with measles was decreasing (table 2). Prior to the campaign, 28% of the cases seen were less than one year old and 16% were more than four years old. In the 1968 epidemic, the percentage of cases less than one year old had increased to 33.5% while those more than four years old had decreased to 8.5%. Finally, in the first three months of 1969, those less than one year old represented 44.5% of the cases and only 1.7% of the cases were more than four years of age. For Cameroon as a whole in 1968, 25.8% of cases occurred in the 0 to 1 year age group, and 16.7% in the over 4 year age group.

2. Measles has occurred in previously vaccinated children.

Since the beginning of 1968, we have seen a large number of cases occurring in children who are said to have been previously vaccinated. Of 1,427 cases seen at the PMI from January through April in 1968, 34% initially claimed to have been vaccinated. Careful questioning reduced this figure to 18% by eliminating those who, in reality, had received BCG or smallpox vaccine but not measles vaccine as well as those children who were vaccinated during the incubation period of the disease. Of the remaining cases, some may have occurred in children vaccinated with poor technique or with vaccine rendered impotent by breakdowns in refrigeration. Some children may have been vaccinated at a time when maternal antibody was still sufficiently high to prevent vaccine infection. It may also be that some of these reported cases merely represent mild reactions to the measles vaccine.

Conclusion

Although the mass campaign was an overwhelming success and proved the efficacy of mass measles vaccination, the maintenance campaign has been less successful in preventing recurrent measles outbreaks. There continue to be approximately 15,000 susceptible children in the population who, along with the unvaccinated children visiting the city, maintain the disease at a low level and allow for periodic measles outbreaks.

TABLE 1

Number of Measles Vaccinations in Douala November 1966 to March 1969

<u>Month</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>
Jan.		240	1422	6614
Feb.		190	2678	2334
Mar.		267	4110	368
Apr.		530	3180	
May		854	1688	
June		1451	1892	
July		1839	1867	
Aug.		2251	785	
Sept.		889	525	
Oct.		701	980	
Nov.	47816 (mass campaign)	725	921	
Dec.	389	378	533	
Yearly totals =	48205	10315	20581	9316 (through March)

TABLE 2

Age Distribution of Measles Cases seen at PMI, Douala  
Before and After Mass Vaccination Campaign

<u>Age</u>	<u>Nov. 65 - Nov. 66</u> <u>(6,000 cases)</u>	<u>Jan. 68 - Mar. 68</u> <u>(1223 cases)</u>	<u>Jan. 69-Mar. 69</u> <u>(290 cases)</u>
<1 year	28%	33.5%	44.5%
1 - 4 years	55%	58%	53.8%
>4 years	16%	8.5%	1.7%

FIGURE 1  
HOSPITALIZED MEASLES CASES IN DOUALA

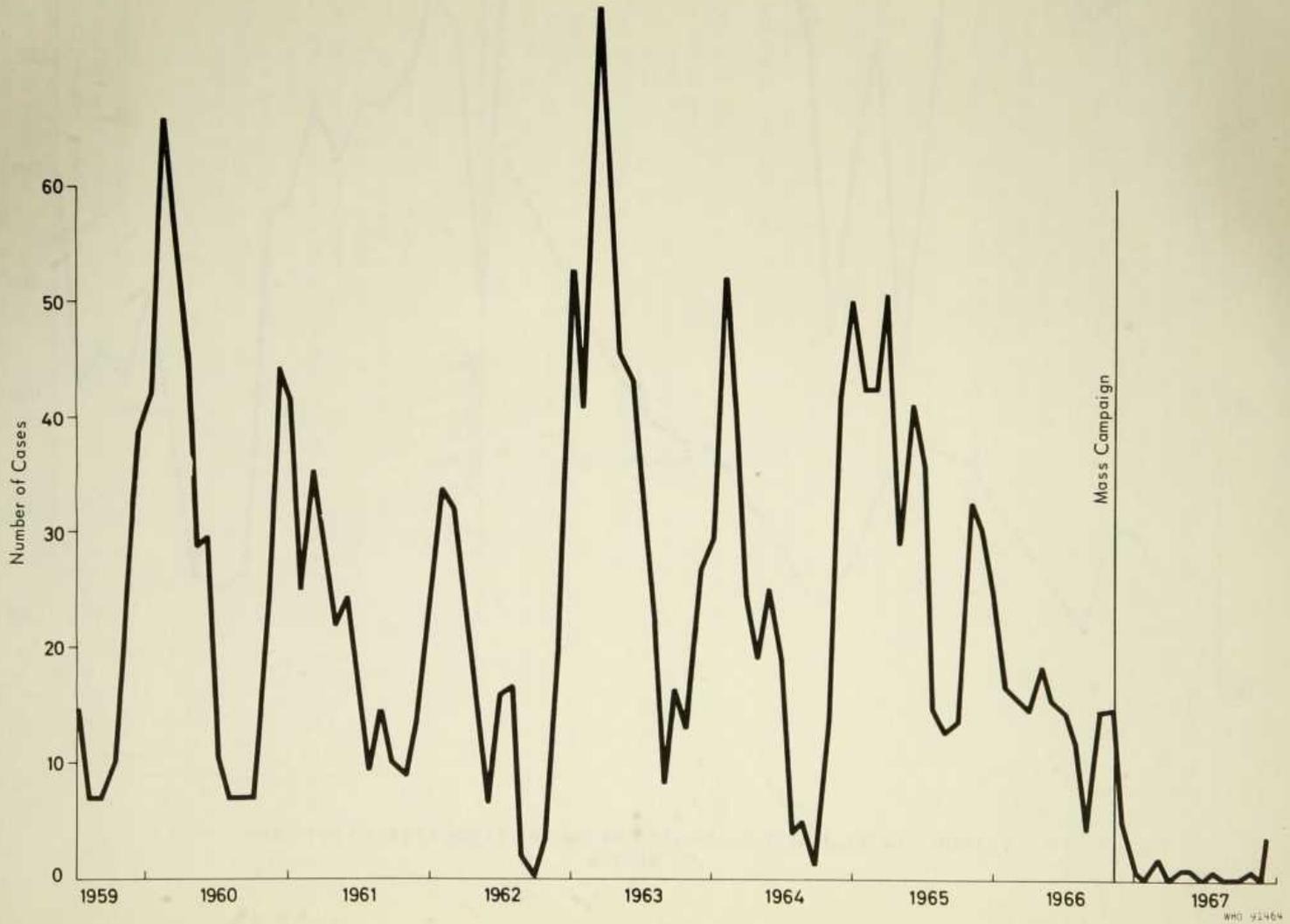


FIGURE 2  
MEASLES CASES REPORTED BY PMI AND ESTIMATED SUSCEPTIBLES - DOUALA

