

ALTERNATIVE APPROACHES TO MEASLES CONTROL USING FIXED CENTRES

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INTRODUCTION

Although a national measles reporting system does not yet exist in Liberia, the effect of the attack phase immunization programme in reducing measles morbidity and mortality can clearly be seen. The maintenance programme must attempt to preserve this effect in as efficient a manner as possible within the financial limits imposed.

The old notion, that the maintenance phase for measles control should begin after an entire country had finished its attack phase, has been discarded. The susceptible population increases so fast, particularly in urban and densely populated rural areas, that one cannot wait till the end of the attack phase to begin the maintenance programme.

Since measles maintenance programmes will continue for many years, it is obvious that they must fit into the future health planning of the country. This requires careful planning now!

APPROACHES TO MAINTENANCE OF MEASLES CONTROL

The most effective method for maintenance of measles control would be to immunize each child as he or she enters the age of susceptibility at about 6 months of age. This ideal approach however would be most difficult to put into practice for obvious reasons.

The next best solution would be to attempt to immunize as many children as possible upon entry into the susceptible age with or without a concomitant attempt to immunize the entire susceptible population by means of mass campaigns at certain intervals. This interval might be anything from 1 to 3 years. The efficiency of the programme in reducing measles susceptibles would decrease as the interval between campaigns increased. Dr. Millar in a recent computer study on measles immunization has concluded that a yearly cycle is necessary if measles transmission is to be interrupted. Measles then would cease to be an endemic disease and would occur only as sporadic outbreaks.

LIMITING FACTORS IN THE CONDUCT OF A SUCCESSFUL MEASLES CONTROL PROGRAMME

The demography and geography of a country will limit the possible approaches to measles control. Liberia has a population of approximately 1.1 million distributed over an area of roughly 97,000 km², with a population density by country of 3.7 to 38.3 persons per square km. About one-third of the population live in villages of less than 100 persons and the total number of towns and villages is approximately 14,000. Most of these villages cannot be reached by car. The number which would need to be vaccinated annually is only 5% of the total population or about 50,000 children. The problem then is not the number of children that must be immunized, but rather the difficulty and cost of reaching all the villages in which the children live.

THE LIBERIAN MAINTENANCE PROGRAMME

A Ten Year National Health Plan has recently been completed for Liberia. In the plan it is stated:

"The main objective of the plan is to provide health care for the people of Liberia within the financial resources of the Republic. In doing so,

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the primary concern will be to place greater emphasis on the prevention of disease and the promotion of health. In Liberia, the creation of a basic health structure from which services can be operated is essential for the promotion of any health activity. Therefore the first objective should be to provide this basic structure throughout the country, more particularly in the hinterland where the existing services are meagre."

This will be carried out through a system of:

1. Health posts
2. Peripheral Health Units
3. Health Centers at the County Headquarters

The Peripheral Health Unit (PHU) will be responsible for a population of 25,000 to 50,000. Its personnel will supervise the operation of the Health Posts in its area. More importantly, the PHU's will be responsible for immunization, health education, mass treatment programmes, etc. Although no PHU's exist at present, the intention is to make the maintenance phase of the smallpox-measles programme the predecessor of the PHU system. It will form the nucleus around which the other preventive programmes of the PHU can be built.

Forty-four existing government hospitals and clinics as well as some mission and concession hospitals and clinics have been tentatively selected as PHU sites. Each PHU will be assigned a specific geographic area of responsibility which will include certain clans or chiefdoms. Since it is financially impossible at present to hire new personnel to staff this system, personnel currently working in the country for the NPHS such as health inspectors and health assistants, will be used. They will devote part of their time to immunization and the remainder to their other duties. It was initially proposed that the 44 men assigned should visit each village once each year to immunize all children between the ages of 6 months and 6 years who had not previously been immunized against measles and to vaccinate all previously unvaccinated persons against smallpox. However, for 44 men to visit 14,000 towns and villages each year is impossible.

An alternative method was needed which provided immunization less frequently than once each year. Susceptibles would have to be allowed to accumulate, but where and for how long? Should the country be divided into 2 or 3 areas, each of which would be covered during one year? This would mean that each area of the country would accumulate susceptibles for 2 or 3 years and from what has been discovered in other programmes in West Africa, this would not have provided effective control of measles.

As a more feasible solution, it was decided that the larger towns should receive priority over smaller ones, particularly those of less than 100 population. This was done because of the following facts:

1. Measles is known to be more continuously present in the larger than in the smaller towns.
2. Larger towns are more exposed to importation of cases from other areas.
3. There is a tendency today for people to migrate from the more remote rural areas to larger towns.
4. The larger towns are more easily accessible by vehicle and the cost of immunizing 100 children in a larger, accessible town is less than the cost of immunizing a smaller group of children in a smaller, inaccessible village.

To decide on the best system, a detailed evaluation was made of the efficacy of six different approaches to a measles control programme as follows:

1. Immunization of all children as they become susceptible at age 6 months.
- 2,3,4. Immunization of all susceptible children on a one year, 2 year and 3 year cycle.
5. Immunization annually of all susceptible children in towns over 100 population and the remainder on a 3 year cycle.
6. Immunization annually of all susceptible children in towns over 200 population and the remainder on a 3 year cycle.

In the analysis, the following assumptions were made concerning the attack phase programme:

1. 90% coverage of children in the areas vaccinated.
2. 96% serological conversion rate among vaccinees.
3. The net effective coverage in an area would be, therefore, $.90 \times .96$ or 86%.

The following assumptions were made concerning the maintenance phase programme:

1. Immunization would be performed by 44 vaccinators stationed in 44 Peripheral Health Units distributed throughout the country.
2. 90% coverage of each village or town immunized.
3. 96% conversion rate upon immunization.

As can be seen in Table 1, the most complete coverage is achieved by immunizing all children as they reach the susceptible age of 6 months. However, the health infrastructure required makes this approach impossible at this time. Approach number 2 is likewise impossible because of the large number of towns and villages that would have to be visited each year. The effective coverage of approaches #3 and 4 (2 and 3 year cycles) is very low. The effective coverages of both 5 and 6 are higher than the 2 year cycle approach and require that fewer towns and villages be visited each year. More could be accomplished in the way of measles control by approaches 5 and 6 than by approach number 3 and at a lesser cost.

In conclusion, some alternative approaches to measles maintenance, the exploration of which have been dictated by local demographic and economic factors, have been described. Some general principles have become apparent. They are that measles maintenance programmes should:

1. Begin as soon as possible after the completion of the attack phase in each major subdivision of the country.
2. Be fully integrated with the ongoing and future health programmes of the country.
3. Assign top priority to urban and more densely populated rural areas so that they may be vaccinated annually.
4. Allow for coverage of second priority areas as quickly as it is economically feasible.

Table 1. A Comparison of the Coverage and Efficiency of Various Immunization Programs

<u>Approach</u>	<u>Frequency of Immunization</u>	<u>Percent Net Effective Coverage of Total Population per Year</u>	<u>Number of Villages and Towns to be Visited by One Vaccinator per Year</u>
1	Routine immunization at clinics at age 6 mos.	86	-
2	1 year cycle	86	318
3	2 year cycle	43	159
4	3 year cycle	29	106
5	All towns over 100 pop. each year and all villages less than 100 every 3 years	63	136
6	All towns over 200 pop. each year All towns and villages less than 200 pop. every 3 years	58	121