

THE VALUE, EFFICIENCY, AND LIMITATIONS OF COLLECTING POINTS
IN MASS VACCINATION PROGRAMMES

E. A. Smith¹, S. O. Foster², J. I. A. Adetosoye³, I. S. Mebitaghan⁴,
P. O. Adeoye⁵, J. M. Pifer⁶

INTRODUCTION

The Smallpox Eradication and Measles Control Programme (SMP) of Nigeria has been highly successful in operating a mass vaccination programme based on collecting points. In the six Northern States, a total of 18,275,653 smallpox vaccinations have been performed from July 1967 through February 1969. In the Southern States over 17,000,000 smallpox vaccinations have been performed during the same period. All of these programmes have used mass vaccination techniques based on collecting points rather than a door-to-door approach. In the six Northern States the teams have been able to vaccinate at a sustained rate of over 900,000 smallpox vaccination per month. This has been done with an average of 28 vaccination teams consisting of one team leader, five vaccinators and a driver. The average daily total of vaccinations performed by these teams is 2,869 for every day that they actually worked. The programme has been successful not only in vaccinating a large number of people; it has also achieved a high level of coverage. When the tally data are compared to the 1963 census, the coverage is about 95.9% (Table 1). Actual assessment performed by the ongoing assessment programme indicate a similar level of coverage (Table 2).

It is not possible to compare this method of vaccination directly with the multiple puncture method based on house-to-house or village-to-village visits as there has never been a large campaign based on these methods in Nigeria. However, it is reasonable to assume that the same number of vaccinators could not vaccinate this many people in a door-to-door campaign. Even in the Western and Mid-Western States, in areas where there are many small towns and villages, the teams have been able to vaccinate about 1,000 people daily.

TECHNIQUES EMPLOYED

The SMP in the six Northern States consists of a permanent field staff of 3 team supervisors and 28 team leaders who are trained and experienced in mass vaccination techniques using jet injectors. When the SMP is ready to start vaccination in a new state or province, an organizational meeting is held which outlines the objectives and needs of the programme. The local authority supplies the SMP with vaccinators who are trained by the permanent staff just prior to the actual campaign. The system of advance publicity used in the mass campaign is dependent upon the traditional rulers, who retain a great deal of their influence with their people. In general, the SMP arranges a schedule so that each district head is aware when the teams are to arrive. The team supervisor meets with the district head about one week before the programme is to begin to arrange vaccination sites that are about 10 miles apart. These vaccination sites are located in the best known and most influential villages. The district head then sends messengers to all the villages and hamlets to inform his people where and when they should come to get vaccinated. This publicity is arranged so that the villages are informed at least 24 hours prior to the arrival of the vaccination team. The team leader is given a list of villages and hamlets assigned to the vaccination site, so that the people from each village and hamlet can be checked off as they arrive.

¹Medical Director, Nigerian SPE/MC Programme, Lagos, Nigeria

²Medical Officer Adviser, NCDC/USAID, Lagos, Nigeria

³Medical Director, Western State SPE/MC Programme, Ibadan, Nigeria

⁴Medical Director, Mid-Western State, SPE/MC Programme, Benin, Nigeria

⁵Medical Director, Northern States, SPE/MC Programme, Kaduna, Nigeria

⁶Medical Officer Adviser, NCDC/USAID, Kaduna, Nigeria

Assessment of the coverage achieved by the teams is done within two or three days on a spot check basis. In this way, areas that are poorly covered can be vaccinated prior to the time that the teams leave the area. In the Western State the teams try to visit all villages in the area, no matter how small. The villages are notified in advance when the team will arrive and a central collecting point is used when the team actually vaccinates. The programme is organized so that the teams may visit up to 7 of these small villages in a day. In the Mid-Western State a similar programme has been used, but in certain large villages of 1,000 to 4,000 it has been necessary to set up two or more mass vaccination points because the different political factions do not ordinarily mix, and the people from one section of a town will not cross to another section of the town.

FACTORS LIMITING THE EFFICIENCY OF THE MASS CAMPAIGN

Four factors are essential to the successful execution of a mass campaign based on collecting points: 1) Good advance publicity, 2) well organized teams and team schedules, 3) well motivated teams and 4) cooperation of the individuals being vaccinated. Most areas where the teams have failed to achieve very high levels of coverage can be related to one or more of these factors. Specific examples are useful in illustrating the importance of these points.

A. Urban Campaigns: The SMP in the six Northern States of Nigeria has consistently achieved only mediocre results in the execution of urban campaigns. The coverage in these campaigns has been consistently between 75%-85% while in urban campaigns in the southern states of Nigeria, coverage has been above 90% in some instances. The chief difference has been that the planning in the southern cities has started two to three months in advance, so that vaccination sites, publicity and health education can be well organized and coordinated. The highly successful campaigns in Lagos and Ibadan indicated that central collecting points had to be arranged so that there was at least one vaccination site per 8,000 population. The time which the vaccinations were performed had to be altered to coincide with the population availability. Due to the large number of people who were working during the day, vaccination sites were set up in the early morning and late afternoon. Factories and schools were vaccinated on a prearranged schedule.

B. Vaccination of Igala Division: The coverage that was achieved in the recent mass vaccination campaign in Igala Division, Kwara State was low for several reasons.

The area was markedly different from other areas in the six Northern States. The villagers are quite independent and relate poorly to the central authority. Therefore, the advance publicity was poor. Second, the area is quite disorganized due to the close proximity to the war front. This made the vaccination of certain areas impossible. Third, the team supervisor was relatively inexperienced and organized the teams poorly. At times they had no work to do, or the local authority had been informed too late to warn the people that the teams were coming. Mop up operations are being planned in this area. These plans will include the use of local personnel who are accustomed to working in the area as well as an advance publicity man who will educate the people during two separate visits to the village prior to the arrival of the vaccination teams.

C. Vaccination of Nomadic Groups: In areas where there are a large number of semi-nomadic and nomadic Fulani, the coverage achieved has been quite poor, even though the coverage among the sedentary population has been excellent. The problem in vaccinating nomadic people is that they are scattered in remote areas, making advance publicity of any sort extremely difficult. However, there is a basic difficulty that lies deeper than an inability to inform them they should come to be vaccinated. They are extremely individualistic and at times resistant to vaccination. Vaccination scar surveys have indicated that only about 40% of the nomadic Fulanis in western Sokoto Province had been vaccinated by the mass campaign at the

completion of the attack phase. Mopup operations in this area included a village-to-village and house-to-house campaign, using multiple puncture or Ped-O-Jet technique. This campaign was conducted during the rainy season when the Fulanis are in large camps. This facilitates their vaccination, but, even so, only about 80% were vaccinated. In general, mass vaccination based on large collecting points does not seem to be an effective way of vaccinating nomadic Fulanis.

A similar problem has been encountered in the rivers areas in the Southern States of Nigeria. As most of these villagers are involved in trading or fishing, 50% of the population is away from the village at any given time. As absence may be for days or weeks, advance notification has not been very effective. Therefore, the use of collecting points in this area has not been successful. Good vaccination coverage has been achieved by making repeated visits or by posting local staff in the area who can do a low intensity continuing campaign.

- D. Vaccination of Migrant Labourers: There are large numbers of migrant labourers who travel hundreds of miles into small isolated farm camps in the southern States. As these people relate poorly to the central authority in the farming area, vaccination of this group must be directed to the dry season residence or to transport routes. A similar problem exists in the Northern States during the dry season, when a large number of workers travel to urban areas and areas in the south to look for work. In Kano City, transient persons enter and leave the city at a rate of about 20,000 per day. Vaccination of these people has been accomplished at mass vaccination points located along the main roads leading into town over a three to four week period of time.
- E. Vaccination of the Small Remote Village: The mass campaign in the North has experienced difficulty in vaccinating small remote villages or hamlets that are located a great distance from the vaccination site. Actual assessment data has not shown a significant difference between the coverage which the programme has achieved in villages less than two miles from the vaccination site and those villages that are more than five miles from the vaccination site (Table 3). However, the SMP has investigated two important outbreaks of smallpox that have occurred in small remote poorly vaccinated villages. The failure to vaccinate such villages could be the result of either of two factors. First, the village might not have been notified that the mass campaign was being carried out; second, although having been notified, the villages may have been reluctant to walk the distance to the vaccination site. The first of these reasons is a failure in the advance publicity, and the second is a failure of the organization of the campaign.
- F. Decreased Coverage of the More Recent Campaigns: There is good evidence that the mass campaign in the six Northern States has been doing a less efficient job as the campaign goes on. Coverage achieved in sample area I of the Bauchi campaign was less than 80% in a population of more than one million people (Table 4). This is compared to a coverage of over 90% that was achieved earlier in the programmes in Sokoto, and Katsina and Kano. This is probably due to a decreasing interest on the part of the team leaders and team supervisors. When the mass campaign was first initiated, they had a great deal of interest and enthusiasm in their work. However, as the campaign has progressed, the interest has definitely decreased, especially since the formation of the six new Northern States and the consequent interest of team leaders to be reassigned to their home States.
- G. Poor Coverage in Highly Individualistic Animist Villages in the North-Eastern State: Even if the mass campaign is functioning efficiently, the teams must have the cooperation of the people. In Adamawa Province there is a tribe of highly individualistic villagers who are quite resistant to vaccination. Preliminary assessment results indicate that the coverage in this tribe was only about 62% while the coverage in other villages in the area was over 90%. The lack of cooperation in these areas will be extremely difficult to overcome, requiring a well-

organized health education project that is able to reach large numbers of people and convince them of the value of vaccination.

SMALLPOX IN VACCINATED AREAS

One of the best ways of evaluating collecting points as a means of operating a mass vaccination campaign is to examine the various smallpox outbreaks that have occurred in vaccinated areas. These outbreaks fall roughly into five categories: 1) smallpox occurring in isolated compounds and small isolated hamlets, 2) smallpox occurring as small outbreaks or isolated cases where the coverage has been moderately good, 3) smallpox occurring in nomadic groups, 4) smallpox occurring as single importations into well vaccinated villages and 5) smallpox occurring in vaccinated individuals.

1. Smallpox in remote villages and isolated compounds: As discussed previously, remote villages that are unvaccinated have been responsible for at least two major outbreaks in vaccinated areas. The importance of these isolated pockets of susceptibles depends on the extent to which they exist. If a large number of these hamlets are left in vaccinated areas, it is possible that they could support smallpox transmission for long periods of time.
2. Smallpox occurring in villages where the coverage has been moderately good: There have been several outbreaks, particularly in Kano State, where up to seven cases of smallpox have occurred in villages where coverage is between 60 to 80%. It appears that these villages have been poorly covered for reasons discussed. However, smallpox transmission appears to be a limited phenomena with, at most, 2 to 3 generations occurring in any one village. This is enough to permit transmission, as these cases, in turn, appear to be responsible for the introduction of the disease into other villages with a limited number of susceptibles.
3. Smallpox occurring in migrant groups: A series of smallpox outbreaks in Western Sokoto province of the North-Western State occurred during the first half of 1968 and appears to have been related to smallpox transmission that was supported by nomadic Fulanis who had not been vaccinated by the mass campaign.

A number of smallpox cases have been exported from outbreaks occurring in migrant workers, particularly in the cocoa plantations around Oyo in the Western State.

4. Smallpox occurring as single importations into well vaccinated villages: There have been a total of eight confirmed importations of smallpox into Katsina Province of the North-Central State since the completion of the mass campaign. In none of these cases has there been any transmission within the villages. All of these villages had an extremely high level of immunity which did not permit continued transmission of smallpox.
5. Smallpox occurring in vaccinated individuals: There have been about 14 cases of smallpox in individuals who have stated that they have been vaccinated by the SMP. All but four of these occurred as isolated cases, while the others all occurred in one compound that went through the vaccination line at the same time. It seems likely that most of these cases were due to poor technique on the part of the vaccinator.

SUMMARY

Vaccination at collecting points has been very successful in the SMP in Nigeria. In the six Northern States the mass campaign has been able to use collecting points located about 10 miles apart and to achieve a coverage of 90% in areas where the traditional authority is quite strong. In the Southern States the vaccination sites have had to be organized on a village to village basis, but collecting points have been successful in vaccinating the people once the team is in the village. Critical to the

success of a mass campaign based on collecting points are four factors: 1) good advance publicity, 2) well organized teams and teams schedules, 3) well motivated teams and 4) cooperation of the people being vaccinated.

Table 1. Percent Vaccination Coverage Estimated by Comparing Tally Data with Population Data

State	Province	Population 1963 Census	No. of Smallpox Vaccinations (Tally Data)	Population Vaccinated (%)
North-Western	Sokoto	4,334,769	4,183,464	95.3
North-Central	Katsina	2,545,005	2,749,824	100+
Kano	Kano	5,774,842	5,560,571	96.1
North-East	Bornu	2,854,000	2,576,575	90.3
North-East	Bauchi	2,476,329	2,347,233	94.6
Total		17,984,945	17,407,667	96.7

Table 2. Percent Vaccinations Coverage by Age in Sokoto and Katsina Provinces and Kano State from Assessment Data

	Age Group			Total*
	0-3 yrs.	4-14 yrs.	15+ yrs.	
Sokoto	96.7	97.3	95.7	96.3
Katsina	96.7	96.5	92.7	94.4
Kano	89.1	93.8	88.8	90.6
Total*	93.1	95.5	91.8	93.2

* Totals weighted in proportion to the population of each area.

Table 3. Percent Vaccination Coverage in Kano State by Distance from the Vaccination Site

Distance from Vaccination Site (miles)	Age Group				Total
	0-3 yrs.	4-14 yrs.	Male 15+ yrs.	Female 15+ yrs.	
0-1	91.5	96.6	91.5	90.4	93.0
2-4	91.2	94.3	92.4	88.7	91.7
5+	90.6	91.4	89.9	87.0	

Table 4. Percent Vaccination Coverage for Assessment Sample Area No. 1 in Bauchi Province

<u>Age</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
0-3 yrs	-	-	84.1
4-14 yrs.	83.8	81.9	82.9
<u>15+ yrs.</u>	<u>66.2</u>	<u>81.5</u>	<u>73.8</u>
<u>Total</u>	<u>-</u>	<u>-</u>	<u>78.5</u>