

COMPARATIVE ADVANTAGES OF JET INJECTORS AND BIFURCATED NEEDLES

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I should like to describe first our experiences in Togo in which, during the last quarter of 1968, we employed teams which used the multiple puncture vaccination technique. I should then like to contrast the advantages of the use of these needles in a house-to-house campaign with the use of jet injectors under different circumstances.

EXPERIENCE WITH BICYCLE VACCINATION TEAMS IN TOGO

One of the most instructive experiments carried out in 1968 involved the use of vaccination teams equipped with bicycles. It was carried out partly with the staff of the National Malaria Service, and partly by the mobile personnel of the public health subdivisions of Anécho and Tabligo.

The National Malaria Service has a well-organized staff trained for work in the field, and includes sprayers (auxiliaries), team leaders, sector heads and supervisors. Thirty members of this Service (formerly sprayers), each equipped with a bicycle, were divided into six teams and placed under the control of the sector heads. Each group of three teams was placed under the supervision of a male nurse or a hygiene assistant who was provided with a car. Each team was allocated a precisely defined geographical sector which it was required to cover by bicycle, farm by farm and house by house, in order to vaccinate the population and at the same time to carry out an active search for cases of smallpox. Vaccination was performed by the multiple puncture method using bifurcated needles.

The second group employed were mobile personnel who are auxiliaries attached to the basic health services and who are normally responsible for visiting once a month every house in a given sector. They were trained as vaccinators and made responsible for the same work as the malaria control personnel. However, they operated individually in the area covered by a dispensary. There were 15 such auxiliaries for the public health subdivision of Anécho and 5 for that of Tabligo.

The vaccinations performed by the various teams during the last quarter of the year were as follows;

Month	Regular teams (jet injector)	Malaria teams (MP)	Mobile personnel in Anécho (MP)	Total
October	50,975	-	39,404	90,379
November	25,208	32,759	18,530	76,497
December	61,052	42,407	24,656	128,115
Total	137,235	75,166	82,590	294,991

The work of such teams cannot be judged solely on the basis of the number of vaccinations performed as the method used was not such as to make possible the rapid vaccination of a large number. In addition, it was often necessary to travel great distances in order to vaccinate perhaps ten persons only.

Previously, vaccination campaigns had been carried out by gathering people together at selected collecting places (schools, health centres or posts, markets, etc.) to which the teams were transported by motor vehicle. In larger towns, several assembly points were used while in small centres, a single assembly point. The assembly points

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were chosen so that the population did not have to travel far. The advantage of this system was the rapidity with which the campaign could be carried out, still further increased by the use of the jet-injectors. In a country like Togo, however, all population centres are not served by roads suitable for vehicles, so that the teams necessarily travelled only to the accessible places. The consequence of this method is that the population of larger centres is generally well covered while farms and hamlets are either inadequately vaccinated or not vaccinated at all. Investigations of cases of smallpox in Togo revealed that it was precisely in these small communities in which smallpox transmission was being maintained. The bicycle teams have the advantage of being able to reach places inaccessible to the regular mobile teams and are able to visit every house in farms and hamlets. The use of such teams is well adapted to vaccination in the southern region of Togo where the population is dispersed among many small farms which, although isolated, are always linked together by tracks suitable for bicycles. In addition, these teams can vaccinate on the road persons who have left their houses to go to the fields or to market. Above all, they can reach young children and old people who have stayed behind in the village or farm.

These teams require only auxiliary personnel with no particular qualifications. They are, therefore, inexpensive. It is essential, however, that these personnel be well organized and kept under constant, close supervision. This was easily achieved with the malaria control teams, with their supervisors.

EFFECTIVENESS OF THE TWO METHODS UNDER DIFFERENT CONDITIONS

1. For what type of population centre are the two methods suitable?

In a vaccination campaign employing teams equipped with jet injectors, large centres are generally adequately vaccinated and small centres are poorly vaccinated or not vaccinated at all. The same applies to localities not accessible by roads. Thus, vaccination with the jet injectors is most suitable for towns and large villages, schools, markets, etc. For vaccination in small villages, farms, hamlets and in localities which are difficult of access, the multiple puncture method appears to be more effective. This method also makes it possible to reach the newborns and children up to the age of four, as well as old people, age groups which are often inadequately vaccinated by the jet injector teams because they remain in the village when the parents are in the fields or at the market. For persons who resist vaccination, a vaccinator who uses the multiple puncture method can try to convince such persons individually. On the other hand, there are situations where the jet injector has a psychological advantage over the multiple puncture method. In Togo, for example, during a campaign carried out between 1962-1966, a vaccine was used in the later stages which gave very severe reactions. This has not been forgotten by the population of certain areas. This vaccination was effected by means of scarification with vaccinostyles. Since the needles used in the multiple puncture method remind the population of the last campaign, it is preferable, under these conditions, to use the jet injector.

Lastly, vaccinators using the multiple puncture method, as I have described, are able to do case finding as they move from house to house. I should also add, that vaccination by the multiple puncture method is particularly suitable for a maintenance programme in which vaccination is performed by mobile personnel and in fixed public health units.

2. Requirements for advance publicity

Vaccination by jet injector, if it is not to lose its advantage of speed, requires use of the collecting point system. Fairly precise planning of the campaign is therefore necessary, since the population must know on what day and at which place it must assemble. It is thus necessary to send a team to the places concerned, so

as to hold meetings with responsible persons to plan the campaign. In addition, the vaccination team must be preceded by a health education team, all of which adds to the cost. In contrast, vaccination on a house by house basis which does not involve assembly of the population requires a less precise degree of planning. Each team is simply assigned a particular geographical area and, in the course of their work, they may carry out health education.

3. Effectiveness of the two methods in terms of the take rate

The two methods give comparable take rates. Nevertheless, a defect in the jet injector which is not rapidly detected may result in a number of unsuccessful vaccinations. On the other hand, vaccination by the multiple puncture method may be rendered ineffective if products are applied by the vaccinee to the site of vaccination.

4. Logistic factors

Vaccination by the multiple puncture method is easier to teach than vaccination by means of the jet injector. This makes it possible to employ temporary personnel and volunteers in a vaccination programme. In a maintenance programme, all male nurses of the public health units can easily be trained in vaccination.

In a vaccination campaign using the jet injector, at least one member of the team must be capable of tracing faults and carrying out simple repairs. When needles are used, breakdowns are impossible; the only problem is that of sterilization, but this is easily solved by providing every vaccinator with a small bowl for the purpose of sterilizing the needles by boiling (every farm has a fire). In our trials with the malaria control personnel, the supervisor collected the used needles each day and had them sterilized at the health centre, while for the mobile personnel, we adopted the method of using small bowls for sterilization.

CONCLUSIONS

I may have given the impression of being an advocate of the multiple puncture method, but I should like to conclude by saying that one method is not in itself or in absolute terms better than the other. It depends entirely on the circumstances.

Thanks to the jet injector, hundreds of thousands of vaccinations have been effected rapidly. In the case of a smallpox epidemic in a town or other large population centre, the jet injector enables the situation to be brought rapidly under control. The two methods can even be used to complement each other to advantage, as was done in one of our districts, in which the jet injectors teams carried out vaccination in the large population centres and such villages as were accessible, while the mobile bicycle teams took to the paths to perform vaccinations in the farms and scattered villages. In addition, after a vaccination campaign with the jet injector, the areas can be gone over again by multiple puncture teams in order to try to reach the few who have escaped vaccination, especially the newborns and children up to the age of four. This is particularly desirable when assessment has shown that vaccination coverage in a given area has not reached a satisfactory level.

It is essential, therefore, in a programme, not to give preference to one method or the other but to achieve the maximum coverage, but the use of the method appropriate to the circumstances.