

## Effectiveness of Polio Vaccination Coverage in Reducing the Incidence of Paralytic Poliomyelitis in a Highly Endemic Area of Bombay City.

By

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### SUMMARY

*A team of medical and paramedical personnel attached to a municipal health centre in a slum area in the north-west part of Bombay (Malavani village) attempted 100% oral polio vaccine coverage by house to house visits from September 1980. Over a period of 2½ years, they succeeded in covering 83% children below the age of three years. Not a single case of paralytic poliomyelitis was reported from that area in the years 1980, 1981 and 1982. A WHO expert guided and supervised a survey in March 1983 and confirmed that there was not a single case of lameness which could be attributed to poliomyelitis in 1403, under three children examined. The implications of these findings are discussed.*

### INTRODUCTION

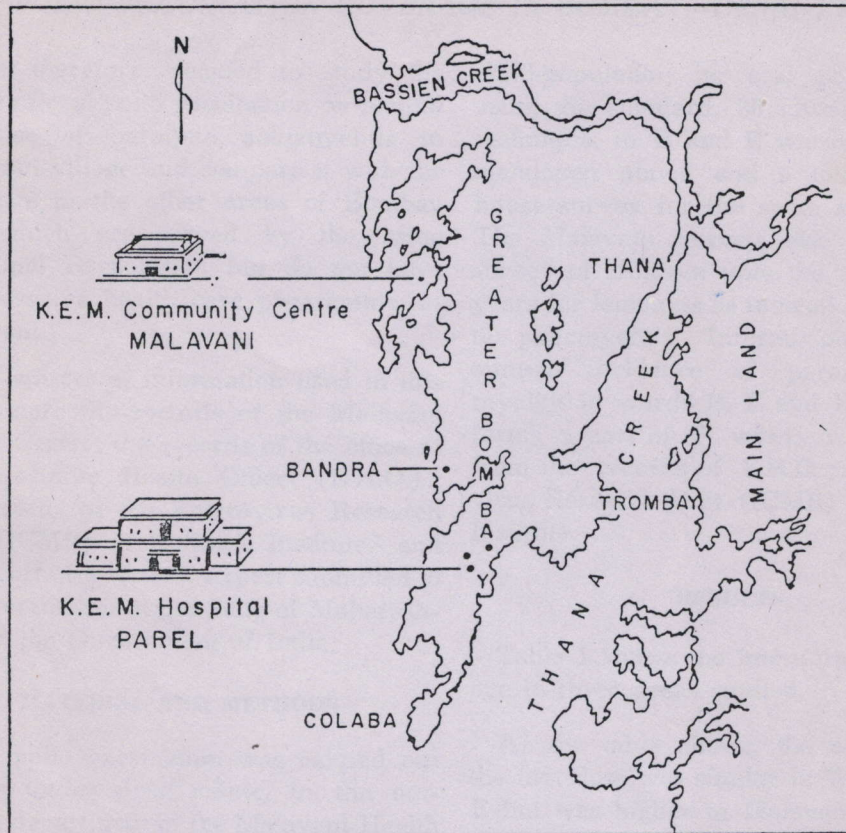
Oral polio vaccine has been in use in the city of Greater Bombay since 1963. In spite of this, the annual incidence of paralytic poliomyelitis in the entire city has increased from 500 cases in 1974 to 900 cases in 1982. The annual incidence, however, varies in different geographical wards of the city, varying from 5.4 per hundred thousand of the population in B ward to 17.13 per hundred thousand of the population in E ward.<sup>3</sup> B ward is at the southern end of Bombay, is an office-cum-residential area, and houses largely higher middle and higher socio-economic groups of the population. E ward, on the other hand, is in the centre of the city, is

overcrowded, has one of the red-light areas of the city, and houses lower middle and poor socio-economic groups of population (Fig. 1).

In 1977, Seth G.S. Medical College and K.E.M. Hospital, a twin institution run by the Municipal Corporation of Greater Bombay (M.C.G.B.), adopted for comprehensive health care a village by name Malavani, situated in P ward which is in the north-west zone of Bombay (Fig. 1). The comprehensive health care programme offered to this village comprises (A) promotive services in the form of mother craft clinic, under fives' clinic, school health clinic, parent craft clinic and community kitchen gardening; (B) preventive services in the form of immuniza-

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tion of children under five years of age and of pregnant women, and control of endemic diseases such as tuberculosis, leprosy and scabies; (C) curative services in the form of medical outpatient department and referral camps run by specialists; (D) rehabilitative services in the form of cataract surgical camps and rehabilitation of the physically and socially handicapped; and (E) multi-sectoral services including community gardening and creche service. We have already published the details of this programme in the form of a booklet.<sup>2</sup>

The Malavani Health Centre, from which all the activities of the above pro-

gramme are run, is under the charge of the Head of the Department of Preventive and Social Medical (PSM), Seth G.S. Medical College. The clinic is manned by medical internes, student nurses, three qualified medico-social workers and menial staff, who work under the supervision of the staff of the P.S.M. department. The health centre has maintained continuous records of the population which was 63,000 in 1977 and 70,000 in 1982. Malavani village houses almost exclusively slum dwellers who belong to the poor socio-economic class. One of the services offered by the centre has been oral immunization against poliomyelitis.

It was, therefore, decided to study the impact of oral polio vaccination on annual incidence of paralytic poliomyelitis in Malavani village and compare it with the incidence in the other areas of Bombay city, which are served by the same Municipal Corporation but do not have the intensive health care programme as Malavani.

The sources of information used in this study were the records of the Malavani Health Centre, the records of the office of the Executive Health Officer (E.H.O.),<sup>1</sup> the records of the Enterovirus Research Unit (ICMR) of Haffkine Institute,<sup>2</sup> and the report of a W.H.O. expert submitted to the Government of the State of Maharashtra and the Government of India.

#### MATERIAL AND METHODS

Oral polio vaccination was carried out in the *under fives' clinic*, in the outpatient department of the Malavani Health Centre, and by house to house visits by the clinic staff. This vaccination was done in all the children upto and including the age of 3 years. The above activity was strengthened by a mass drive which began in September 1980, and is continuing till date.

In March 1983, under the guidance of a W.H.O. expert invited by the Government of India, we, jointly with the Health Department of the M.C.G.B., carried out a survey of the coverage of under 3,

child-population by oral polio vaccine, using the standard, 30 cluster, sampling technique, in B and E wards of the city mentioned above and a total house to house survey for the same in Malavani. The Malavani survey also included a survey of children upto the age of three years for lameness as indicative of paralytic poliomyelitis. Information about the annual incidence of paralytic poliomyelitis in wards B, E and P (Malavani forms a part of P ward) was obtained from the records of E.H.O. and Enterovirus Research Unit (ICMR) of Haffkine Institute.

#### RESULTS

Table 1 shows the immunization coverage in three areas studied.

As the table shows, the coverage for the first dose was similar in Wards B and E but was higher in Malavani. Further, in Wards B and E, it dropped progressively for the 2nd and 3rd doses. In contrast, in Malavani, it was maintained upto the third dose.

Table 2 shows the incidence of paralytic poliomyelitis in various areas of the Bombay city.

Finally, the survey showed 16 cases of lameness among 1403, *under three* children examined in Malavani but none of them was due to paralytic poliomyelitis.

TABLE 1  
Immunization coverage in various areas

| Area     | No. of children examined | Immunization coverage in %age |         |          |
|----------|--------------------------|-------------------------------|---------|----------|
|          |                          | Dose I                        | Dose II | Dose III |
| Ward B   | 222                      | 79.7                          | 73.4    | 63.5     |
| Ward E   | 240                      | 80.0                          | 76.0    | 70.0     |
| Malavani | 1403                     | 87.8                          | 86.6    | 83.2     |

TABLE 2  
*Incidence of paralytic poliomyelitis in various areas (expressed as per 100 thousand)*

| Area                                    | Population<br>(in lacs) | Incidence of paralytic poliomyelitis |       |       |
|---|-------------------------|--------------------------------------|-------|-------|
|   |                         | 1980                                 | 1981  | 1982  |
| Ward B*                                 | 1.47                    | 10.0                                 | 5.43  | 5.44  |
| Ward E*                                 | 4.56                    | 15.2                                 | 17.13 | 14.27 |
| Ward P*                                 | 2.96                    | 11.3                                 | 6.50  | 12.50 |
| Malavani<br>Malavani (Present<br>study) | 0.71                    | 0.0                                  | 0.00  | 0.00  |

\* From the records of the Enterovirus Research Unit, ICMR.

### DISCUSSION

The present work demonstrates that even in a slum area like Malavani which houses people belonging to very poor economic groups and which is located in the middle of a highly endemic area, it is possible to abolish paralytic poliomyelitis by adequate vaccination coverage of children below the age of three years.

An attempt was made to achieve 100% coverage by house to house visits, but it resulted in only 83% coverage in spite of the extensive and intensive efforts by a team of doctors and paramedical personnel. However, the efforts appear to be worthwhile as shown by the zero polio incidence for three successive years and zero lameness due to polio as brought out by this survey.

In the past, it was thought that minor illnesses including diarrhoea were temporary contraindications to the administration of oral polio vaccine. Further, it was also thought that oral polio vaccine should not be administered immediately before or after a breast feed. These recommendations increased the difficulty of adequate coverage of child population. The recent recommendation,<sup>4</sup> however, is that oral polio vaccine need not be withheld in either of the above situations. This would make coverage easier because it is now thought permissible to hand over

the oral polio vaccination programme to non-medical personnel including community health volunteers. Finally, the old recommendation to restart a complete schedule of three doses if the child does not complete the course in recommended period of 3 months is no longer thought necessary.<sup>4</sup>

### ACKNOWLEDGEMENTS

We thank the Executive Health Officer, for giving us the necessary data. We are also thankful to the Director, Enterovirus Research Unit, I.C.M.R., Haffkine Institute, for extending the help. Lastly, we are thankful to the Dean, Seth G.S.M. College and K.E.M. Hospital, Bombay, for allowing us to publish the hospital data.

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