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THE CONTROL OF SMALLPOX IN GREATER BOMBAY

by

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The population of Greater Bombay is about 6 000 000. Being an industrial, educational and commercial centre of India, as well as a major sea and air-port, it attracts a large number of people from all parts of the country for employment, education and business. This has resulted in a tremendous increase in population, creating serious problems in housing, water supply and sanitation. Lack of housing has resulted in an eruption of slums. It is estimated that about one million people live in slums which are without adequate drainage or tap water supply and pose a constant danger to public health in the city. There is a constant threat of epidemics.

Smallpox is one of the dreaded epidemic diseases which health authorities must worry about. Though the disease has been practically eliminated from Greater Bombay, any slackness in the efforts in the anti-smallpox campaign is likely to result in the re-introduction of the disease with serious consequences.

The Municipal Corporation of Greater Bombay has always taken an active part in the smallpox programme, cooperating with Central and State Governments, with or without financial aid, and has achieved successful results.

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Tables I and II indicate the incidence of smallpox in Greater Bombay since 1963.

TABLE I

Smallpox Incidence by Year, 1963 - 1971

Year	Cases	Deaths
1963	253	75
1964	562	211
1965	3 202	1 323
1966	360	141
1967	2 580	1 007
1968	101	38
1969	46	25
1970	13	2
1971	-	-

TABLE II

Smallpox Incidence by Month, 1967 - 1972

Month	1967	1968	1969	1970	1971	1972 (Aug.)
Jan.	224	20	3	4	-	-
Feb.	404	15	13	2	-	-
Mar.	647	26	15	3	-	1(imported)
Apr.	515	23	6	1	-	-
May	469	19	5	1	-	7(imported)
June	226	4	1	1	-	-
July	49	-	2	1	-	
Aug.	22	-	-	-	-	
Sept.	9	1	-	-	-	
Oct.	5	-	-	-	-	
Nov.	4	2	-	-	-	
Dec.	6	1	1	-	-	
	2 580	101	46	13	nil	

In 1877, the Bombay Vaccination Act was passed. It required every Bombay-born child to be vaccinated within six months after birth and every immigrant under 14 years,

within three months after his arrival in Bombay. Bombay was the first city in India to make vaccination compulsory.

Greater Bombay is divided into 18 districts. Each district is in charge of a Vaccinator with 4 Birth-Registration Clerks. The Registrar of Births and Deaths issues notices to parents and guardians of children, directing their attention to the Vaccination Act and mentioning the place of the vaccination centres and the hours which they are open.

The district registrar of births and deaths submits a list of births registered in Bombay to the Superintendent of vaccination every month.

In 1963 the National Smallpox Eradication Programme was started in Greater Bombay and the attack phase of the programme was completed at the end of that year. In 1964, the mopping up operation was completed and Bombay entered into the maintenance phase. In subsequent years, however, large numbers of cases of smallpox were reported as may be seen from tables I and II. Epidemiological investigation proved that many of these cases were imported into Bombay and the indigenous cases were among persons who had earlier arrived in Bombay in an unprotected state. It was at this stage that neonatal vaccination in hospitals and maternity homes was introduced, supplemented by frequent mass vaccination programmes in slum areas and the establishment of vaccination centres at important railway stations, ferry wharfs and state transport bus-stops. The most important step, however, was to declare Greater Bombay to be an area of compulsory protection from smallpox under Section 15 of Maharashtra Vaccination Act, 1964.

The National Smallpox Eradication Programme in Greater Bombay, was under the overall supervision of the Superintendent of Vaccination assisted by a staff of 3 Unit Supervising Officers, 36 Sanitary Inspectors, 84 Vaccinators, 132 Enumerators, 6 Health Educators, labour and clerical staff. Through all the media of health education, the community was made aware of this programme. This was followed up by a room-to-room and a hut-to-hut visit by enumerators, vaccinators and sanitary inspectors. The enumerators enumerated the entire population and prepared family registers. Vaccinators carried out vaccination. A team of vaccinators checked the results of both primary vaccinations and re-vaccinations after 7 days and vaccinated unsuccessful cases of primary vaccination and those who had been missed. Up to 31 December 1963, 57% of the population of Greater Bombay was vaccinated. The entire cost of the scheme was Rs.630 333. The non-recurring costs and 75% of the recurring costs were received from the Government as financial aid.

In 1964, the mopping up operation was completed with the help of 60 vaccinators and 6 Supervisory staff. The total coverage of 57.3% of the population was considered unsatisfactory, however. This was mostly due to refusal by persons to get themselves revaccinated on religious or other grounds. Though the attack phase of the programme was completed in 1964, there was a high cyclical rise in smallpox during 1965 and in 1967. Epidemiological investigations of all cases of smallpox proved that the smallpox had occurred among persons who had come to Bombay recently without history of vaccination. This led to a change in the overall strategy. The steps included:-

1. Top priority to the most vulnerable age-group, 0-14 years.

2. Establishment of an annual target for primary vaccination to eliminate the backlog in primary vaccination.

3. Assessment of work done by the vaccinators by carrying out periodical scar surveys.

4. Vaccination of newborns in maternity homes before they are discharged.

5. The most important step, however, was to declare Greater Bombay to be an area of "Compulsory Protection" for smallpox, under Section 15 of Maharashtra Vaccination Act. This step gave very good results in 1968, when 5 360 000 persons were vaccinated within a short period of 5 months and, since 1969, no indigenous cases of smallpox have been reported.

Neonatal vaccination is carried out in 31 Municipal and Government maternity homes. The vaccinators visit the hospital or maternity home twice or thrice a week. The infants are vaccinated on the second or third day after birth in the absence of contra-indications. Arrangements are also made to direct vaccinators to private maternity homes.

There are 95 permanent vaccination centres throughout Greater Bombay. They work daily. Vaccination is also done at 83 municipal dispensaries and municipal hospitals. Mass vaccination programmes are arranged every week in slum and labour areas in Bombay with the help of the Department of Health Education of the Corporation. Night vaccination campaigns are arranged in labour and slum areas every week to vaccinate persons who are not available during the day and also to protect the floating population and migrants with no fixed place of abode. Vaccination centres have also been opened at important railway stations and other centres to protect the new arrivals. Children in municipal and private primary schools are vaccinated every year from July to November. Periodic mass vaccination programmes are arranged at textile mills, factories, industrial establishments, government and private offices.

Scar surveys are periodically carried out in different parts of Bombay to appraise the work done by vaccinators and to determine the backlog of vaccination in the area. Scar surveys have shown that there is a definite decline in the percentage of unvaccinated children in Bombay.

The Vaccination Department conducts vaccination courses for training vaccinators. Every year three courses each of three months' duration are conducted. About 30 students are admitted to the course each time. Medical students, nurses and sanitary inspectors are also trained in vaccination.

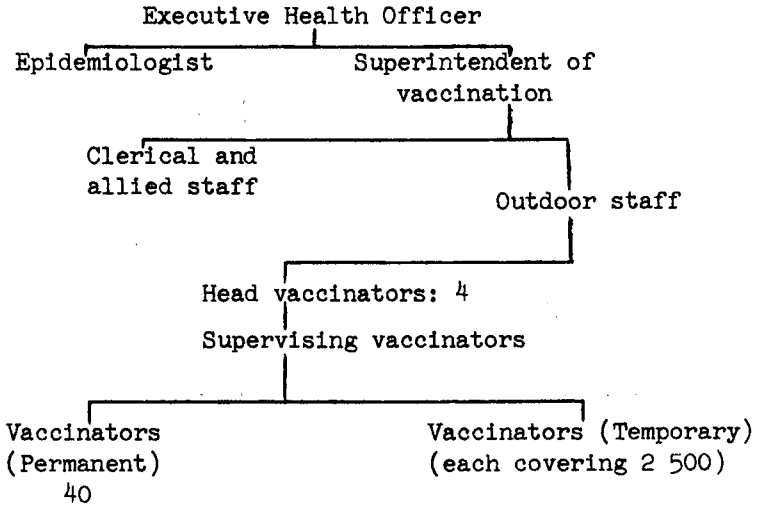
Health education is an important part of the programme in Bombay. The object of the continuous health education campaign is to keep the population aware of the danger of smallpox.

Though smallpox has been eliminated from Bombay and no smallpox cases have been reported for the past two years, the Health authorities are vigilant to see that there is no reintroduction of the disease.

APPENDIX

Organizational Pattern of Vaccination Department

The organizational pattern of the vaccination department is as follows:-



1. Superintendent of Vaccination: He is in overall charge of the department. He works under the guidance and supervision of the Executive Health Officer.

2. Head Vaccinator: The area of Bombay Municipal Corporation has been divided into 4 zones, each having a population of 1 500 000. Each Head Vaccinator is responsible for vaccination work in his zone. He is responsible for the supply of vaccine and other material; and exercises overall supervision over the vaccination work done by the vaccinators working under him. He is responsible for carrying out mass vaccination programmes in slums, schools, factories, etc. in his zone and for maintenance of registers and records.

3. Supervising Vaccinators: Each supervising vaccinator supervises the work of 4 to 5 vaccinators. He is responsible for their work and their attendance. He is supposed to check their work daily and maintain proper records in his sectors.

4. Vaccinators: There are 130 vaccinators working in the Municipal Corporation area, of which 40 vaccinators are permanent. Permanent vaccinators:-

   a) Manage 94 vaccination centres in Bombay.

   b) Carry out neonatal vaccination in maternity homes and hospitals and vaccination programme in schools and factories.

   c) Keep a watch over unprotected children and immigrant children detected by vaccination karkoon, for vaccination.

   d) Carry out contact vaccinations in the vicinity of suspected smallpox cases.

   e) Visit slum areas once in every three months.

   f) Observe results of primary vaccination after 8 days and take necessary measures if found necessary.

   g) Maintain records of primary education; and

   h) Issue primary vaccination certificates and certificates for international vaccination.

Statistical Record of Births, Smallpox Cases and Vaccinations

Year	Births	No.of smallpox cases	No. of deaths due to smallpox	Primary vaccinations done	Revacci-nations done	Total
1958	91 666	3 235	882	94 711	1 227 947	1 322 658
1959	110 270	512	182	114 953	428 392	543 345
1960	107 383	2 842	918	124 683	1 026 100	1 150 783
1961	116 337	3 868	1 615	115 024	1 838 075	1 953 099
1962	121 305	125	45	130 685	672 398	803 083
1963	131 831	360	75	151 700	2 381 125	2 532 825
1964	132 592	562	138	139 093	1 046 016	1 185 109
1965	140 781	3 202	1 323	181 415	3 528 507	3 709 922
1966	114 986	360	141	175 195	1 478 601	1 653 796
1967	153 230	2 580	1 007	182 798	3 553 271	3 736 069
1968	156 830	101	38	237 266	4 966 963	5 204 229
1969	159 571	46	25	222 725	1 555 957	1 778 682
1970	161 312	13	2	203 220	1 377 400	1 580 620
1971	164 293	nil	nil	194 920	1 443 130	1 638 050

Summary of Scar Survey carried out in Greater Bombay

From January to December 1971

Month	Percentage of absence of scar			
	Less than 1 year %	1-4 years %	5-14 years %	Total %
January	9.7	0.3	0	1.8
February	9.6	0.6	0	1.8
March	11.3	0.4	0	1.8
April	6.6	0.3	0.3	1.4
May	9.1	0.5	0.5	2.0
June	11.4	1.2	0.4	2.5
July	8.5	1.3	0.2	2.3
August	8.4	0.3	0.1	1.5
September	10.89	0.14	0.14	1.87
October	11.95	1.04	0.14	2.37
November	12.2	1.7	0.13	2.43
December	13.79	1.88	0.15	3.2