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SCAR SURVEYS AS A TOOL FOR EVALUATION AND SUPERVISION
OF THE SMALLPOX ERADICATION PROGRAMME
EAST JAVA PROVINCE - INDONESIA

by

Dr Witjaksono¹



1.0 Introduction

A programme to eradicate smallpox in East Java Province was begun in early 1965 following the second major smallpox epidemic to occur after the war. The first epidemic occurred in 1950, during which 43 193 cases and 7 606 deaths were recorded. The second epidemic began in 1961 and reached its peak in 1965, when 36 120 cases and 531 deaths were reported. The strategy of the programme was as follows:

1. An active surveillance system was promoted.
2. Epidemiological analyses were done to determine the principal problem areas.
3. Special containment actions were taken among the most mobile population.
4. Since other parts of Indonesia were endemic, routine vaccination programmes were promoted.

With this strategy, East Java succeeded in reducing the number of smallpox cases from 36 120 in 1965 to 258 in 1968. The last indigenous outbreak occurred in November 1968 and ended in January 1969, with a total of 15 cases and 1 death. Since then, only 4 imported cases have occurred, all of which were detected and contained in the first generation.

¹ Medical Officer, Department of Communicable Disease Control, East Java Provincial Health Service, Indonesia

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To evaluate the continuing effectiveness of the routine vaccination programme, the East Java Provincial Health Service, since 1968, has regularly performed scar surveys. The purpose of this paper is to discuss the utility of scar surveys as a tool in evaluation and supervision.

2.0 Methodology and uses of scar surveys in East Java Province

Scar surveys are performed both on a periodic basis and as a means for continuous supervision.

2.1 Periodic supervision scar survey

At least twice a year, all SEP supervisors in all 29 regencies and 8 municipalities are instructed to perform scar surveys in their own areas. These are done during the same period throughout the Province in order to ensure uniform conditions. One is conducted in June/July to obtain an accurate picture of specific problem areas to be dealt with during the latter half of the year; the other is performed in November/December to estimate the extent of the "Back Log", i.e. the number of unprotected persons to be tackled by the routine vaccination programme in the coming year.

From 1968 to 1970, four scar surveys, based on sampling methods, have been performed to assess the overall situation in the Province (Table 1).

The first two scar surveys were a part of a national level assessment done by WHO/Government of Indonesia assessment teams. In these, three of 37 Regencies/Municipalities were chosen at random; then, two subdistricts were again randomly chosen from each Regency/Municipality. All villages of these subdistricts were assessed by 20 surveyors and were completed within a day. Each surveyor had to examine approximately 200 children below 15 years of age. From every sub-district a sample of approximately 4 000 were surveyed.

The third and fourth scar surveys were simultaneously done by all Regency/Municipality SEP Supervisors. Four subdistricts were chosen for assessment by the following criteria: two were from areas where, according to reports, the vaccination programme was well performed; the other two were chosen as representative of the worst areas. One village was chosen at random in each subdistrict and about 200 children below 15 years of age were examined in a day.

2.2 Continuous supervision scar survey

Supervision scar surveys are intended to assist supervisory personnel by providing a continuing objective evaluation of the work of their vaccinators. All SEP supervisory personnel are encouraged to perform frequent day-to-day supervision scar surveys in areas of recent vaccination efforts. A sample of about 200 children below 15 years of age is examined. Besides examining for vaccination scars, special attention is given to the take rates obtained, as well as to the number of absentees in order to obtain a rough idea of the difficulty in reaching the people.

Since pockmarks are also looked for, the scar surveys can also evaluate the completeness of case reporting by comparing the proportion of pockmarks by age group with the last reported cases from the area.

In some instances, scar surveys may be used for the assessment of containment actions to determine whether they were properly done or not.

These surveys are relatively inexpensive. The scar survey of February 1968 as an example, required 6 man days of supervisors' time and 120 man days for surveyors. The total cost, including salaries, allowances and transport did not exceed \$150.

3.0 Results of scar surveys

The estimated number of unprotected children (back log) can be calculated from the reported number of primary vaccinations as well as from the results of scar surveys (Table 2). For East Java Province, surveys conducted in February 1968 and June 1968, show that the reported number of primary vaccinations is reasonably comparable to the number estimated on the basis of scar survey results. The difference is only 3.7%. That these two figures, derived in different ways, coincide so well, gives added support for the use of scar surveys as a method of assessment and supervision.

Table 3 shows the results for three individual regencies based on scar surveys of February 1968 and July 1970. The survey of July 1970 was done somewhat differently, as previously noted, and did not provide for random sampling as did the earlier surveys. This was because of a shortage of manpower. In Pasuruan Regency, the difference between the estimated number of primary vaccinations, as calculated on the basis of the scar survey and the total number reported, is 26 498 (23%), while in Malang Regency, the difference is 4.5% and in Kediri Regency, 20.4%.

Where the reported number of primary vaccinations gives a larger number, as in Kediri Regency, this is explained by the fact that, in some areas, vaccinations are performed by some agencies, e.g. Army paramedical personnel, School Health Service, M.C.H., etc. which unfortunately do not submit reports as they should.

Examples of supervision scar surveys done by Provincial and Regency/Municipality Supervisors are shown in tables 4 and 5. Although a very rough picture is presented due to the inherent biases, the stress is on the frequency of such surveys which logically have a good psychological effect for improvement of the programme as a whole.

4.0 Conclusions

Scar surveys have been important in the following areas:

1. In arriving at a more accurate estimate of the unprotected population and to compare these with reports of vaccinations performed.
2. In evaluating routine vaccination activities.
3. In identifying specific problem areas where surveillance should be strengthened.

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TABLE 1. ESTIMATION OF THE NUMBER OF UNPROTECTED CHILDREN IN EAST JAVA PROVINCE
ON THE BASIS OF SCAR SURVEYS*, 1968 - 1970

| No. | Period of scar survey | Estimated population (000) | | | | Percent unprotected | | | Estimated no. of unprotected children (000) | | | | |
|-----|-----------------------|----------------------------|--------|---------|----------|---------------------|--------|---------|---|--------|---------|----------|----------------|
| | | Total | 0-1 yr | 1-4 yrs | 5-15 yrs | Total 0-15 yrs | 0-1 yr | 1-4 yrs | 5-15 yrs | 0-1 yr | 1-4 yrs | 5-15 yrs | Total 0-15 yrs |
| 1. | Feb. 68 | 24 526 | 829 | 3 532 | 5 984 | 9 325 | 72 | 23 | 7 | 583 | 812 | 419 | 1 814 |
| 2. | June 69 | 25 000 | 825 | 3 600 | 6 100 | 10 525 | 52 | 20 | 5 | 425 | 731 | 329 | 1 485 |
| 3. | Nov. 69 | 25 000 | 825 | 3 600 | 6 100 | 10 525 | 36 | 15 | 3 | 294 | 535 | 161 | 990 |
| 4. | July 70 | 25 500 | 842 | 3 672 | 6 222 | 10 736 | 30 | 10 | 3 | 252 | 366 | 156 | 774 |

* Samples
Regencies
No. of
subdistricts
No. of
villages
No. of per-
sons examined

| | | | | |
|-----------|----|-----|-----|--------|
| Feb. 1968 | 3 | 6 | 60 | 18 509 |
| June 1969 | 3 | 6 | 57 | 24 400 |
| Nov. 1969 | 37 | 128 | 128 | 14 645 |
| July 1970 | 37 | 128 | 128 | 28 849 |

TABLE 2. COMPARISON BETWEEN REPORTED NUMBER OF PRIMARY VACCINATIONS
AND ESTIMATED NUMBER ON THE BASIS OF SCAR SURVEY RESULTS
IN EAST JAVA PROVINCE, FEBRUARY 1968 - JUNE 1969

| | |
|--|---------------|
| (a) Estimated population in 1968 | 24 525 584 |
| (b) Estimated number of unprotected children determined by scar survey (Feb. 1968) | 1 813 900 |
| (c) Estimated number of newborns - Feb. 1968 - June 1969 | 1 451 530 |
| (d) (b) + (c) | 3 265 430 |
| (e) Estimated number of unprotected children determined by scar survey (June 1969) | 1 485 450 |
| (f) Estimated number of primary vaccinations performed (d) - (e) | 1 779 980 |
| (g) Reported number of primary vaccinations - Feb. 1968 - June 1969 | 1 843 822 |
| (h) Estimated number of successful primary vaccinations based on a take rate of 93% | 1 714 754 |
| (i) Difference (f) - (h) | 65 226 = 3.7% |

TABLE 3. COMPARISON BETWEEN REPORTED NUMBER OF PRIMARY VACCINATIONS AND ESTIMATED NUMBER ON THE BASIS OF SCAR SURVEY RESULTS IN EAST JAVA PROVINCE, FEBRUARY 1968 - JULY 1970

| | Pasuruan Reg. | Malang Reg. | Kediri Reg. |
|--|---------------|---------------|----------------|
| (a) Estimated population in 1968 | 802 356 | 1 602 957 | 1 033 758 |
| (b) Estimated Back Log in Feb. 68 on the basis of scar survey | 72 122 | 118 478 | 56 605 |
| (c) Estimated newborns Feb. 68 - July 70 | 80 235 | 160 295 | 103 375 |
| (d) (b) + (c) | 152 357 | 278 773 | 159 980 |
| (e) Estimated Back Log in July 1970 on the basis of scar survey | 34 752 | 51 605 | 30 525 |
| (f) Estimated number of primary vaccinations on the basis of scar survey | 117 605 | 227 168 | 129 455 |
| (g) Reported number of primary vaccinations Feb. 68 - July 70 | 91 107 | 216 801 | 155 838 |
| (h) Difference (f) - (g) | 26 498 (23%) | 10 367 (4.5%) | 26 383 (20.4%) |

TABLE 4. SUPERVISION SCAR SURVEYS DONE BY PROVINCIAL SUPERVISORS
SEPTEMBER 1969 - OCTOBER 1969

| No. | Regency/ Municipality | Subdistrict | Est. % of unprotected children | | | Take rates (15 or more persons) |
|-----|--------------------------|-------------|-----------------------------------|---------|----------|------------------------------------|
| | | | 0-1 yr. | 1-4 yr. | 5-15 yr. | |
| 1 | Kediri | Keras | 94 | 18 | 0 | |
| 2 | Ponorogo | Babadan | 29 | 8 | 3 | 17/18 = 94.4% |
| 3 | Bondowoso | Bondowoso | 62 | 25 | 5 | |
| 4 | Tuban | Merak urak | 85 | 20 | 4 | |
| 5 | Patjitan | Ngadiredjo | 10 | 17 | 2 | 16/16 = 100% |
| 6 | Magetan | Panekan | 17 | 4 | 0 | 22/22 = 100% |
| 7 | Modjokerto Mun. | Modjokerto | 24 | 15 | 2 | 20/20 = 100% |
| 8 | Djombang | Modjoagung | 76 | 23 | 1 | |
| 9 | Ngandjuk | Lotjeret | 20 | 8 | 0 | 19/19 = 100% |
| 10 | Bangkalan | Burneh | 57 | 13 | 5 | 14/15 = 93.3% |

TABLE 5. SUPERVISION SCAR SURVEYS DONE BY REGENCY SEP SUPERVISORS
JULY 1970 - AUGUST 1970

| No. | Subdistrict. | Village | Est. % of unprotected children | | |
|-----|--------------|-------------|--------------------------------|---------|----------|
| | | | 0-1 yr. | 1-4 yr. | 5-15 yr. |
| 1 | Silo | Garakan | 92 | 31 | 14 |
| 2 | Silo | Sumberdjati | 96 | 32 | 6 |
| 3 | Majang | Sidomukti | 92 | 11 | 0 |
| 4 | Majang | Seputih | 100 | 24 | 9 |
| 5 | Puger | Wringintelu | 8 | 1 | 0 |
| 6 | Puger | Bagon | 28 | 7 | 1 |
| 7 | Ambulu | Andongsari | 64 | 17 | 3 |
| 8 | Umbulsari | Sukorono | 64 | 11 | 0 |
| 9 | Balung | Karangduren | 24 | 4 | 2 |
| 10 | Rambipudji | Petjoro | 48 | 16 | 3 |
| 11 | Wirolegi | Wirowongso | 84 | 20 | 7 |
| 12 | Sumberbaru | Josoratih | 24 | 13 | 6 |
| 13 | Sukowono | Sukoredjo | 60 | 9 | 8 |
| 14 | Tanggul | Pondokdalem | 32 | 12 | 0 |
| 15 | Tanggul | Tanggul | 67 | 9 | 2 |
| 16 | Kentjong | Wonoredjo | 19 | 6 | 1 |
| 17 | Kentjong | Kraton | 9 | 5 | 0 |