



INTER-REGIONAL SEMINAR ON SURVEILLANCE
AND ASSESSMENT IN SMALLPOX ERADICATION

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LOW LEVEL TRANSMISSION OF SMALLPOX IN A WELL VACCINATED AREA
PASAR MINGGU, DJAKARTA, INDONESIA (FEBRUARY-AUGUST 1970)

by

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1.0 Introduction

In August 1970, a death in the administrative unit of Pasar Minggu (population: 14 367; area: approximately 20 sq. km.) was reported to a team which was conducting a scar survey to assess the level of smallpox vaccinations within the municipality of Djakarta, Indonesia. A subsequent investigation revealed that the patient had most probably died of smallpox and that it would be necessary to investigate further to find the extent and source of the outbreak. The results and conclusions of this further investigation are the subject of this report.

2.0 Summary of Findings

As of the date of the investigation, 29 August, 19 cases of smallpox had been discovered (Table 1), representing at least 11 generations, with the first case occurring on 28 February 1970. Five cases were still active and one additional case developed in the following week. After containment actions, no further cases were reported.

2.1 Source of infection and transmission pattern

As the first case occurred six months before the outbreak, it was difficult to determine the origin of this case. However, it is possible that the source was in the village of Balaikampong which is approximately one kilometre from the

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first case (Figure 1) across the Tjiliwung River. This village reported 38 cases of smallpox during week 38 of 1969 but no cases since that time. However, as the reporting system in this area is not optimum, it is possible that during the final months of 1969, and during January 1970, several cases remained unreported in Balaikampong. These unreported cases could have served as a link to Pasar Minggu. Balaikampong was investigated but we were unable to uncover any additional cases.

Referring to figure 1, the twenty cases represent a slow steady transmission over a twenty-one week period. As shown in figure 2, the infected houses were usually 50 to 300 metres from each other. Infection spread slowly through the area as a smouldering continuous chain of infection.

Nine cases resulted from intra-familial transmission while the remaining 10 cases (excluding the first case) were transmitted by personal visit to infected households. In the 13 separate households infected, there were 80 residents, of whom 26 had never been vaccinated. All 20 cases came from the group of 26 who had never been vaccinated.

TABLE 1. AGE DISTRIBUTION OF CASES

Age Group	Less than 1 year	1-4 years	5-14 years	More than 14 years
Number of cases	2	11	5	2

2.2 Level of protection before containment

The August scar survey (Table 2) which was completed before containment action was taken, indicates that 12% of the children under age 15 were unprotected (e.g. bearing no vaccination scar and having no pockmarks) and were thus susceptible to smallpox. As this age group in Indonesia represents only 40% of the total population and as most adults in Indonesia have at one time either been vaccinated or bear pockmarks, it can safely be stated that the proportion of unprotected persons of all ages in Pasar Minggu was a great deal lower than the above-mentioned 12%.

TABLE 2. SCAR SURVEY - PASAR MINGGU, DJAKARTA, AUGUST 1970

Age Group	Percentage unprotected	No. of persons seen
Less than 1 year	61%	48
1-4 years	20%	270
5-14 years	2%	181
Total	12%	499

3.0 Conclusions

The results of the investigation of the outbreak in Pasar Minggu clearly illustrate that the following concepts require consideration in an eradication programme:

1. A high level of protection against smallpox within an area is no guarantee against future transmission of smallpox among those persons still unprotected. Additionally, it is possible for smallpox to establish itself within such an area by maintaining a low but steady level of transmission.
2. Precise investigation, through containment measures, regular follow-up visits and continuing surveillance must take precedence over routine vaccinations.
3. Areas surrounding former reported cases of smallpox must be considered as possible areas of transmission and should, consequently, be surveyed at regular intervals.

FIGURE 1. PASAR MINGGU, DJAKARTA, INDONESIA
SMALLPOX OUTBREAK, 1970 - EPIDEMIC CURVE

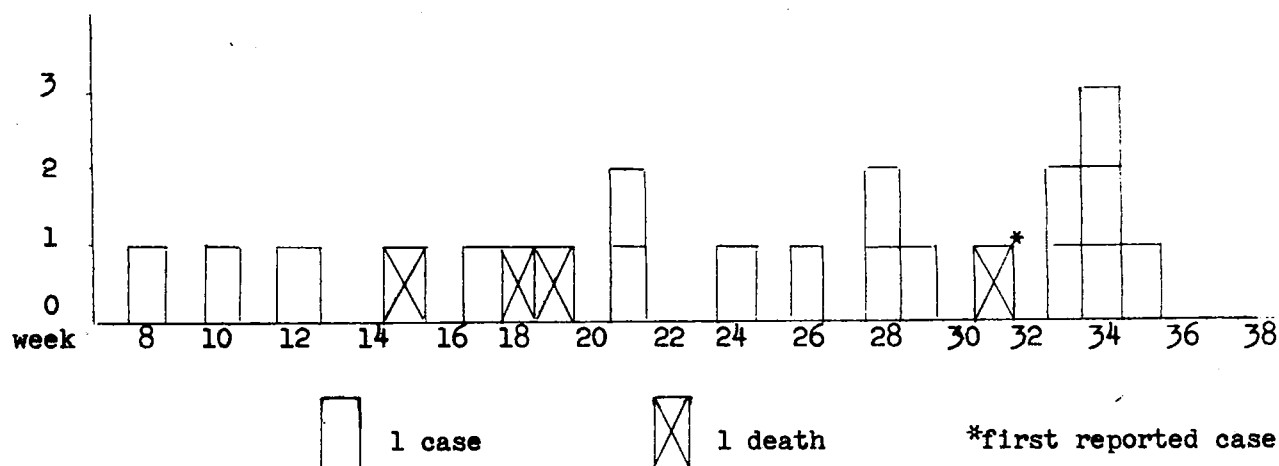
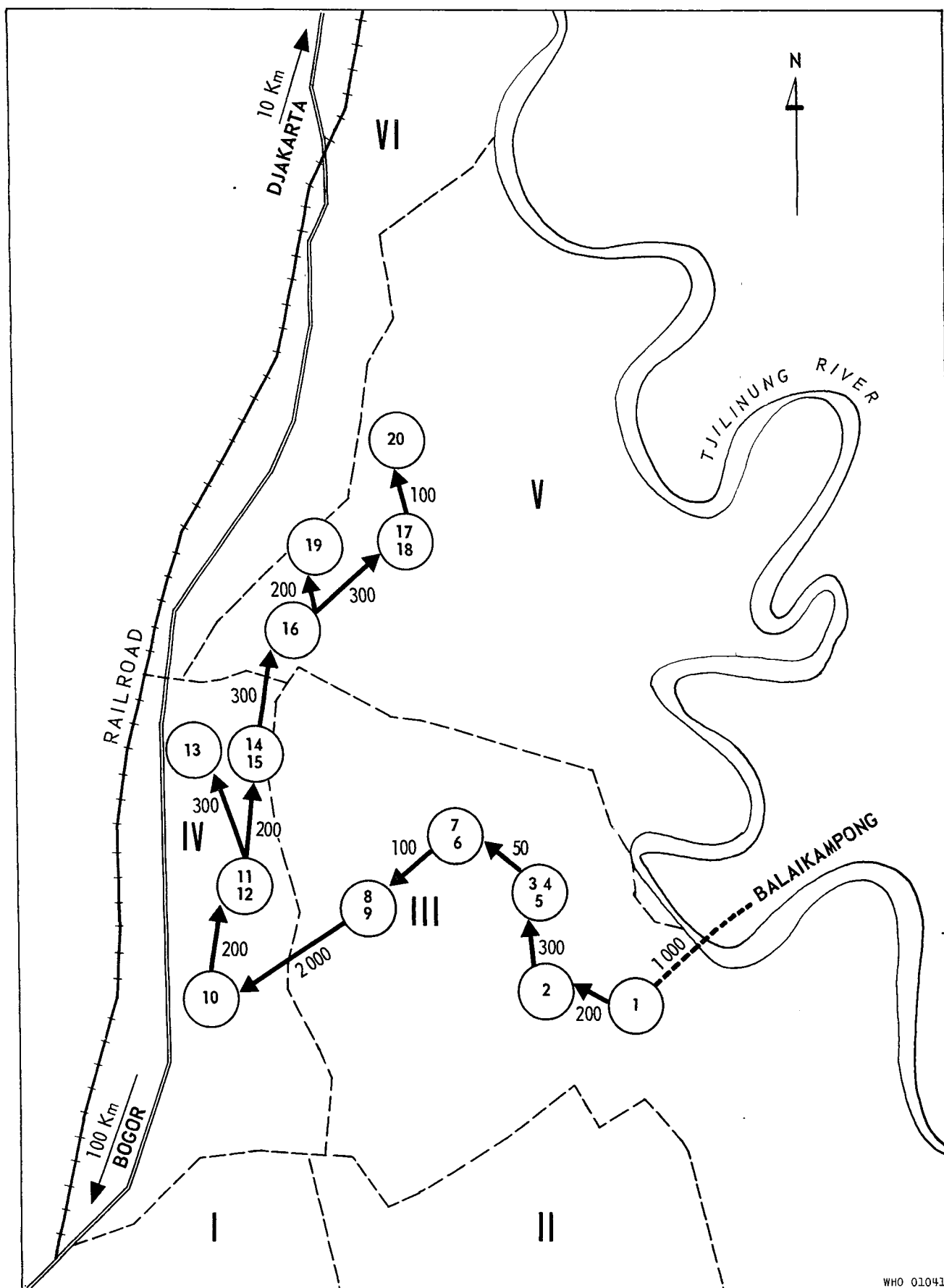


FIG. 2
PASAR MINGGU, DJAKARTA, INDONESIA - SMALLPOX OUTBREAK, AUGUST 1970



→ TRANSMISSION (IN METERS)
--- BOUNDARY LINES BETWEEN WARDS