



WORLD HEALTH ORGANIZATION
ORGANISATION MONDIALE DE LA SANTÉ

INDEXED

TEACHING EXERCISE - FIELD INVESTIGATION OF A SMALLPOX CASE

PROBLEM FOR STUDENTS

Section I

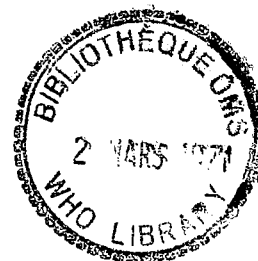
On Thursday afternoon, 3 November, the chief of Bala village (population 150) reported to the Medical Officer in Camal City (population 15 000) that one of the village children had a fever with a rash. He thought the child might have smallpox. The Medical Officer asked a vaccinator to investigate.

The vaccinator visited the village on Saturday, 12 November. He found that a 10-year-old girl, Efta Aye, had become sick about two weeks before. After a few days of fever, a rash appeared on her face, legs and arms, with a few lesions on her trunk. Her mother said she had been vaccinated 6 months ago.

The child looked well and had no fever although there were still scabs on her face, arms and chest. The mother said there were a number of cases of chickenpox in the village. Some had occurred among playmates of the patient. Considering this, as well as the fact that the child had been vaccinated recently, the vaccinator concluded that she probably had chickenpox.

None of the other 6 members of the family was sick except for the patient's 2-month-old brother, Carlo Aye, who had a fever. The vaccinator examined the child to determine if a rash was present but found none.

He returned to the District Health Office and reported to the Medical Officer that there were chickenpox cases in Bala village but no evidence of smallpox.



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Section II

Nine days later, on 21 November, the chief of the village sent another message to the Health Officer. It said that another child in the family had a rash and was very sick.

The Medical Officer sent the Surveillance Officer, a Senior Health Inspector, to the village. He departed immediately. The very sick child, Carlo Aye, the 2-month-old brother of Efta Aye, was found to have an extensive rash. It was pustular and heaviest on the face, arms and legs although there were a number of lesions on the chest and back. The rash was typical for smallpox. The mother said that the child had become sick about 11 November and had developed a rash after 2 or 3 days of illness. The mother said he had not been vaccinated as the vaccinator had told her that children should not be vaccinated until they were at least 3 months of age.

The Surveillance Officer examined all the other family members and vaccinated them. Among those examined was 10-year-old Efta Aye whose scabs had almost all come off (onset, 30 October). The Surveillance Officer looked for a vaccination scar but found none. He asked the mother about other smallpox cases whom Efta Aye might have been in contact with. The mother knew of none. He asked the mother if she knew of any other persons who had been sick during the last month. She said that there was a lot of chickenpox in the village and her sister had been ill and had some sort of rash. He instructed the mother, as well as the village chief, that the children were to remain in the house until all scabs had fallen off and that no visitors should be allowed to enter the house.

The Surveillance Officer went to the sister's house which was located in the village. The sister, Nona Dee, a 42-year-old woman, had a few scabs on her face, arms and legs. A vaccination scar was present on her arm. She said she had been vaccinated when she was a child and had been revaccinated 4 or 5 years before. She had developed a rash about 10 days previously (11 November). Prior to her illness she said she had frequently visited her sister's house. She knew of no other families in the village with smallpox. However, her one-year-old son, Jojo Dee, had developed a fever one week before; vesicles had appeared three days later (17 November) and could now be seen on his face. He had never been vaccinated. The Surveillance Officer examined the child, confirmed what she had said, vaccinated all members of the household, and instructed her about the need for isolation.

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Section III

With the village chief, the Surveillance Officer went house-by-house inspecting all persons and vaccinating everyone without regard to when the person had last been vaccinated. A total of 120 of the 150 residents were vaccinated. No other cases of smallpox were found and none of the residents knew of any other cases in neighbouring villages. As the mother had indicated, however, there were a number of recently recovered and acute cases of chickenpox.

On the basis of the history and dates of onset of the different cases, he concluded that Efta Aye must have introduced smallpox into the village. He returned to the house of the Aye family and asked the mother where Efta Aye had been during the 2 weeks before she got sick with smallpox. The mother reported that Efta Aye had been hospitalized because of measles in Camal City and had returned home only a week or so before she became sick again. Except for being in the hospital she had not been outside the village and they had had no visitors.

The Surveillance Officer arranged for a vaccinator to remain in the village overnight in order to vaccinate the 30 residents who had been missed. He then returned to Camal City.

On the morning of 22 November, he visited the 100-bed hospital and confirmed that Efta Aye had been hospitalized there between 7 and 18 October. However, the hospital director said that they had admitted no cases of smallpox for more than a year. The Surveillance Officer examined the available hospital records for the previous 3 months but could find no record of a patient with smallpox having been admitted to the hospital.

He then talked to two other doctors and several nurses but none could recall any cases of smallpox in the hospital.

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Section IV

The Surveillance Officer asked if any patients with chickenpox had been admitted to the hospital since early October. He was told that there had been none. He then asked if any patients had died during the time that Efta Aye was in the hospital. After considerable investigation and discussion, it was determined that 3 persons had died, one after being severely wounded in a fight, one very young infant with severe diarrhoea and a 20-year-old pregnant woman who had experienced an illness which the doctors had diagnosed as hemorrhagic fever. The pregnant woman, Ana Bo, had been admitted to the hospital on 16 October and she had died on 20 October. Her illness was said to have lasted about 6 days.

The Surveillance Officer reported his findings to the Medical Officer who immediately went to the hospital and persuaded the hospital director of the need to vaccinate all patients. The hospital director also agreed in the future, to vaccinate all patients admitted to the hospital and to revaccinate his staff every 3 years. The Surveillance Officer with assistance from the nurses, vaccinated all patients and staff - 175 persons in all. He next obtained the names of 14 persons who had been in the same ward at the same time as Ana Bo and sent a sanitarian to try to find these persons.

He learned that Ana Bo, the pregnant woman who had died, was from Como village, a village of 90 persons which was about 4 miles away.

On the following day, 23 November, he drove to the village. When he arrived, he talked to the village chief who said that the Bo family had come to the village early in October but that the mother had died soon after they arrived and that the family had returned back to their home in another Province. He did not know where in the Province they had come from. He knew of no cases of smallpox in his village.

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Section V

The Surveillance Officer talked to the families which had lived near the Bo family. They confirmed what the village chief had said. They knew of no cases of smallpox in their village. They were, however, able to provide the name of the city from which the family had come and to which they returned. The city, Gavon, has a population of about 500 000 persons. The family was very poor and was thought to have lived in a slum area.

The Surveillance Officer proceeded from house-to-house vaccinating all inhabitants and checking for recent cases of smallpox. In one house at the edge of the village, he found another family from the same city as the Bo family but who had lived in the village for almost a year. Two children, a boy Ritso Fay, 5-years-old, and a boy Bibi Fay, 3-years-old, were sick with fever and had pustules which were most dense on the face, arms and legs. They had both developed a rash 4 days before, i.e. about 19 November. A 2-year-old sister, Tonia Fay, was covered with scabs in a distribution characteristic of smallpox and a 6-year-old brother, Limo Fay, showed depigmented areas, also in a distribution characteristic of smallpox. The sister had developed a rash about 8 November and the brother about two weeks before that (25 October). None had scars of vaccination. The family, however, denied having had any contact with the Bo family.

By staying in the village until late in the evening, the Surveillance Officer was able to vaccinate 83 of the remaining 85 persons. Two adult males who had been working in a distant town for the past 10 days were missed.

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Section VI

On the following morning, 24 November, the Surveillance Officer informed the Medical Officer about the patient, Ana Bo, and the fact that she had probably acquired smallpox in Gavon City or the neighbouring province.

The Medical Officer arranged immediately to inform the health officer in Gavon City as well as the Smallpox Eradication Officer at Provincial level.

There were 8 other villages near the afflicted villages which ranged in size from 50 to 300 persons. The Surveillance Officer visited each of these and spoke with each village leader, the school teachers and school children. He showed them pictures of smallpox patients and asked if they knew of any cases in the area. In 2 villages, he was told that there were children with skin rashes which might be smallpox. The patients were examined. One was found to have chickenpox and the second, a skin infection.

In Volta village (population 90), the seventh village which he visited, one of the school children told him of 2 cases which had recently occurred. He went to the house and examined the patients - one was an 8-year-old boy, Elvis Lal, who had depigmented areas on the skin in a distribution characteristic of smallpox. He had become ill about 5 November. The second case was his 4-year-old sister, Saba Lal, who had become ill about 19 November and now had a vesicular rash which had been present for 2 days and was suggestive of early smallpox. Neither had vaccination scars. The mother said she knew of no other cases in the village and had no idea where Elvis could have become infected as he had not been out of the village for many months and they had had no visitors for a very long time.

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Section VII

The Surveillance Officer vaccinated all those living in the household except the father who had left the village one week before to seek employment in a distant city. No one knew how to contact him nor when he would return. He then asked the women in neighbouring houses if they knew of any visitors to the Lal family or if the Lal family had made any trips to other villages during October. One of these neighbours reported that the Lals had visited Como village some time in October. When this was repeated to the mother in the Lal family, she recalled that this was so. In fact, they had spent a week in Como village in the last part of October but she denied knowing the families who had developed smallpox.

The Surveillance Officer proceeded from house-to-house and was able to vaccinate 85 persons. He found no additional cases of smallpox.

He returned to Camal City. On the following morning, the supervisor reported that he had been able to discover 12 of the 14 patients who were known to have been in the same ward of the hospital with Ana Bo. All were in good health.

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Section VIII

Two weeks later, on 9 December, the Surveillance Officer visited each of the afflicted villages to determine if additional cases might have occurred and to check vaccination takes. Over 95 per cent. of the unvaccinated pre-school children had vaccination takes. One additional case was found in the Lal family of Volta village. The father, Koko Lal, a 25-year-old carpenter, had become ill on 1 December with fever and backache and had returned to the village. Two days later, he developed a rash over his face, arms and legs which was now becoming pustular.

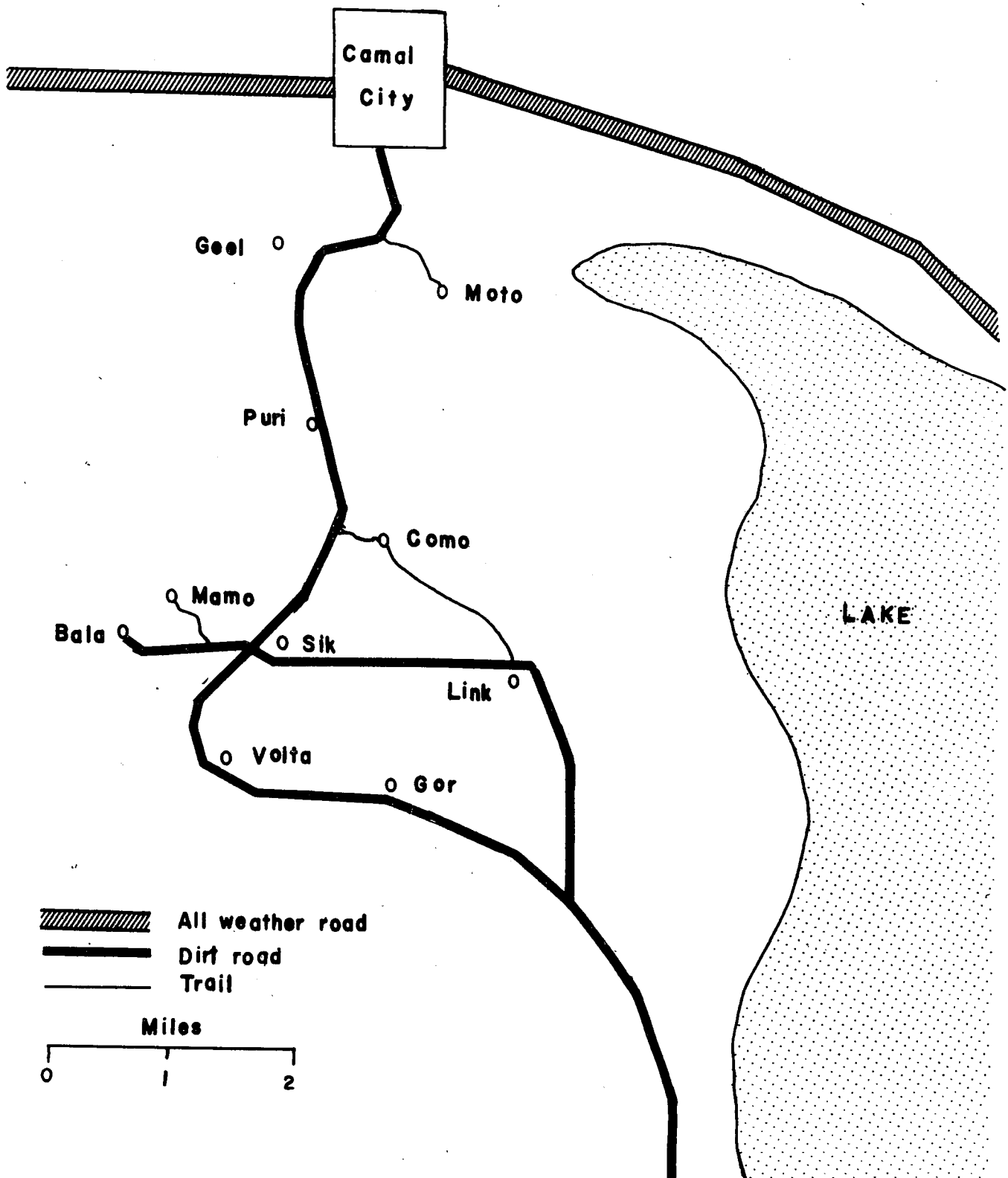
The village was again checked on a house-to-house basis to ensure that all persons had been vaccinated during his last visit and that all had either a scar of primary vaccination or a primary vaccination take. During the house-to-house visit, he found a family who had just moved into the village. They were vaccinated on the spot.

He then visited the hospital in Camal City and, with the director, examined all patients to be certain that all were being vaccinated on admission. Three patients were found who had not been vaccinated. They were promptly vaccinated and procedures were again checked to be certain that in the future, all patients would be vaccinated on admission to the hospital.

Fig. 1

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MAP OF AREA



**SAMPLE
CONTAINMENT VACCINATION
TALLY FORM**

PROVINCE/DISTRICT _____

INVESTIGATION NO.

SURVEILLANCE OFFICER

VILLAGE _____

DISTRICT

DATES

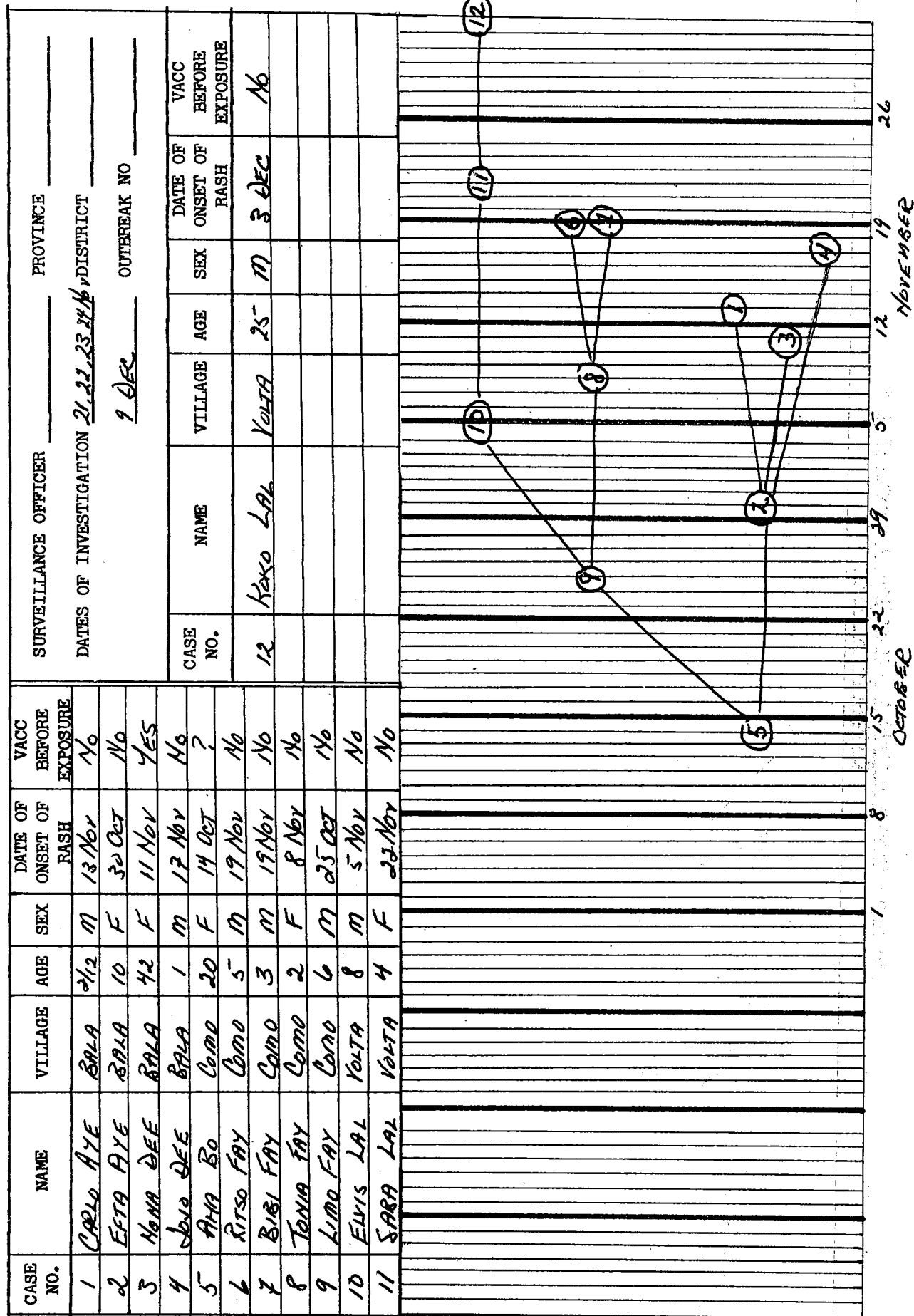
VACCINATION DONE IN ENTIRE VILLAGE/TOWN

VACCINATION DONE IN PART OF TOWN

[illegible]

[illegible]

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I SUMMARY OF INVESTIGATION

DATE NOTIFIED 3 Nov
 DATES OF INVESTIGATION 12, 21, 22, 23, 27 Nov 9 Dec
 DATE OF FIRST CASE 14 Oct
 DATE OF LAST CASE 3 Dec

STATE/PROVINCE _____
 INVESTIGATION NO. _____
 DISTRICT _____
 VILLAGE _____
 SURVEILLANCE OFFICER _____

II RESUME OF CASES

<u>AGE</u>	<u>CASES</u>			<u>DEATHS</u>	<u>VACCINATION SCAR PRESENT</u>		
	SEX						
	M	F	TOTAL		YES	NO	?
<1	1	0	1	0	0	1	0
1-4	2	2	4	0	0	4	0
5-14	3	1	4	0	0	4	0
15-44	1	2	3	1	1	1	1
45 +	0	0	0	0	0	0	0
?	0	0	0	0	0	0	0
Total	7	5	12	1	1	10	1

III METHOD BY WHICH CASES WERE FOUND

	NO.
ROUTINE NOTIFICATION	<u>2</u>
INVESTIGATION OF OTHER CASES	<u>10</u>
OTHER	<u>0</u>
TOTAL	<u>12</u>

IV VACCINATION PERFORMED TO CONTROL OUTBREAK

A. HOUSEHOLD MEMBERS AND CLOSE CONTACTS

NO. _____ NO. VACCINATED _____

B. VILLAGE OR SECTION OF TOWN	NO. ENUMERATED	NO. VACCINATED
<u>BALA</u>	<u>150</u>	<u>150</u>
<u>Como</u>	<u>90</u>	<u>88</u>
<u>VOLTA</u>	<u>90</u>	<u>85</u>