ASSOCIATED WITH EXPOSURE AT A FUNERAL CEREMONY:

SMALLPOX OUTBREAK - YAWEI CHIEFDOM

KAILAHUN DISTRICT, SIERRA LEONE

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BACKGROUND

An outbreak of smallpox occurred in Yawei Chiefdom, Kailahun District, Sierra Leone, in May 1968.

Kailahun District is bordered on the east by the countries of Guinea, and Liberia, and on the west by Kono and Kenema Districts in Sierra Leone. Approximately 162,615 people reside in the District which has a population density of 97.0 persons per square mile. An international market is situated at Koindu, near the point where the three countries meet. The district has a comparatively extensive laterite road network, two hospitals, two health centres, three mission dispensaries, and fifteen treatment centres, and consistently, the lowest incidence of smallpox in Sierra Leone.

THE EPIDEMIC

Smallpox cases in the Yawei outbreak were first reported in late May, 1968, to a local health inspector who immediately sought out and isolated the patients and conducted "ring" vaccinations among individuals in close contact with these patients. On June 8, the Sierra Leone Smallpox Eradication/Measles Control Programme received word of the outbreak and subsequently despatched a vaccination team which administered 3,421 vaccinations in the Chiefdom on June 14 and 15.

EPIDEMIOLOGICAL INVESTIGATION

The index case for the epidemic was a 40-year old female petty trader who visited the village of Wordu, in Kono District, sometime in late April. She was there only overnight. Approximately one week after her return to the village of Kavuyama, she complained of headache, fever and neck pain, five days later she developed a rash; two days after that, she died. Her illness was not recognized as smallpox at that time.

The woman was also local head of the Bundu (Sande) Society, a secret female society. Several visitors came to see her during her illness. Women from throughout the chiefdom and beyond attended her funeral. In all, an estimated 243 persons attended her funeral (110 persons from the village of Kavuyama, 130 from other towns in Yawei Chiefdom, 3 persons from adjacent Sandaru Penquia Chiefdom). A listing of the cases, describing those individuals who developed smallpox after contact with the index patient, is given in Table 1.

A peculiar pattern of exposure and transmission resulted from the index patient's position as head of the female secret society.

Ninety percent of the secondary cases occurred in persons over 30 years of age, and 70% of the secondary cases were women over 30 years. Of the ten secondary cases, seven were individuals who had been vaccinated, but more than five years previously; all these seven patients recovered. The three other secondary cases had never been vaccinated, and one of those died. Furthermore, the individuals most exposed to the index case were generally over 15 years of age.

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In a scar survey (Table 2) which was conducted on June 12, it was observed that 73% of the over 15 years age group showed old vaccination scars, indicating that a significant amount of protection existed among this group. This would partly account for the limited extent of the smallpox transmission in the epidemic.

Three types of exposure to the index patient were identified as apparently responsible for the transmission of smallpox in the epidemic: (1) visit to the index patient during her illness; (2) washing of the corpse. (3) attendance at the funeral. With the exception of the seventh patient, all the secondary victims experienced at least two of these kinds of exposure. Four of the patients experienced all three types of exposure. Case 7, the only case with a single exposure, was unvaccinated. Of the six persons who washed the index case's corpse, all six were infected. However, since the interval from washing the corpse to onset of disease in two of these was only 8 days, it is more likely that they were infected while visiting the index case before her death. The attack rates were much lower among those individuals exposed by visiting the ill woman, or by attending her funeral (10/243, attack rate of 4.1%). The overall case fatality rate was 18.3%.

Case seven had direct contact with the index patient only once, on the day of the funeral. His rash began on May 24. Unless he was infected by virus passively brought home by his mother (who visited the index patient while she was ill), he must have been infected about May 12. Hypothetically, therefore, the index patient's rash began sometime around May 9 or 10.

Although the corpse was kept in the house of case four for 24 hours, it is surprising that there were no other infections in this household. Of the fifteen inhabitants, none had been vaccinated in the past 5 years; seven had never been vaccinated. It is perhaps significant that the body had already been washed, and also was obviously no longer exhaling virus.

CONCLUSION

The fact that the index smallpox patient apparently developed smallpox after an overnight visit in the Kono-Koinadugu area is probably typical of many such episodes in which smallpox is spread by transient visitors or residents to a highly endemic area. Moreover, the importance of intimate contact in spread of the disease is also illustrated.

This outbreak barely hints at the potential for wide-spread dissemination of smallpox as a result of widely attended funeral ceremonies for prominent victims of the disease, often secret society officials. In rural areas of Sierra Leone, this mode of dissemination is frequently implicated as the origin of wide-spread smallpox outbreaks.

Perhaps the most important point about this outbreak, however, is that it illustrates the effectiveness of early isolation of cases and vaccination of immediate contacts.

TABLE 1

SMALLPOX CASES - YAWEI CHIEFDOM

Case No.	Village	Age	Sex	Onset	Vaccinated	Outcome	EXPOSURE: Visited Patient	EXPOSURE: Washed Corpse	EXPOSURE: Attended Funeral
1*	Kavuyama	40	F	mid May?	?	Died	-	-	-
2	Kavuyama	50	M	5/22	No	" 6/7	Yes**	No	Yes
3	Kavuyama	30	M	5/23	No	Recov.	Yes	No	Yes
4	Kavuyama	30	F	5/23	>5 yrs	Recov.	Yes	Yes	Yes
5	Kavuyama	35	F	5/23	>5 yrs	Recov.	Yes	Yes	Yes
6	Kavuyama	45+	F	5/24	< 5 yrs	Recov.	Yes	No	Yes
7	Kpanguima	4	M	5/24	No	Recov.	No	No	Yes
8	Bendu	50+	F	5/26	>5 yrs	Recov.	?	Yes	Yes
9	Malema	45+	F	5/26	>5 yrs	Recov.	Yes	Yes	Yes
10	Malema	60+	F	5/26	>5 yrs	Recov.	Yes	Yes	Yes
11	Bendu	60	F	5/29	>5 yrs	Recov.	No	Yes	Yes

* Index Case

** Husband of case 1

TABLE 2

Vaccination Scar Survey, Yawei Chiefdom

Age	Percent with Vaccination Scar
< 1	0
1-4	17
5-14	57
15-44	75
45+	70