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SMALLPOX TRANSMISSION IN AN ISOLATED NOMADIC GROUP

by

S. O. Foster,¹ H. E. S. Abdulgadir,¹ and H. A. Kamaluddin²



The 1977 smallpox epidemic in Somalia, possibly the world's last, has directed attention to the problem continuing smallpox in isolated population groups in remote rural areas. Detection and control of smallpox in nomadic groups provides a significant challenge to national eradication programmes and to the International Commission charged with certifying the world as smallpox free. The following is an account of a smallpox outbreak in one such nomadic group.

The location of the outbreak

Mandeelo village is the current name for an impermanent nomadic village of 10 huts and 46 people with 200 camels, 500 goats and 30 cows located in Tieglow District, Bakool Region, Somalia. This group has moved together since their religious leader, now 83, was a young man. As each of the 10 families in the village has two to three pieces of farming land "three minutes by three minutes walk at a fast pace", the group is classified as semi-nomadic. Depending on the availability of grass for grazing and water, the village moves four to 30 times per year. The preferred living area and extended living area, travelled over in drought years, are shown in Fig. 1.

The group's perception of smallpox

The residents of Mandeelo are devout Moslems. Smallpox is believed to come from Allah and its prevention depends on religious activities which include reading from the Koran. When the village became infected prayers were offered "to protect us from death" and "to raise the epidemic from us". Treatment consisted of reading from the Koran, copying Koranic scriptures and, for some, drinking of a potion of water poured over a board covered with Koranic writings. Vaccination was not considered to be effective in preventing smallpox.

Pre-outbreak immunity status

Left upper arm scars, often self-induced, numerous and resembling vaccination scars, are common among Somali nomads. Immunity status cannot, therefore, be reliably assessed by checking for vaccination scars. Susceptibility to smallpox was determined by smallpox infection or by development of a primary vaccination reaction in individuals with no previous history of vaccination (Table 1).

¹ WHO consultant, Smallpox Eradication Programme, Somalia.

² National Surveillance Worker, Somalia.

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TABLE 1. SUSCEPTIBILITY TO SMALLPOX OF 44 MEMBERS OF THE NOMADIC GROUP^a

Age-group	No. of persons in age-group	Previously vaccinated		Not previously vaccinated			
		No.	%	No.	%	Final outcome	
						Smallpox	Vaccination take ^b
0- 4	6	0	0	6	100	6	0
5-14	10	0	0	10	100	8	2
15-45	17	1	6	16	94	4	12
45+	11	9	82	2	18	1	1
Total	44	10 ^c	23	34	77	19	15

^a Two of the 46 member-group were absent throughout the containment period but were followed-up.

^b Typical primary vaccination reaction produced.

^c Nine of these had been vaccinated more than 15 years previously and four of those produced vaccination reactions typical of primary vaccination.

The outbreak

Smallpox was imported into Tieglow District in February 1977 by religious pilgrims coming to celebrate Mohammed's birthday at a religious shrine at Biyooley. About 5000 people reportedly attended the celebration and it was later reported that "several" smallpox cases had been present. One religious pilgrim became infected with smallpox at Biyooley and in the rash stage of the disease he visited the nomadic group, then located in Boralow, and spent a night in one of their huts. Ten days later the first case of smallpox amongst the nomadic group developed. Over the next five months, 18 additional cases occurred as the village moved through four areas (Fig. 2). Three of these cases occurred in a subgroup of the village which moved to Bay Region. These cases could possibly have been infected by another contact, but, if so, the source is unclear.

Outbreak detection and control

With the intensification of the Somalia smallpox eradication programme in March 1977, a 200 Shilling (then approximately US\$ 33) reward was introduced for the reporting of each new outbreak of smallpox. An unpaid volunteer searcher, who had previously received two rewards, reported the Mandeelo outbreak on 26 June, four months after the introduction of the disease into the group. A two-man vaccination team and two isolation guards were posted to the village. All residents and visitors were listed and vaccinated. The 11 active patients were isolated under guard in the village. Three additional smallpox cases occurred after the initiation of containment. Two were vaccinated after infection and had mild modified smallpox. The third case, a six-year old girl, developed severe disease on 27 July. This child had been vaccinated at the time of containment but her parents reported that she had applied "a spit and stick treatment" to the vaccination site which had apparently prevented a successful take. No additional cases occurred in this outbreak nor were any exportations to other villages detected. No deaths occurred.

Discussion

At the time of containment 19 individuals produced a reaction typical of primary vaccination. Presumably all were still susceptible to smallpox and could have continued transmitting the disease if containment had not been initiated.

During the outbreak 19 of 34 persons never previously vaccinated (56%) were infected with smallpox, over an estimated 8-10 generations of transmission. Such low rates of spread could enable smallpox transmission to continue for six to 10 months in similar small isolated nomadic groups.

Repeated thorough searches of areas inhabited by nomadic groups must be carried out before it can be confidently claimed that these areas are free of smallpox.

FIG. 1. PREFERRED AND EXTENDED LIVING AREAS OF THE NOMADIC GROUP

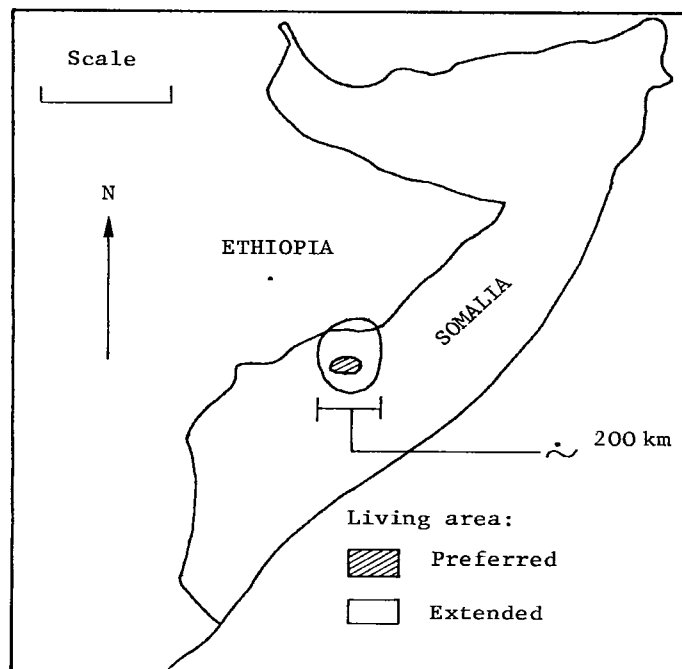
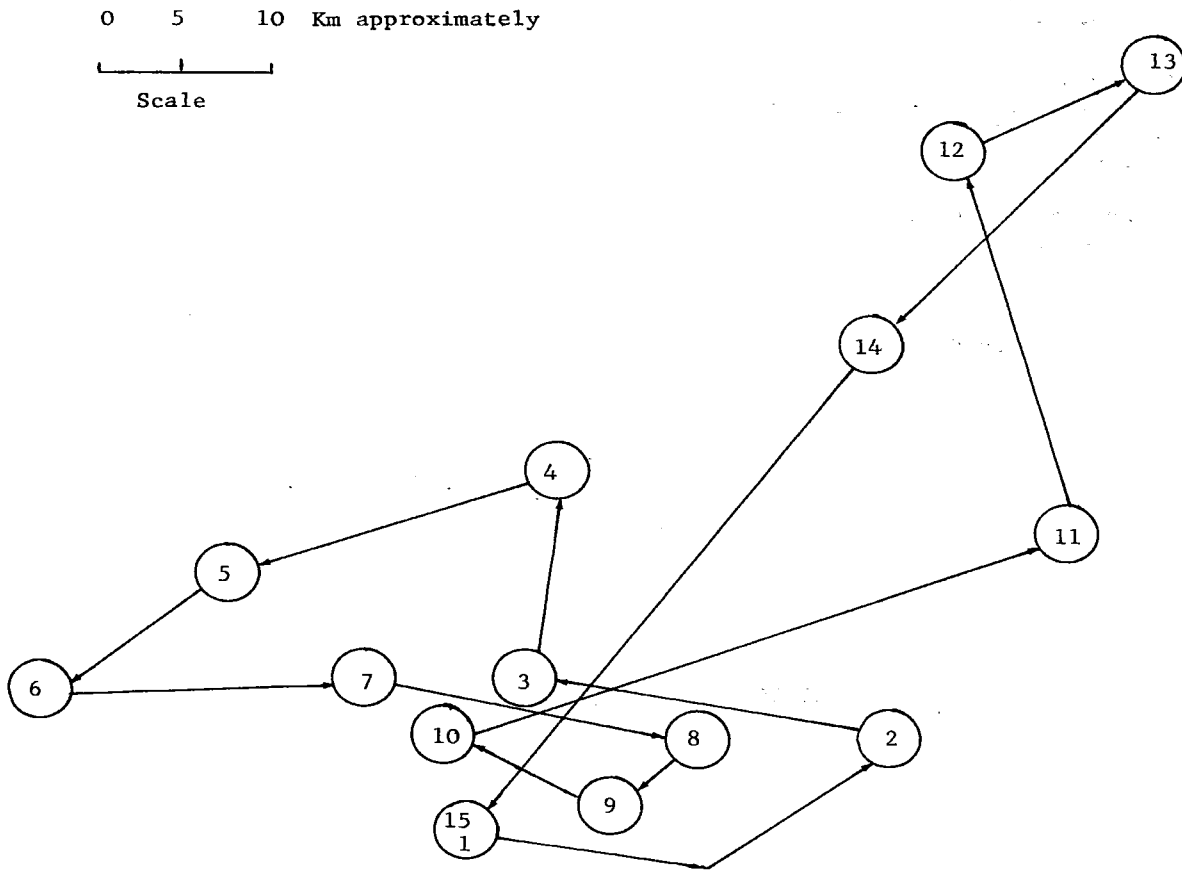


FIG. 2. DIAGRAMMATIC REPRESENTATION OF THE MOVEMENTS OF THE NOMADIC GROUP OVER A 14-MONTH PERIOD



<u>Number</u>	<u>Location</u>	<u>Date of arrival</u>	<u>Length of stay in days</u>
1	Geide	10 June 1976	30
2	Gobet Hassan	10 July 1976	20
3	Fajar Buolo	1 August 1976	30
4	Kos Gaboro	1 September 1976	20
5	Boor Arrow	20 September 1976	30
6	Maroroy	20 October 1976	20
7	Dagiise	10 November 1976	30
8	Bor Kus	10 December 1976	30
9	Rota Bakool	10 January 1977	20
10	Boralow	1 February 1977	40 smallpox
11	Farta Harrey	8 March 1977	30 smallpox
12	Madagasey	8 April 1977	30 smallpox
13	Ceel Gidood	8 May 1977	40 smallpox
14	Mandeelo	18 June 1977	67 ^a smallpox
15	Geide	13 August 1977	

^a The stay at Mandeelo was prolonged at the request of the Smallpox Programme staff to ensure complete containment.