

Epidemiological studies on the 1967–1968 foot-and-mouth disease epidemic: the reporting of suspected disease

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SUMMARY

From an analysis of the telephone reports in ten FMD Control Centres in the West Midlands, the veterinary officers' reports on each outbreak, the farm patrol reports and the daily number of outbreaks announced on the 17.50 h B.B.C. T.V. News, it would appear that the reporting of suspected outbreaks was indirectly related to the local disease activity. Private veterinary practitioners reported older cases of FMD at the beginning and end of the epidemic than in the middle.

INTRODUCTION

To a disinterested observer during this epidemic, the heightened atmosphere in the West Midlands during the 1967–8 Foot-and-Mouth Disease epidemic had much in common with the cholera epidemics of the past century or Defoe's Great Plague. About the individual farm tragedies were the hyperactivity of peripheral groups, the appearance of old beliefs in the prophylactic properties of onions and of a new belief in borax, reinforced by the need for any means of protection, and the charity of neighbours.

Anyone visiting a farm during diagnosis or slaughter became aware of the intense 'bush telegraph' activity about the farm. Information not only went out, it also came in with equal rapidity and accuracy, thanks largely to the telephone. During the epidemic there were frequent newspaper accounts of the clinical disease and of local outbreaks. Pamphlets and posters were distributed by the Ministry and advice given by officers, especially those involved in patrolling duties checking farm stock. It can be assumed that after a few weeks of such sustained information every farmer knew what symptoms to look for and the importance of prompt notification. As a result, because the majority of farmers and their families refused to leave their farms, virtually all reports of suspected disease were telephoned into the local FMD Control Centres or to the police. Under Section 8 of the Diseases of Animals Act, 1950, anyone suspecting FMD must report it to the police.

As the control machinery depends on the individual farmer noting that his stock have FMD and then reporting his suspicion, we felt that it was important to study some of the factors which affect the initial reporting of this disease.

METHODS

Four sources of information were available: (i) the veterinary report on each outbreak; (ii) the telephone log in certain Centres; (iii) the number of outbreaks reported on the 17.50 h B.B.C. T.V. News each day during the epidemic; (iv) the farm patrol records maintained at each FMD Control Centre, showing when each farm was visited by a veterinary officer. The written veterinary report (i) on each outbreak contains the date and originator of the report of suspected disease, the species of affected stock, the date of disease confirmation, and information on the apparent age of clinical disease as well as the results of further investigations. This information was abstracted on all outbreaks (see Hugh-Jones & Wright, 1970). In ten Centres – Chester, Crewe, Ellesmere, Llangollen, Macclesfield, Market Drayton, Oswestry, Shrewsbury, Stafford and Worcester – the results of investigations of individual telephone reports of suspected outbreaks were recorded against the initial report in the logbook (ii). These were abstracted as positive (FMD confirmed) or negative (FMD not confirmed); the condition that the farmer thought might have been FMD was seldom recorded. The 17.50 h B.B.C. T.V. News was chosen because for the majority of farmers this would be the first opportunity of hearing the news after work and because the British public regarded the B.B.C. as the provider of official news; some farmers would have gone to bed before any later news programmes. However, the inclusion of news items depends on its relative importance to the other news that day and not its absolute value. Unfortunately disease confirmation can be quite lengthy and the 24-hour total reported to the broadcasting companies at 17.00 h cannot be assumed to have contained a constant proportion of the outbreaks in the process of being confirmed as a result of the suspicions generated at the afternoon milking.

RESULTS

Origin of reports

Of the 2252 outbreaks involving cattle and pigs, 73 % were reported by the owner or an employee, either directly or through the police, 21 % by his veterinary surgeon, 4 % by patrolling veterinary officers, and in 2 % the reporter was not recorded, or was in one instance a Public Health Inspector (Tables 1 and 2). In the initial stages, most cases were reported by private veterinary surgeons. By the first week in November, possibly owing to the intensive publicity, the farmers were increasingly contacting the Control Centre themselves and this reached a peak of 83 % of outbreaks by the third week in December. Private veterinary surgeons were again involved more frequently as the epidemic ended. Of the outbreaks reported by farmers 63.5 % were made on the day clinical disease apparently appeared. Corresponding figures for the reports made by patrolling veterinary officers and by practising veterinary surgeons were 60 % and 52 % respectively. As the epidemic progressed, the private veterinary surgeon was responsible for reporting a higher proportion of older cases. The percentage of first day reports by farmers remained fairly steady about their mean throughout the epidemic (see Figure 1).

Table 1. *Origins of reports of confirmed outbreaks of FMD in cattle and pigs by week*
(Figures in parentheses are percentages.)

Week	Outbreaks reported by			
	Farmer	Veterinary practitioner	Patrolling veterinary officers	Others
21. x. to 27. x.	0	1 (100)	0	0
28. x. to 3. xi.	25 (45)	27 (49)	1 (2)	2 (4)
4. xi. to 10. xi.	83 (58)	54 (38)	4 (3)	2 (1)
11. xi. to 17. xi.	210 (72)	68 (23)	5 (2)	7 (2)
18. xi. to 24. xi.	331 (73)	97 (21)	14 (3)	12 (3)
25. xi. to 1. xii.	293 (79)	58 (16)	9 (3)	9 (3)
2. xii. to 8. xii.	221 (76)	50 (17)	15 (5)	4 (1)
9. xii. to 15. xii.	152 (74)	26 (13)	23 (11)	3 (1)
16. xii. to 22. xii.	124 (83)	16 (11)	6 (4)	4 (3)
23. xii. to 29. xii.	86 (77)	17 (15)	4 (4)	4 (4)
30. xii. to 5. i.	38 (68)	15 (27)	3 (5)	0
6. i. to 12. i.	30 (68)	11 (25)	2 (4)	1 (2)
13. i. to 19. i.	11 (61)	4 (22)	2 (11)	1 (6)
20. i. to 26. i.	15 (65)	8 (34)	0	0
27. i. to 2. ii.	4 (57)	3 (43)	0	0
After 2. ii.	21 (57)	9 (24)	4 (11)	3 (8)
Totals	1644 (73)	464 (21)	92 (4)	52 (2)

Table 2. *Age of apparent clinical FMD in cattle and pigs in relation to origin of report*

(Figures in parentheses are percentages.)

Reported by	Outbreaks			
	Same day	Next day	Later	Totals
Farmers	1044 (63.5)	550 (33.4)	50 (3.0)	1644 (73.0)
Private veterinary practitioners	242 (52.2)	189 (40.7)	33 (7.1)	464 (20.6)
Patrolling veterinary officers	55 (59.8)	33 (35.9)	4 (4.3)	92 (4.1)
Others, not stated	31 (59.6)	14 (26.9)	7 (13.5)	52 (2.3)
Total	1372 (60.9)	786 (34.9)	94 (4.2)	2252

Telephone records

The number of telephone calls to each of the ten Centres reporting suspected disease is given in Table 3. These figures refer to the period from the setting up of a centre to either mid-January or, in the case of the Worcester Centre, when it was closed. There was a total of 5700 initial telephone calls reporting suspected cases or eight calls per Centre per day. This activity ranged from 3 per Centre day (Llan-gollen) to 13 per Centre day (Crewe). Of more interest is the ratio of negative to positive telephone calls. The further the Control Centre was from the epidemic the

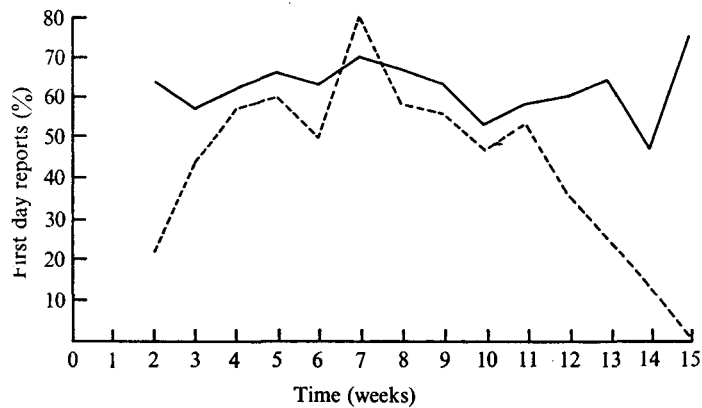


Fig. 1. Percentage of outbreaks reported on the first day of appearance of clinical disease. —, Farmers; --, veterinary practitioners.

Table 3. *Distribution of telephone calls into the ten FMD Control Centres*

FMD Control Centre	Days	Negative calls	Positive calls	Total calls	Total calls/day	Negative calls/day	Negative/Positive
Chester	80	365	425	790	9.88	4.56	0.86
Crewe	81	560	455	1015	12.53	6.92	1.23
Ellesmere	75	389	399	788	10.51	5.19	0.98
Llangollen	79	159	78	237	3.00	2.01	2.04
Macclesfield	66	303	68	371	5.62	4.59	4.46
M. Drayton	64	309	146	455	7.11	4.83	2.12
Oswestry	83	407	324	731	8.81	3.90	1.26
Shrewsbury	68	385	95	480	7.06	5.66	4.05
Stafford	79	482	86	568	7.19	6.10	5.61
Worcester	34	233	32	265	7.79	6.85	7.28
Totals	709	3592	2108	5700	8.04	5.05	1.70

Table 4. *Correlations between the daily negative and positive reports into the ten Control Centres*

Reports	Period		
	25. x. to 17. i.	25. x. to 27. xi.	28. xi. to 14. i. (a) 28. xi. to 13. i. (b)
Negative: same-day positive	0.660*	0.972*	0.818* (a)
Negative: next-day positive	0.592*	0.985*	0.739* (b)
Positive: next-day negative	0.715*	0.914*	0.833* (a)

* Significance: $P < 0.001$.

greater the relative number of negative calls. There was a strong inverse correlation, -0.809 , between the ratio and the number of confirmed outbreaks.

Because of the intense 'bush telegraph' activity we explored the possibility that positive reports engendered local negative reports. Throughout the West Midlands the two are very closely related (see Table 4). Over the whole period, 25 October

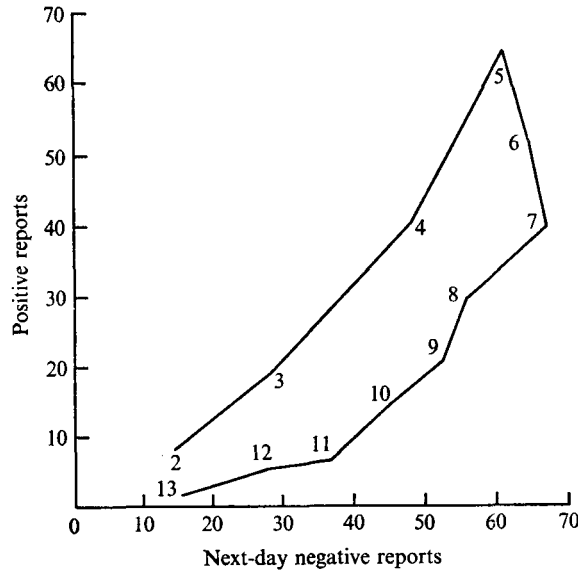


Fig. 2. Relationship between positive reports and negative reports on the following day during the different weeks of the epidemic.

Table 5. Correlation between the same day, 3-day and 5-day running totals of positive and negative reports for the first 25 days of ten FMD Control Centres

Centre	Telephone reports		Correlations		
	Positive	Negative	Same day	3-day	5-day
Chester	196	122	0.357	0.677	0.656
Crewe	209	164	0.498	0.782	0.889
Ellesmere	191	135	0.266	0.618	0.799
Llangollen	42	49	-0.251	-0.291	-0.158
Macclesfield	37	110	-0.155	0.251	0.523
M. Drayton	66	125	0.171	0.043	0.262
Oswestry	159	144	0.271	0.546	0.651
Shrewsbury	48	134	0.122	0.071	0.107
Stafford	19	134	0.323	0.464	0.608
Worcester	32	212	0.292	0.687	0.722

1967 to 14 January 1968, it was closest between the positive reports of one day and the negative reports the next. As the epidemic increased in intensity up to 27 November 1967, it was a reverse relation – that is, the negative reports of one day were closest to the positive of the next. After that date and as the epidemic waned the positive reports related to the negative reports the next day. If one plots the positive reports and the next day negative reports by weeks, one obtains the hysteresis curve seen in Fig. 2.

However, inside an area characterized by any FMD Control Centre one cannot demonstrate an immediate direct relationship between the positive and negative reports. We have used the Ellesmere FMD Centre as an example of this in Fig. 3. The centre opened on 3. xi. 67. At first the number of daily negative telephone calls

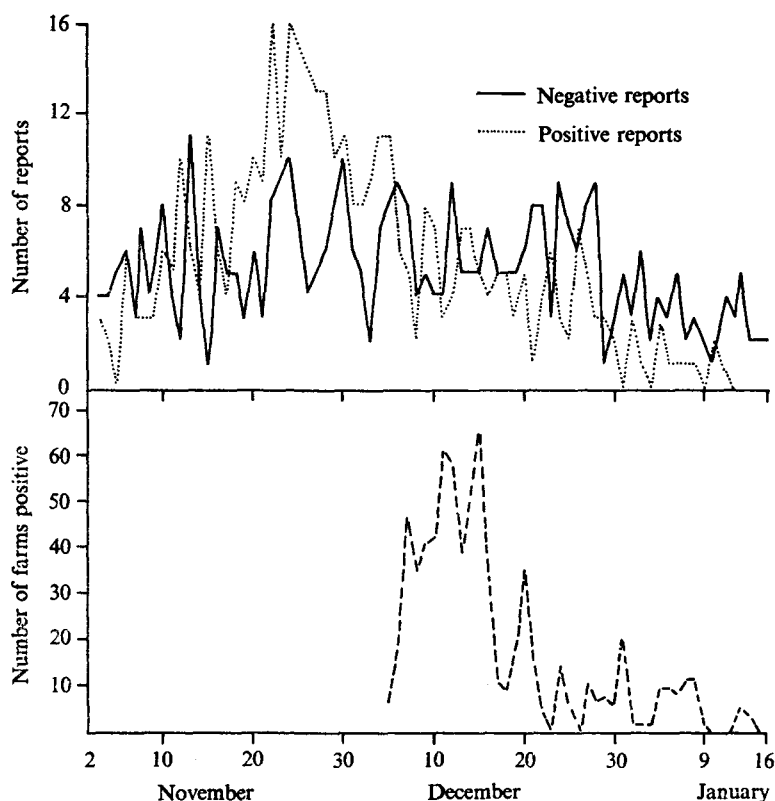


Fig. 3. Daily positive and negative reports at Ellesmere FMD Control Centre, and farms visited by patrolling veterinary officers.

fluctuated and then reached a figure about the mean which was maintained until 20. xii. 67. In the meantime the daily number of confirmed positive reports reached a peak on 24. xi. 67 and then fell away to the last confirmed outbreak on 11. i. 68. The two types of report varied independently of each other. That is, if the number of positive reports increased, the number of negative reports the same day was as likely to increase as decrease. With all centres a similar pattern was noted when it took about 7 days for the negative reports to reach a level characteristic of the area, which was then maintained until the epidemic died away. Then the daily number of negative reports would also decrease. This reflects the hysteresis relationship shown in Fig. 2. However, if we compare for each centre the running 3- and 5-day totals of positive and negative reports for the first 25 days of each centre, a correlation develops with the summed experiences of 3 days in some areas (see Table 5), but not in others; the latter were Llangollen, Market Drayton and Shrewsbury, which were all on the margins of the main epidemic area.

Because of the initial fierceness of the epidemic, which absorbed a large volume of manpower, there was a shortage of veterinary surgeons for patrolling outside the high-risk areas. As the epidemic waned and more men became available for this work, a regional blitz was carried out to check all farms with stock. In these

circumstances it appears that the farmer's telephonic activity may be independent of the quantity of patrolling in his area.

For the period 25. x. 67 to 17. i. 68 we compared the total numbers of negative and positive reports received each day of the week. In both series the maximum number were received on a Monday. The least number of negative reports were received on a Sunday.

There was a very low correlation between the number of outbreaks reported by the B.B.C. T.V. News and the number of positive or negative reports during the period 15. xi. 67 to 14. i. 68. Regular bulletins on the epidemic started on 15. xi. 67. When there was a change in the number of new outbreaks announced by the B.B.C. T.V. news compared with the previous day there was no effect on the number of the same-day or next-day negative reports; there were as many days with an increase as a decrease. However, if the B.B.C. T.V. news did not report any FMD outbreaks at all there was a response in that more days showed a decrease in negative reports 24 hours after the television report. This decrease continued if no outbreaks were again reported the next day. However, it would seem that any effect the B.B.C. T.V. news has is statistically very weak.

It snowed throughout the West Midlands during 7–12. xii. 67, 17–20. xii. 67 and 8–14. i. 68. In all areas there was a drop in the number of reports at the beginning of each of these periods. There was a similar decrease at the Christmas and New Year holidays.

DISCUSSION

At the beginning and end of the epidemic the reporting of disease is dependent on the private veterinary surgeon. At all times he is likely to meet older outbreaks. Initially there has presumably been a delay as the farmer would not recognize the condition and would wait for the animal or animals to get better. The private veterinary surgeon also sees a herd less frequently than the farmer or the regularly patrolling veterinary officer. This phenomenon of initial old outbreaks occurs in all FMD epidemics and is the reason why the first outbreak to be confirmed need not be the true primary outbreak in an epidemic. Towards the end of the epidemic the older cases were possibly the result of the falling number of outbreaks encouraging farmers to believe their animals were not affected.

We have noted the inverse relation between the total number of outbreaks and the mean number of daily negative telephone calls for the different areas. The reason for this is beyond our competence to analyse but it could reflect social differences between areas, an area suppression of responsibility in time, or of only responding up to a certain number of outbreaks when even a random telephone call would reveal an outbreak of FMD.

What actually persuades the farmer to pick up his telephone to report his suspicions will vary greatly from person to person. The majority clearly did not delay long, though some might leave it overnight. From the evidence of negative calls it would seem that within the limitations already discussed, the more outbreaks currently in an area the more likely is a farmer to call the Control Centre. It is not a direct reaction but reflects the recent disease experience of the area. There is

evidence to suggest that local trends, and therefore local 'bush telegraphs', have more effect than the national news. At the same time the latter may, by not announcing the number of current outbreaks, give the individual farmer an excuse for not reporting his suspicions. Those who were in the West Midlands during this epidemic realize the courage that was needed by farmers to report their suspicions of FMD in their stock and the frequent heartbreak that followed as a result.

However, 36.5% of all outbreaks reported by farmers were clinically more than 1 day old. Present control measures depend on prompt identification of affected animals.

Before another such epidemic we must look at other active and continuous methods of encouraging farmers to promptly report FMD-like conditions especially on Sundays. The natural 'bush telegraph', involving the agricultural community and possibly the local press, may be near its maximum efficiency but on the other hand it may be possible to improve it, especially as it shows local variations in level and presumably therefore in character.

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REFERENCE

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