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# SHORT REPORT
# Using facsimile cascade to assist case searching during a Q fever outbreak

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## SUMMARY

In September 2002, facsimiles were sent to 360 primary-care physicians alerting them to a local outbreak of Q fever. The physicians subsequently submitted serology samples on significantly more patients than in a previously comparable period in 2001. Facsimile cascade assists effective communication with primary-care physicians in an outbreak investigation.

Electronic communication is increasingly being used in the investigation and management of disease outbreaks: to alert clinicians or intensify surveillance systems [1, 2]; to collect data on cases and exposed persons [3, 4]; and to provide information for those at risk [5–8]. A range of methods has been used including facsimile, email [4], the internet [3], mobile phones and video links [9–12]. However, few of these methods have been evaluated. We reviewed specimen submission rates in order to evaluate the use of a facsimile cascade to improve the identification of cases in an outbreak investigation.

In mid-September 2002, we identified several cases of Q fever among employees of a cardboard manufacturing plant in the city of Newport, Gwent, UK [13]. Home addresses of the cases were scattered over a wide area. As part of the outbreak investigation, we decided to instigate case searching for Q fever in patients presenting to local primary-care physicians in order to exclude the possibility that a larger outbreak was occurring in the community. We used a well-established facsimile cascade system, operated on behalf of the public health department by a national telephone service provider, to send a facsimile to all primary-care practices in the area. Two facsimiles were sent to all 106 primary-care practices (representing 360 primary-care physicians) in the Gwent locality, covering an area of 600 square miles and a population of over 560 000 people on 17 and 20 September 2002. Physicians were asked to submit serum samples on any patient meeting a clinical case definition of Q fever and an association with the area where the outbreak appeared to be occurring.

To assess whether primary-care physicians had responded to these facsimiles a centralized computer database holding all laboratory records for the area was interrogated. We identified all complement fixation (CF) tests for *Coxiella burnetii* requested by primary-care physicians between 1 September 2001 and 31 October 2001 and between 1 September 2002 and 31 October 2002. Patients' dates of birth, but not their names, were used as personal identifiers. Where more than one sample had been submitted on a patient, only the first sample submitted was used in our analysis. The number of individuals tested in each week was plotted using Microsoft Excel. We compared the number of patients tested by primary-care physicians on the corresponding weeks of September and October 2001 and 2002. The paired Wilcoxon signed rank test was used to assess statistical

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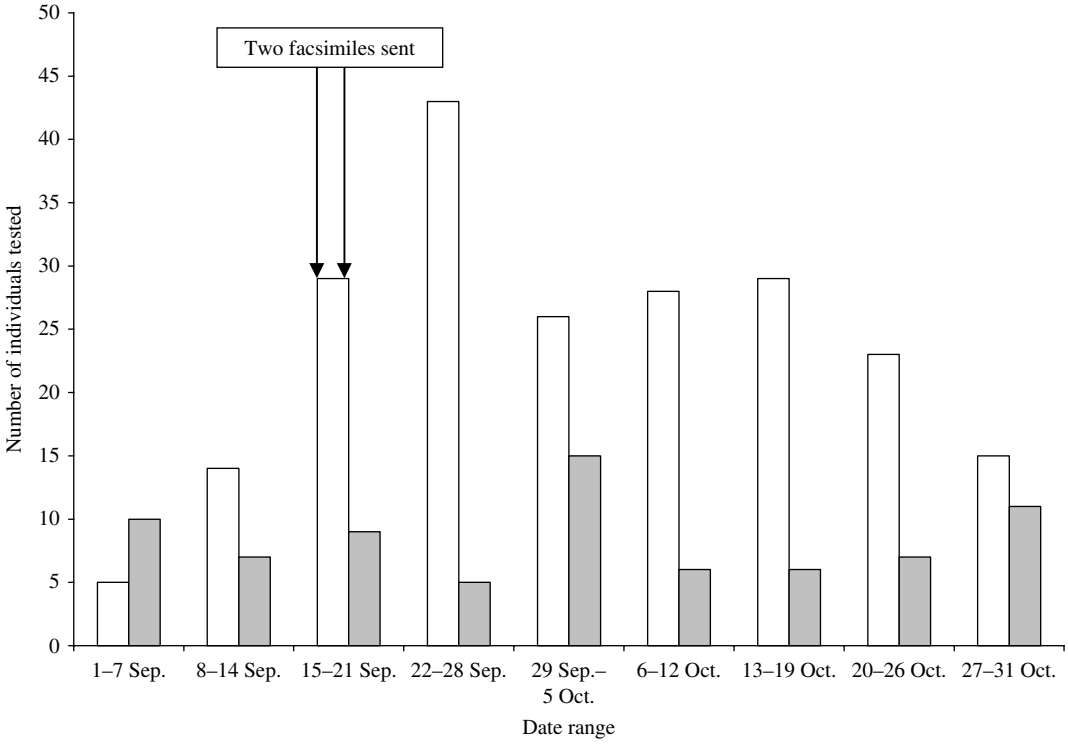


**Fig.** Number of patients with Q fever antibody tests, submitted by primary-care physicians in Gwent in 2001 and 2002 and analysed in South Wales laboratories. ▩, 2001 patients; □, 2002 patients.

significance. The null hypothesis tested was that there was no statistically significant difference between the number of patients tested for Q fever in the target population in each week between September and October 2001 compared to the corresponding week in September and October 2002. A second analysis comparing the number of patients tested on each corresponding day of the two time-frames was also undertaken to ensure that summarizing the data by week did not affect the results.

The locality's population did not change significantly between 2001 (563 542) and 2002 (567 315). Direct comparisons could therefore be made between the numbers of patients tested in these two years. Primary-care physicians submitted CF tests for Q fever on 69 individuals between 1 September 2001 and 31 October 2001 compared with 212 individuals between 1 September 2002 and 31 October 2002 (see Fig.). The graph demonstrates a bulge in the number of patients tested in 2002 compared to a relatively constant number of patients tested in 2001. The difference precedes the facsimile transmission but is most apparent after it. The paired Wilcoxon signed rank test for the difference in the proportion of the population tested in 2001 and 2002 was $P<0{\cdot}001$ both when data were compared on a weekly and on a daily basis. Data on the geographical pattern of samples submitted was not available. Local laboratory staff indicated that they were not aware of a rise in samples coming in from other surrounding areas during the outbreak and that the rise in the number of samples received by the laboratory did not reflect a general rise in the number of CF tests for Q fever received between 2001 and 2002. The 212 CF tests submitted in 2002 included 185 samples with a titre of $\leqslant 8$, three samples with a titre of 16, eight samples with a titre of 32, four with a titre of 64, eight with a titre of 128, three with a titre of 256, and one with a titre of 512.

One previously unrecognized case of Q fever was identified as a result of samples submitted by primary-care physicians. However, further investigation indicated that this individual was not associated with the main outbreak but represented a sporadic case of Q fever and had been exposed to recognized risk factors for the disease elsewhere. We expected to identify more previously unrecognized cases than this as a consequence of our case searching. There are several reasons why the number of new cases identified was so small. First, this outbreak was particularly localized and the at-risk group was concurrently identified by a

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cohort study of those working or attending a specified factory premises. Second, CF tests were used to screen the samples submitted rather than newer, more sensitive and specific immunofluorescent tests, which might have identified a larger number of cases in the general population.

The facsimiles sent to primary-care physicians appear to have contributed to a prompt and statistically significant increase in the number of requests for Q fever serology. Test results suggest that there was no wider outbreak of Q fever, since despite the large number of community samples submitted around the time of the outbreak, only one new case of Q fever was identified.

There are a number of weaknesses and potential biases in the study that need to be considered. Factors other than receiving a facsimile would have contributed to the increase in serology requests received in September 2002. For example, local press statements (although these did not occur until after the first facsimile was sent), local peer-group networks and contacts with hospital staff would have increased awareness of the outbreak. Increased awareness of the outbreak and subsequent increased self-presentation of patients concerned about the possibility of Q fever may also have been a factor. A few GPs were phoned with a request to take blood samples of specific patients prior to the sending out of the facsimiles. Use of date of birth to remove duplicates, undertaken to maintain patient confidentiality, may have removed a few individuals who coincidentally had the same date of birth.

Anecdotal evidence from the laboratory suggests that although local GPs occasionally ask for an atypical pneumonia screen, including Q fever serology, they very rarely name Q fever serology directly on the request form. In contrast, in September 2002 a large number of the primary-care samples shown in the Figure directly requested Q fever serology. This provides indirect evidence to suggest that the facsimiles were linked to the requests for Q fever serology.

Doctors receive large quantities of correspondence [14] and vary in the quantity they read [15, 16]. We were not certain that our facsimiles would be read or acted upon. However, this study suggests that at least some primary-care physicians read and acted upon the facsimile cascade sent out as part of this outbreak investigation. It is not clear what proportion of the 360 primary-care physicians saw patients who met the case definition for Q fever but were not tested. A survey of the physicians might have produced additional useful information.

A number of previous evaluations of facsimile were identified by searching Medline 1966 to week 47, 2003 and EMBASE 1980 to week 47, 2003 for facsimile.mp limited to 'human', English language articles. In most of the 151 references identified the use of facsimile was incidental to the focus of the paper and the outcomes measured did not relate to the use of facsimile. Eight evaluations of facsimile transmission were identified of which seven suggested some benefit. One was in a communicable disease context [2]. Three papers evaluated 'one to one' transmission of clinical information by facsimile [17–19]. Two papers evaluated 'many to one' transmission by facsimile from patients or peripheral health-care workers back to a central hub [20, 21]. Three papers evaluated 'one to many' transmission (facsimile cascade) from a centre to peripheral sites [2, 22, 23]. One study provided limited evidence for the use of facsimile cascade to disseminate information and intensify surveillance during a period when there was increased risk of a disease outbreak. In 1994 a facsimile cascade was used to disseminate information to a wide range of public health officials by the Centers for Disease Control (CDC; Atlanta, GA, USA) in response to a reported epidemic of plague in India [2]. The CDC Fax Information Service subsequently sent out a further 5589 documents providing information about plague using an automated fax back system to handle requests for further information. This resulted in the identification of 13 travellers who were potentially at risk of incubating plague although none of these cases proved positive. A high percentage of primary-care physicians have access to a facsimile machine and there is some evidence that they have a preference for this method of communication [24].

In conclusion, this study provides some evidence that sending a facsimile cascade to primary-care physicians, may assist in the identification of cases during an outbreak investigation and may provide the basis for the design of future studies investigating the usefulness of facsimile for communicating with primary-care physicians.

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## DECLARATION OF INTEREST

None.

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