

variation in population density. Moreover, the place of residence is not necessarily the place of exposure to leptospirosis.

We emphasize the importance of public education regarding the relative risks, as a means of preventing exposure, and of continuing education of physicians and primary health-care workers to raise their awareness of the seasonal distribution and early symptoms of leptospirosis.

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References

1. Everard JD, Everard COR. Leptospirosis in the Caribbean. *Reviews in Medical Microbiology* 1993;4:114-22.
2. Bayley HH. An investigation of the infectious jaundice of Barbados. *Caribbean Medical Journal* 1939;1:135-42.
3. Everard COR, Edwards CN, Everard JD, Carrington DG. A twelve-year study of leptospirosis on Barbados. *Eur J Epidemiol* 1995;11:311-20.
4. Everard COR, Bennett S, Edwards CN, Nicholson GD, Hassell TA, Carrington DG, et al. An investigation of some risk factors for severe leptospirosis on Barbados. *Journal of Tropical Medicine and Hygiene* 1992;95:13-22.
5. Bennett S, Everard COR. Absence of epidemicity of severe leptospirosis in Barbados. *Epidemiol Infect* 1991;106:151-6.
6. Everard COR, Jones CJ, Innis VA, Carrington DG, Vaughan AW. Leptospirosis in dogs on Barbados. *Israel Journal of Veterinary Medicine* 1987;43:288-95.
7. Spiegel RA, Ashford DA, Trevejo RT, Rigau-Perez JG, McClure EM, Amador JJ, et al. Leptospirosis outbreak associated with pulmonary hemorrhage—Nicaragua, 1996. Abstracts of the First Meeting of the International Leptospirosis Society; 1996 Sept; Nantes, France. Nance, France: International Leptospirosis Society, 1996.

Electronic Communication and the Rapid Dissemination of Public Health Information

To the Editor: In the United States, communicable disease surveillance, investigation, and control are the responsibility of the states. The Centers for Disease Control and Prevention (CDC) provides epidemiologic and laboratory support to the state

and territorial epidemiologists (state epidemiologists) and state public health laboratory directors (state laboratory directors), who are located in each of the 50 states, Washington, D.C., the Virgin Islands, the Federated States of Micronesia, American Samoa, the Marianas Islands, and Puerto Rico. Historically, communication between CDC and these state representatives has been conducted by telephone, facsimile, or letter, and more recently by the WONDER (1) electronic mail (e-mail) system. We examined the timeliness and coverage of the WONDER system when used to contact state epidemiologists and laboratory directors during two recent foodborne outbreaks.

The first outbreak was reported to CDC on February 10, 1995, by the Communicable Disease Surveillance Centre (CDSC) in the United Kingdom. CDSC had linked an outbreak of salmonellosis in the United Kingdom to a snack food distributed to many countries including the United States (2). CDC decided to notify all state epidemiologists about the outbreak immediately so that they could take appropriate action to protect consumers and report suspected cases. This e-mail message was ready to be accessed by all state epidemiologists from 4:27 p.m. Eastern Standard Time (E.S.T.) on Friday, February 10, 1995.

The second outbreak involved *Salmonella* serotype Stanley infections associated with the consumption of alfalfa sprouts. In the United States, the outbreak was recognized when a larger than expected number of isolates of *Salmonella* Stanley for the first week of June 1995 was reported (3). CDC notified state epidemiologists and laboratory directors about the outbreak and requested that cases of *Salmonella* Stanley infection be reported and *Salmonella* Stanley isolates be sent to CDC. This e-mail message was ready to access from 9:41 a.m. E.S.T. on Friday, June 9, 1995.

These two e-mail messages were sent to two group codes maintained by the Council for State and Territorial Epidemiologists and the Association of State and Territorial Public Health Laboratory Directors on the CDC WONDER e-mail system. The subject heading for these messages indicated that they were urgent and from CDC. The messages were available for 22 days from the day of posting, at which time unaccessed messages were automatically returned to sender. Each message was sent with an automatic receipt acknowledgment function.

Letters

Because many of the territories are not regularly connected to WONDER, only the 50 states, the District of Columbia, and Puerto Rico were included in the study. The time to receipt was calculated on the basis of working days (Monday through Friday) only. E-mails accessed during a weekend were attributed to the following Monday.

In February, 48 of 50 states were on the state epidemiologists WONDER e-mail distribution list; 47 states, Puerto Rico, and the District of Columbia accessed the e-mail message within 22 days; one state did not access it within that period; 8 (16%) accessed the message the day it was sent; 28 (57%) accessed it within 1 working day—three of these accessed the message during the weekend; and 43 (88%) of 49 recipients accessed the message within 1 week. While no additional cases were reported, e-mail communication may have hastened product recall, thereby preventing further cases.

In June, 49 states were on the state epidemiologists WONDER e-mail distribution list; 48 states and Puerto Rico accessed the e-mail message within 22 days; two did not access the message within that period; 25 (51%) accessed the message the day it was sent; and 40 (82%) accessed the message by the second working day—two of these accessed the message on a weekend.

Thirty-eight states and Washington, D.C., were on the state laboratory directors WONDER distribution list in June; 25 (64%) accessed the message the day it was sent, and 32 (84%) of 38 accessed the message by the second working day—one of these accessed the message on a weekend. All 38 states and Washington D.C. accessed the e-mail message within the systems' 22-day limit. The pattern for state laboratory directors was almost identical to that for state epidemiologists.

Within 3 weeks of transmission of the June message (by June 30, 1995), state health department laboratories had forwarded 55 *Salmonella* Stanley isolates to CDC: 44 (80%) of these were the outbreak strain. These reports contributed to a traceback that implicated a single alfalfa seed distributor.

The use of e-mail to communicate health related messages to epidemiologists and laboratory directors was timely and highly successful in these incidents. By the second working day, more than half of the intended recipients had accessed the February message, and more than 80% had accessed the June message. However, not all state epidemiologists and laboratory directors access

WONDER e-mail daily, and so other means of communication would be necessary if contact were required within 1 working day.

Because epidemiologists and laboratory directors have to dial into the WONDER mainframe by modem to find out if they have new messages and to receive them, retrieving WONDER e-mail messages can be less than timely; there is no mechanism to alert users to incoming WONDER e-mail messages. This delay is likely to be overcome as more epidemiologists and laboratory directors become connected to the Internet by local area networks that automatically check for incoming messages several times per hour. Some epidemiologists and laboratory directors have been slower to access their WONDER e-mail address because they also had an Internet address and thus accessed the WONDER system less often.

Perhaps more than one person in each state office should be on the distribution list to ensure message delivery when one representative is absent. We confirmed only that the message had been accessed by someone using the state epidemiologists' password; however, it is possible that someone other than the state epidemiologists accessed the message on their behalf adding to the delays.

Electronic communication by public health groups (e.g., Epi-net links public health agencies in the United Kingdom, Salm-net links agencies involved in foodborne disease surveillance and control in Europe) is rapidly increasing (4). However, there is a need for a global network that allows public health agencies of every country to rapidly communicate real or potential emergent disease threats.

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References

1. Fried A, Roser DH, Reid JA. CDC WONDER: A cooperative processing architecture for public health. *J Am Med Inform Assoc* 1994;1:303-12.
2. An outbreak of *Salmonella agona* due to contaminated snacks. *Commun Dis Rep CDR Wkly* 1995 Feb 17;5:29,32.
3. Martin SM, Bean NH. Data management issues for emerging diseases and new tools for better methods. *Emerging Infectious Diseases* 1995;1:124-8.
4. Vacalis DT, Bartlett CL, Shapiro CG. Electronic communication and the future of international public health surveillance. *Emerging Infectious Diseases* 1995;1:34-5.