BIOSECURITY AND BIOTERRORISM: BIODEFENSE STRATEGY, PRACTICE, AND SCIENCE
Volume 2, Number 3, 2004
© Mary Ann Liebert, Inc.

What Does the Public Want to Know in the Event of a Terrorist Attack Using Plague?

RICARDO WRAY and KERI JUPKA

ABSTRACT

We used formative research to assess the information needs and information-seeking strategies with general public audience segments in response to a hypothetical attack using plague, and we pretested informational materials about plague. Twelve focus groups were conducted across the country, with 129 individuals being purposively sampled by ethnicity and place of residence. Across groups, participants wanted to understand: the nature of the threat of plague, how to protect themselves from transmission, how to detect exposure and symptoms, how to treat infection, and progress in apprehending perpetrators. Participants reported that they would seek information from both the news media and local authorities. Based on the findings and the challenges posed by a terrorist attack using plague, the authors recommend that message materials answer key questions, provide clear action steps, be clear and easily understood, include sources for credibility, and reflect full government disclosure. A dissemination plan is required to ensure that critical information will be available when people need it and where they look.

EFFECTIVE PUBLIC COMMUNICATION is an essential part of an emergency response in the event of disaster.[1] It can enhance the likelihood that populations at risk will take precautions, reassure populations that are not at risk, facilitate relief efforts, and thereby reduce morbidity and mortality.[2] Public communication is difficult enough under conditions of natural disasters and accidents; terror attacks using biological, chemical, or radiological agents present unique challenges.[3] Because terrorist attacks are intentional, manmade, and catastrophic by design, they have a heightened potential for causing general distress and uncertainty.[4] Add to this the infectious nature of biological weapons, which can increase the likelihood of fear and social disruption beyond the populations that are directly threatened, and the communication challenge becomes particularly striking.[5]

The need for a systematic and evidence-based approach to informing the public in the event of a terrorist attack became especially urgent in the wake of the distribution through the postal service of letters containing anthrax, resulting in 22 cases of anthrax disease and 5 fatalities in the fall of 2001.[6] The experience of the public health community with the anthrax attacks placed in stark relief the challenges of communicating public information in the face of an ongoing and uncertain biological threat. Lessons learned have received considerable

Ricardo Wray, PhD, and Keri Jupka, MPH, are with the Health Communication Research Laboratory, School of Public Health, Saint Louis University, Saint Louis, Missouri. This article was prepared on behalf of the Saint Louis University Pre-Event Message Development Team: Bruce Clements, MPH, Nicole Kozma, MPH, and Suzy Walker, RN, BSN, all at the Institute for Bio-Security, Saint Louis University; and Heather Jacobsen, MPH, Health Communication Research Laboratory, Saint Louis University. The article is presented in collaboration with the CDC, ASPH, and the Pre-Event Message Development Teams at the University of Alabama-Birmingham, the University of California at Los Angeles, and the University of Oklahoma. Funded by the Centers for Disease Control and Prevention, #A1104-21/23.

attention and critique from the news media,[7–10] as well as prompting much soul-searching within federal agencies.[11] In response, the Office of Communication at the Centers for Disease Control and Prevention (CDC) decided to develop messages that provide accurate information about specific threats and to pretest them with members of the general public. Thus, in the event of a real emergency, the "pre-event" messages would be ready for distribution. This approach provided the impetus for the research reported here.

Teams of researchers at four schools of public health were selected by the CDC to form a partnership to carry out formative research and to develop and evaluate agent-specific messages. The goal was to inform the development and assessment of new message materials by better understanding the information needs and information-seeking strategies of the general public in the event of a terrorist attack, and by assessing available informational materials. The teams used a standardized protocol to carry out the research and achieved a cumulative total sample size that strengthened the validity of the results. A total of 45 focus groups were completed with general public audience segments about four threats: plague, botulism, VX (a nerve agent), and radiological devices. This article reports on the 12 focus groups that discussed plague.

COMMUNICATION CHALLENGES OF A TERRORIST ATTACK USING PLAGUE

The deliberate release of a biological agent, such as the pathogen that causes plague, in a terrorist attack poses unique challenges for emergency response communication. The characteristics of plague, its transmission, and its treatment create a special set of informational needs that emergency responders and public officials will need to address to reduce morbidity and mortality resulting from an attack.

There are three types of plague that result from infection by the bacterium *Yersinia pestis*: bubonic, pneumonic, and septicemic plague. Pneumonic plague is the most deadly of the three and can be spread from person to person through droplet spread. Pneumonic plague also can result from the release of an aerosolized form of *Yersinia pestis*. Such a release would likely result in the infection of individuals who were immediately exposed and would then spread from person to person, extending the impact of the attack and potentially causing widespread fear and disruption. Consequently, pneumonic plague is considered a likely candidate for use in a bioterrorism attack. (It is possible that terrorists could release infected animals and fleas that could transmit bubonic plague to people, who could then infect others with pneumonic plague via droplet spread, but this is considered less likely because such an attack would have a smaller likelihood of success.)

The symptoms of plague resemble flu and pneumonia and include fever, headache, weakness, chills, shortness of breath, chest pain, and cough. If not treated, pneumonic plague has a high mortality rate, but treatment with antibiotics within 24 hours of onset of symptoms substantially raises the chances of survival.

Emergency response officials will need to provide information that can help members of the public prevent transmission, detect symptoms, and seek treatment, including factual information in these areas and local resources available to the public. Messages will need to describe general means of prevention of transmission, such as barriers to prevent droplet spread, and local measures such as quarantine. For individuals who are uncertain whether they have been exposed to plague or not, it will be important to provide a clear description of symptoms and to emphasize the importance of seeking immediate treatment at onset of symptoms. At the same time, describing how to seek diagnosis and treatment—namely, identifying the locations of clinics—will be critical in reducing the level of infection and death. Finally, officials will need to identify effective information sources, including local agencies, emergency telephone numbers, and websites, while ensuring that information is accurate, up-to-date, and consistent across sources.

METHODS

Communication scholars[12] and federal agencies[13] recommend using focus groups to elicit formative data about audiences to inform the development of messages and communication strategies. Focus groups provide an exploratory approach to understanding knowledge, beliefs, opinions, and preferences about a given problem or topic, to discerning media use of selected audiences, and to getting reactions to message materials.[13–16]

Twelve focus groups about plague were conducted by six universities in the South, the Southeast, the Midwest, the Southwest, and on the West Coast. Individuals who participated in the groups were purposively sampled to represent general public audience segments, defined by ethnicity and race and place of residence, namely: Caucasian (three groups); African American (three); Hispanic (three); Native American (one); Asian American (one); and students in an English as a second language (ESL) class (one). Eight groups were conducted in urban areas and four in rural areas. Each focus group was restricted to members of a single ethnicity and place of res-

idence, and groups varied in terms of other demographic characteristics, such as gender, education, and income. Consistent with standard guidelines for focus group discussions, participants were generally recruited through counterpart community-based organizations,[17] and they were provided small incentives.[18] Institutional Review Board approval for human subjects protection was received from all participating schools before research began.

The research objectives for the focus groups were to obtain insight into the participants' current knowledge and attitudes about terrorist threats, and to determine their information needs and information-seeking strategies in response to a hypothetical terrorist attack, and to pretest available agent-specific informational materials. Specifically, each focus group was divided into three sections. The first section inquired about "pre-event knowledge," asking participants to discuss their understanding of the color alert system, precautions to take in the event of a terrorist attack, and distinctions among biological, chemical, and radiological agents.

The second section asked participants to respond to a three-part hypothetical scenario depicting an intentional release of plague in a building in their community. Over the course of the three parts of the scenario, the nature of the attack emerged, from a nonspecific threat, to the first appearance of victims and speculative identification of the agent, to the confirmation of plague as the agent. After each part of the scenario was read aloud, participants were asked how they would feel about the news, what they would do, what they would want to know, and where they would turn for information and why. After the hypothetical scenario discussion, participants were asked to evaluate the level of preparedness of emergency response systems and authorities in their community, as well as to describe their views about the role of the media in such an emergency.

In the third section of the focus group, participants were asked to evaluate an information fact sheet available from CDC about plague. At the time of the focus groups, the available fact sheet addressed only naturally occurring plague and did not include much information that would be relevant in the event of a terrorist attack using plague. Participants were asked to assess the materials in terms of comprehensibility and informativeness, the emotional response elicited, credibility, and self-efficacy, and to offer recommendations for improvement.

Trained researchers moderated the focus groups, which lasted from 90 minutes to 2 hours, and audiotapes of the discussions were transcribed. Participating schools developed a standard protocol for data analysis based on a coding guide derived from the discussion guide. Two coders analyzed the content of each transcript using thematic analysis based on the coding guides and allowing unanticipated themes to emerge.[19,20] Reliability of results was confirmed by a process of cross-coder validation, in which themes were compared and consensus obtained for each transcript. A summary report was drafted about each group. Researchers at each school performed the data analysis and wrote reports for groups that they carried out. Each school then took on the work of summarizing all group data for a specific agent, based on the coded transcripts and summary reports from all groups on that agent. SLU analyzed and summarized the results of all 12 groups discussing plague.

Certain limitations are inherent in this mode of research. The participants in the study made up a nonrandom convenience sample of various audience segments within the general population, limiting our ability to generalize about the public at large. Focus group research is also limited in that it relies on the skills of moderators and data analysts, with the possibility for bias being introduced in the data collection and coding processes. The collaborators on the project sought to minimize these limitations by following the same protocol throughout the research process, from preparation of human subjects protection protocols and discussion guides, through data collection, coding, and analysis. Thus, results are comparable across the 45 focus groups conducted with general public audience segments across the country, enhancing our confidence in the validity of the results.

The average age of the 129 participants was 46 (SD = 18.1) with a range of 17 to 86 years of age. Sixty-three percent of participants were female, and 37% were male. Thirty-seven percent of participants had some high school, a high school diploma, or GED, 22% had some college, and 41% had a bachelor's degree or higher. African Americans made up 26% of the sample, with 21% Caucasian, 10% American Indian or Alaskan Native, 30% Hispanic, and 10% Asian (3% other). Most (64%) reported that their main language spoken at home was English, with 17% speaking Spanish, 7% bilingual, and 12% speaking some other language. Twenty-eight percent were single, 59% were married or living with a partner, 8% were divorced or separated, and 5% were widowed. Most (67%) had children, and most (57%) were employed. The median family income was in the $30,000 to $39,999 range (however, 24% did not respond).

FINDINGS

The following represent summary points based on the data analysis, acknowledging commonalities and differences across groups. Quotes are selected as representative to corroborate specific themes that arose in the discussions.

Results: Pre-event knowledge

Participants in most groups had only a general, limited understanding of the color alert system. Participants knew that alert levels changed based on the likelihood of a terrorist attack occurring: "Each color represents a different level of danger." Hispanic and ESL participants had more limited knowledge. All groups displayed a wariness of the usefulness of the system: "The thing about the colors is that they do not tell the public what they should do. It is just colors, but nothing else."

Participants in most groups had sporadic and varied knowledge of precautions that they could take in the case of a terrorist attack. Urban groups discussed information seeking and stockpiling supplies. Staying alert and informed was another way to be prepared: "Be informed, so that we can be prepared." Rural groups noted that staying vigilant might forestall disaster, and they were confident that they would be able to identify unfamiliar vehicles or individuals: "That's kind of easy here because we pretty well know everybody, and if you see a truck or car going down the road, you are pretty much sure of who it is. And anybody who is different kind of stands out." Only participants in the ESL group mentioned a need for protective gear such as gas masks.

Participants in most groups also had a limited and general understanding about distinctions among different potential terrorism agents (biological, radiological, and chemical). With a few exceptions, urban participants were more knowledgeable than rural participants. Rural African American, Native American, and ESL students had the most trouble distinguishing between agents.

Results: Response to a hypothetical attack

Across groups, participants responded to the hypothetical emergency with increasing fear, concern, and helplessness as the scenario progressed and news of casualties were reported. As one participant said: "Scared to death." Elderly and disabled participants were especially concerned, as they felt helpless and feared they would be trapped because of their lesser mobility: "We would panic." Younger participants were more likely to be nonchalant and reported an occasionally misplaced optimism: "I think I'm confident that I would be safe because I would go on the antibiotics and I think I am healthy enough to survive it." Some participants felt less fear after receiving additional information that emergency response personnel were responding to the threat.

In the face of a hypothetical attack in their city, participants in most groups responded that they would do one or more of the following: seek out information, contact their family members to see if they were all right, take steps to protect themselves and family, and look for food, shelter, and water: "[Like] preparing for a snowstorm." While urban residents were likely to seek shelter, participants in rural areas were more likely to express the intention of fleeing their communities: "Try to get as far out of [my state] as possible."

Participants in most groups generally wanted information in five key areas. They wanted to understand:

1. The nature of the threat: "I think I'd want information about how it could be spread."
2. What protective actions they would need to take if they had not been exposed: "I'd want to know who came in contact with all this, or how many people have been in contact with it, and what's the severity of it, and then you'd know whether you'd want to get out or stay at home."
3. What steps they would need to take if they thought they had been exposed, or if they had been in contact with someone who might have been exposed: "How [long] does take before you show signs?"
4. What steps to take if they knew they had been exposed: "I don't even know if I thought I was infected if it would be better to go to my primary care physician instead of going to the hospital."
5. Information related to the specific event: "What is [an] aerosol attack?"

Participants in all focus groups indicated that the mass media would be a critical source of information. They also indicated that they would seek information from local authorities, emergency responders, and medical personnel. Over time, participants reported that they would look for more in-depth information from the newspaper and/or Internet. Urban participants reported clearly that they would turn first to the national media for general information and to the local media for information about emergency response and safety in their community. Some urbanites mentioned the CDC website specifically as a source of information. Rural groups (including Caucasians, African Americans, and Native Americans) said they would first turn to local health officials, first responders, and civil authorities for information: "I guess you'd go to the law enforcement first and call them." After local officials, rural participants would then look to the mass media.

When asked to evaluate news programs on the media, some participants commented positively on their accuracy and timeliness. Other participants expressed cynicism over media bias, saying: "They're only after the ratings." A number of participants reported that they would compare across multiple sources and channels (i.e., local, national, and international media and the Internet) to corroborate and confirm the validity of the information being provided.

When asked about their confidence in how well the government can deal with a terrorist attack, participants reported a wide range of views, from distrust to confidence. Participants in most groups agreed that the government is responsible for being prepared for and responding to terrorist events. Both federal and local government leadership is important, participants said. Some participants questioned how prepared government agencies and first responders were in their own communities: "Is the government also equipped to disseminate things after the attack because you don't know when, nobody knows when, not even the government knows when?"

The ability of the government to provide treatment was a concern in rural areas. Minority groups, especially African Americans and Hispanics, reported the highest level of distrust in the government, and they were skeptical about how trustworthy the government would be in an emergency. These participants often expressed strong beliefs that the government withholds information: "They say what they want. They think we do not know." Almost all participants thought that the government should operate with complete openness and disclosure: "The government has the obligation to tell the truth."

Results: Materials pretest

Although the fact sheet lacked specific information with reference to an attack scenario, focus group participants found the information about transmission and symptoms reassuring: "I think the more you know about, the less anxious you're going to be about all of this stuff." At the same time, participants in all focus groups reported that they had unanswered questions, consistent with the information needs reported in response to the hypothetical attack. Participants requested information about the threat, the different types of plague, symptoms, and diagnosis of plague. Participants in all groups wanted to know how to protect themselves and their families in the event of an attack: "What can you do to help yourself?" Participants wanted to know what steps they could take to prevent transmission, how to know if they had been exposed, and what to do if they were infected. Many different groups requested information on where to go for treatment and the availability of drugs.

As plague is carried and transmitted by common animals, participants requested specific information related to animals (pets for all groups and farm animals in rural groups): "People might think to keep their pets inside away from rodents. But I don't know if that would be better or not, because if you bring your pets inside they are going to draw fleas no matter where they are." Rural participants in particular noted the possibility that they might kill their livestock or pets if they felt that the animals might pose a risk of transmission of plague: "I think you will end up finding a lot of people shooting their pets just to be safe." Finally, participants in most groups wanted to know who was responsible for the attack and what was being done to apprehend the perpetrators.

Participants had a wide range of emotional responses to the materials. For rural African Americans and Native Americans, and one Hispanic group, fear was a common response: "I'm scared of plague. I got nervous." Other groups stated that they felt better due to having additional information: "I feel a lot better, I guess knowing about it since I walked in here."

Participants in most groups found the fact sheet credible, in part because it contained information participants had heard before, made logical sense, and was provided to them by a credible university. However, almost all groups also mentioned that including a source for the information is necessary: "Who is giving us this information?"

Groups varied in terms of their comments regarding the ability of the materials to foster self-efficacy about protective actions. Almost all groups admitted they could use additional information on action steps to take in the event of an outbreak: "We need more information on what to do." The younger group and the ESL group felt that they would be able to take action and survive a terrorist attack using plague. Other groups felt confident about recognizing symptoms.

Participants offered specific recommendations for how message materials should be formatted and what they should include. Participants noted that the use of plain English and less technical language for low-literacy audiences would be an improvement: "Put it in layman terms." Other recommendations for plague materials included adding illustrations and color, shortening the length, including contact numbers and other information sources, including source identification and references, and using multiple media and formats.

DISCUSSION

The research team noted relatively low levels of preevent knowledge regarding the purpose of the color alert system, precautions in the event of an attack, and distinctions among categories of agents. Notably, participants did not highlight the infectious nature of biological agents. There were few differences between groups. Officials providing emergency information in the event of a terrorist attack involving plague need to know that the general public is starting at a low level of knowledge about the topic. Information will need to be provided at a basic level, using simple terminology and concepts.

The hypothetical scenario elicited a rising level of fear

over the course of the scenario, but this concern was tempered in many with added information. Participants reported they would take commonsense actions: checking on the safety of family and friends and seeking information about safety precautions. There was some confusion about whether flight or shelter in place was the best response. Participants reported information needs in several key areas: the nature of the threat; action steps to prevent transmission, detect exposure, and treat infection; and progress in investigating the attack. While some participants expressed distrust of the media, most said they would at some time during a crisis turn to television and radio for information, as well as seeking guidance from local authorities. Public opinion polling in response to the threat of terrorist emergencies has found similar categories of desired information needs and primary use of the mass media for information seeking by the public.[21,22] Responses were common across groups with two notable exceptions: Urban respondents reported looking to the media for information first, and then to local authorities, whereas rural respondents reported the reverse. Minority groups were more likely to report a higher level of distrust of the government.

Despite the inappropriateness of the pretest materials in response to the hypothetical scenario, focus group participants noted that they felt reassured by the available relevant information regarding transmission and symptoms. A clear set of unanswered questions was identified, as participants wanted to know: the nature of the threat; protective steps to take to prevent transmission; how to detect exposure; how to seek treatment in case of exposure; and actions being taken by the authorities to apprehend attackers. Participants indicated that action steps helped foster self-efficacy, and they found that the fact sheet was credible on the whole. Clear recommendations were made for how to improve the materials, including using plain language, illustrations, and clear design principles, as well as providing contact information and websites for individuals seeking more detailed information.

These findings point to several guidelines that should shape emergency response communication in the event of a plague attack. First, these results identify a clear set of questions members of the public will want answered. Second, it is clear that members of the public will seek information from the mass media as well as from local health, emergency response, and law enforcement agencies. Third, distrust of the government and its ability to respond to an emergency are widespread, and members of the public may respond to information strategies with some skepticism.

In this analysis, two findings stand out. First, there was a great deal of agreement across groups on a number of topics: relatively low levels of pre-event knowledge in general; a common set of information needs; and common criticism of the existing fact sheet. Differences between groups were relatively few, notably: different information-seeking strategies by urban and rural groups, and a greater degree of distrust held by minority groups. While emergency officials will need to be attentive to these differences, to a great degree they can assume that a common strategy will address the information needs of most people.

Second, given professional concerns about the potential social disruption that may be caused by the infectious nature of plague, it is striking that few of the group discussions touched on the topic. The fear and anxiety reported appeared to be prompted as much by the intentional and uncertain nature of the terrorist attack depicted in the scenario as by the infectiousness of plague. Little discussion arose about fears of interpersonal transmission of plague, suggesting that this threat was not especially salient in these focus groups. This may simply reflect the low existing knowledge indicated in the first part of the focus groups. Clear message materials about the elements and efficacy of infection control procedures may deter discrimination or fear of potentially infected individuals in the event of an intentional release and outbreak.

IMPLICATIONS FOR PUBLIC COMMUNICATION

The findings from the focus groups provide clear direction for message design and dissemination strategies to implement in the event of a terrorist attack using plague.

1. Message materials should answer key questions.

In the event of a terrorist attack with plague, information should be available to help members of the public:

- Understand the nature of the threat;
- Take protective actions if they think they have not been exposed;
- Take steps if they think they have been exposed, or if they have been in contact with someone who may have been exposed;
- Take steps if they know they have been exposed;
- Understand steps being taken to apprehend perpetrators; and
- Understand what to do about pets and livestock.

2. Message materials should provide action steps.

Focus group participants suggested that materials that included steps that individuals can take to protect them-

selves give them a sense of control. Clear action steps about infection prevention, detection of exposure and symptoms, and the urgency of seeking treatment at the onset of symptoms may be the most important precautions to include.

3. Message materials should be easily understandable, clear, and accurate.

Focus group participants offered guidelines for how messages should be written and presented. Messages should be in plain language, preferably at a sixth-grade reading level.[23] Materials to be disseminated in print or over the web should be developed according to clear design principles to make them easily and quickly understandable. Materials should include graphics that help individuals with lower literacy and educational levels understand them, as pictures, other visuals, and color can help increase comprehension.

4. Message materials should include information to increase credibility.

Participants noted that information sources increase the credibility of materials. Respected sources mentioned by participants included: local health departments, the CDC, the President, and the Red Cross and other respected organizations. Information specific to the event also can increase credibility. Contact information, websites, or other sources for people to obtain additional, more detailed information can also lend credibility and comprehensiveness to message materials.

5. Messages should reflect full disclosure from government agencies.

In an emergency, it is important to convey that the government is "leveling" with the public, without jeopardizing efforts to locate and thwart attackers. Focus group participants reported that they believe it is the duty of the government to tell the truth. Government spokespersons need to be especially careful about being honest and forthcoming with minority and other disadvantaged groups.

6. Government agencies should develop effective media-based dissemination plans.

As these findings indicate, the public will turn to a variety of sources for information in an emergency, including the media and local authorities. It is critical that a dissemination plan be in place to ensure that message materials are available across media channels and via local official sources when an event happens. This can enhance the likelihood that messages across channels will be consistent. Such a plan requires joint effort among private, nonprofit, and government agencies at local, state, and national levels to assure efficient provision of critical warning information to responders and public audiences.[2]

CONCLUSION

As the focus groups showed, a terrorist attack would create a great deal of fear and feelings of helplessness in the public. In a real event, it is likely that the communicable nature of plague and the high rate of mortality due to the infection would cause even higher levels of panic. The focus groups also showed that the release of information can allay such fears. In the case of plague, further transmission can be prevented, detection of infection is fairly easy, and treatment with antibiotics leads to a greatly enhanced chance of survival. The effective dissemination of general information about prevention of transmission, and detection and treatment of infection, as well as specific information regarding local informational and clinical resources, should go a long way to reducing the level of disorder and morbidity and mortality caused by an attack.

The results from these focus groups are corroborated in a number of instances from findings in national public opinion polls. In addition, the results and implications reported in this article are consistent with current thinking in the literature regarding public communication in the event of terrorist attacks. The results of this research provide a reasonable and informative foundation for the preparation of message materials and dissemination strategies to be introduced in the event of a terrorist attack using plague. Effective communication—in the form of consistent, accurate, and timely information disseminated efficiently across the media and government agencies—may well be the key to preventing panic and potentially saving lives.

REFERENCES

1. Landesman L. *Public Health Management of Disasters: The Practice Guide*. Washington, DC: American Public Health Association; 2001.
2. Partnership for Public Warning. *A National Strategy for Integrated Public Warning Policy and Capability*. McLean, Va: Partnership for Public Warning; May 16, 2003.
3. Koplan J. Communication during public health emergencies. *J Health Commun* 2003;8(Suppl 1):144–145.
4. Bennett P. Understanding responses to risk: Some basic findings. In: Bennett P, Calman K, eds. *Risk Communication and Public Health*. Oxford: Oxford University Press; 1999:3–19.
5. Evans R, Clements B, Shadel B. The threat of bioterrorism in U.S. business briefing. *Business Briefing: Global Healthcare 3* 2002;3:28–31.
6. Mina B, Dym J, Kuepper F, et al. Fatal inhalational anthrax with unknown source of exposure in a 61-year-old woman

in New York City. *JAMA* February 20, 2002;287(7): 858–862.
7. Altman L. At disease centers, a shift in mission and metabolism. *New York Times* September 10, 2002:F-1.
8. Altman L. Director defends CDC's handling of anthrax attacks. *New York Times* March 26, 2002:F-6.
9. Altman L. A national challenge: The disease; experts assess officials on anthrax outbreak. *New York Times* September 10, 2001:B-6.
10. Joseph S. *Improving Public Health Capabilities in Interacting with the Media: An Urgent Issue in the Current Context of Terrorism*. Summary proceedings of a discussion conference convened at the Columbia Graduate School of Journalism. Sante FE, NM: Blackdog Associates; June 17–18, 2002.
11. Kennedy MG, guest ed. Public health communication during the September 2001 bioterrorism-related anthrax outbreaks: CDC activities and lessons learned. *J Health Commun Supplement* 2003;8.
12. Kreuter M, Lezin N, Kreuter M, Green L. *Community Health Promotion Ideas that Work*. Boston, Mass: Jones & Bartlett; 1998.
13. U.S. Department of Health and Human Services. *Making Health Communications Programs Work*. Bethesda: National Cancer Institute; 2002.
14. Basch C. Focus group interview: An underutilized research technique for improving theory and practice in health education. *Health Educ Q* 1987;14(4):411–448.
15. Krueger R. *Focus Groups: A Practical Guide for Applied Research*. Newbury Park, Calif: Sage Publications; 1994.
16. Morgan D. *Focus Groups as Qualitative Research*. 2nd ed. Thousand Oaks, Calif: Sage Publications, Inc.; 1997.
17. Asbury J. Overview of focus group research. *Qual Health Res* 1995;5(4):414–420.
18. Forthofer M. Using audience-segmentation techniques to tailor health behavior change strategies. *Am J Health Behav* 2000;24(1):36–43.
19. Morse J. Designing funded qualitative research. In: Denzin N, Lincoln Y, eds. *Handbook of Qualitative Research*. Thousand Oaks, Calif: Sage; 1994:220–235.
20. Valle R. Cultural and ethnic issues in Alzheimer's disease research. In: Light E, Lebowitz B, eds. *Alzheimer's Disease Treatment and Family Stress: Directions for Research*. Rockville, Md: National Institute of Mental Health; 1989:122–154.
21. Pollard W. Public perceptions of information sources concerning bioterrorism before and after anthrax attacks: An analysis of national survey data. *J Health Commun* 2003;8(Suppl 1):93–103.
22. Rainie L. *Half of Americans Fear Terrorists Might Mount Successful Cyber-Attacks Against Key American Utilities and Business*. Washington, DC: Pew Internet and American Life; August 31 2003. Available at: http://www.pewinternet.org/ppf/r/100/report_display.asp.
23. Davis T, Crouch M, Wills G, Miller S, Abdehou D. The gap between patient reading comprehension and the readability of patient education materials. *J Fam Pract* 1990;31(5):533–538.

Address reprint requests to:
Ricardo Wray, PhD
Health Communication Research Laboratory
Department of Community Health
School of Public Health
Saint Louis University
3545 Lafayette Ave.
St. Louis, MO 63104

E-mail: wray@slu.edu

Published online: August 23, 2004