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Sourcing Patterns in News Coverage of the Anthrax Attacks

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This content analysis examined attribution of 12 source types in news coverage of the 2001 anthrax attacks that appeared in 833 stories from 272 U.S. newspapers, Associated Press, National Public Radio, and four U.S. television networks. Sourcing patterns were examined across disaster phases, media types, attribution type, advice type, uncertainty factors, and explanation types. Prominent sourcing shifted from federal politicians to federal health officials after journalists began receiving tainted letters, and first responders emerged as the top source type after the attacks ended. Nearly half of all attributions were unnamed sources. Law enforcement officials were the most commonly quoted sources in stories that mentioned outrage rhetoric, speculation, hoaxes, and false alarms. The findings highlight routines that journalists use in disaster situations fraught with dread and uncertainty, as well as the types of information they seek during different phases of a crisis and by different types of sources.

Key Words: risk communication, newes sourcing, outrage, bioterrorism, disaster phases.

Introduction

Letters contaminated with deadly anthrax surfaced across the U.S. in October 2001. Spores spread through the postal system, alarming a public already anxious in the aftermath of the 9/11 attacks. A week after the September 11 terrorist attacks, a letter containing anthrax spores was mailed to Tom Brokaw at NBC but was not made public. National news coverage of anthrax incidents began October 4, 2001, the day that Robert Stevens, a photo editor for South Florida supermarket tabloid publisher American Media Inc., learned from watching CNN that he had anthrax infection. He died the next day from exposure to the same strain that had been mailed to NBC, and he was the first respiratory anthrax fatality in the U.S. since 1976. HHS Secretary Tommy Thompson announced that Stevens had contracted anthrax by drinking water from a stream, a medically improbable explanation for inhalation infection.

Contaminated letters quickly surfaced across the U.S., and spores spread through the postal system. Federal officials did not acknowledge a possible terrorism connection until Oct. 9, after nine postal workers tested positive for anthrax exposure. From October 4 to November 20, 11 inhalational and 11 skin-contact cases of anthrax infection were identified, and five of the inhalational cases were fatal (Jernigan et al. 2002). The cases generated immense media attention and dominated the nightly television news for several weeks.

News coverage of the attacks illuminated how the news media cover events when the intent and capabilities of terrorists is impossible to ascertain. The official, initial response was confused and spread across many agencies. Reporters found themselves in the midst of a story where journalists were both messengers and potential victims.

Disaster stages

The anthrax attacks can be examined in terms of Couch's (1996) contamination model, which consists of seven stages: pre-event, no-problem, warning, threat, impact, relocation, and *techfix*. The pre-event stage represents a community's history before the contamination occurs or is discovered, which affects the community's subsequent response. The no-problem stage reflects the views of people who

argue that contamination either does not exist or, if it does exist, poses no problem. During the warning stage, signs of potential danger are contained within normal channels. The media gives word of the impending disaster, and then the threat immediately precedes the actual impact. When the threat emerges, the danger is perceived as imminent and public groups become active.

The impact occurs when effects can be seen. The threat becomes a reality, removing the last vestiges of business as usual. In the relocation stage, people are moved away from the problem to recover personal safety. In the final stage, techfix, a technological solution renders the community safe again and allows recovery to proceed. Reliable technological solutions to contamination may not exist or are likely to be surrounded by disagreements about their adequacy. In a contamination disaster, it is often difficult to identify a disaster stage for slowly unfolding situations or when there is no single high point. Rather, there is often a series of signal events (mini-disasters) that shape the definitions and political conflicts. Many contamination cases involve protracted periods between multiple warnings of possible danger and the belief that the worst is past. Individuals often become trapped in extended periods of dread during the warning, threat, and impact stages (Couch 1996).

Risk framing

News framing is the process of organizing and packaging information. It involves selecting aspects of a perceived reality and making them more salient to promote a particular problem definition, causal interpretation, moral evaluation, or treatment recommendation. News frames are embodied in key words and concepts emphasized within stories (Entman 1993).

The framing of uncertainty in news coverage can intensify existing anxiety, contribute to consequences far more serious than the initial threat, and exaggerate social and economic responses to a hazard (Flynn, Slovic, and Kunreuther 2001; Singer and Endreny 1992).

Individuals tend to believe a hazard occurs more frequently when they can easily recall or imagine such instances. Thus, when news coverage of a risk increases, this increases the perceived likelihood of the risk occurring. To promote rational understanding

of an unfamiliar threat, news accounts must alarm the public when appropriate, without causing audiences to ignore alarms when danger is still present.

Outrage

The traditional method of risk assessment is to characterize the hazard, quantify the frequency, duration, and magnitude of exposure, and estimate the probability of an adverse health consequence (Guidotti 1994). This approach differs radically from the typical public reaction to risky situations. Risk communication scholars use the term "outrage" to denote a negative public response to a hazardous situation.

Outrage is likely to occur when a hazard receives substantial media attention (Sandman 1989). News coverage of a hazard can promote outrage if it amplifies or ignores risks, highlights panic, or emphasizes drama over scientific fact (Covello et al. 1986; Hornig 1993). Uncertainty can manifest itself in news coverage through outrage rhetoric, speculation, imprecise language, and contradictory or confusing evidence.

Experts tend to focus on hazard and ignore outrage, while the public focuses on outrage and ignores hazard. As a result, experts often overestimate risk when the hazard is high, and underestimate risk when the hazard is low. The public does the opposite. In a threatening situation, uncertainty leads to outrage, which in turn contributes to perceived hazard. Risk is the product of a hazard plus a community's outrage about the hazard (Sandman 1995).

Post-9/11 dialogue has been dominated by the belief in widespread panic (Dynes 2003). While widespread panic may be a disaster myth, risk research has shown that indeterminate risk does breed fright. When individuals are upset about uncertainty, they believe they are in danger, but when they are not upset, they tend to think they are not endangered.

Outrage often leads people to perceive a much greater risk than the scientific estimates of risk. Multiple interpretations of whether the worst is past can provoke outrage, including psychological distress and social breakdown (Kroll-Smith and Couch 1990). Contamination disasters are more likely than natural disasters

to involve social stigma (Edelstein 1991), assignment of blame (Davidson and Baum 1991), lack of technical control (Couch and KrollSmith 1992), ambiguity of cause and effect (Brown 1991), and an extended time frame (Shrivastava 1987).

Dread risks can cause direct damage and provoke indirect damage. Exaggeration, alarmism, and overreaction to bioterrorism can be economically harmful and create the damaging consequences the terrorists seek but are unable to perpetrate on their own (Mueller 2005). Emotionalism in headlines, images, sound, and text can complicate an otherwise successful public health response to a bioterror attack (Stein et al. 2004). Outrage also can trigger an unnecessary strain on the medical system. During the anthrax attacks, many hospitals were inundated with "worried well," fearful citizens, while many others experienced side effects from the misuse of antibiotics. Public over-reaction hindered the health system's ability to treat those in need of medical care (Tucker 2002).

Comparability Factors

An antidote for outrage is factual information that helps individuals evaluate a risk's acceptability. Risk acceptability is determined by comparing a risk with feasible alternatives, weighing risks, or weighing costs and benefits (Graham and Wiener 1995). When information promotes comparability, it enables individuals to consider tradeoffs among different risks and ultimately achieve rational understanding of an unfamiliar threat in context (Covello, von Winterfeldt, and Slovic 1986). Statements also can reduce uncertainty by explaining why health effects are unlikely, how contamination is prevented, how infections can be treated, or how risks are reduced through preventive measures (Gordon 2003). While claims that promote uncertainty tend to be value-laden, claims that promote comparability are more straightforward and factual (Thompson 1988).

Individuals often evaluate unfamiliar risks by comparing them with familiar ones. Risk comparisons explain gradients of risk, the cost for risk reduction, tradeoffs among different risks, weighing of costs vs. benefits, estimated deaths or injuries/illnesses across time, time between exposure to a hazard and its effects, or links between

exposure to a hazard and various health impacts (Covello et al. 1986; Johnson 2004). Officials often explain the toxicity of a hazardous substance by referring to a higher benchmark, such as a public health standard, to try to persuade audiences that a risk is acceptable. However, people with negative views of government, whom officials might wish to reassure, tend to doubt that such benchmarks offer a valid risk comparison (Johnson and Chess 2003).

News Sourcing and Attribution

Terrorist attacks are intended to destroy public confidence in leadership. Lack of confidence in the government's ability to respond to a terrorist attack is associated with concerns about lack of preparedness, disclosure, and dedication (Olson 2000). Top-down, one-way communication seeks to bring public belief in line with expert views (Coleman 1995). Official statements, meant to assure the public that the mail, airlines, or water supply is safe, may have the opposite effect simply by calling attention to the issue.

To reduce outrage, risk advice must reassure, neither understate nor over-emphasize risk, simplify complex information (Covello, Sandman, and Slovic 1988; Edwards et al. 2001), and cajole rather than command (Connell and Knuth 1998). Ultimately, it must build trust, deepen comprehension, and gain agreement (Rowan 1994). When individuals perceive a risk as high, they may reject even the most solid advice unless the message bolsters enough self-efficacy for them to adopt recommended protective actions (Gordon 2003). Individuals overestimate risk when they believe that officials have minimized risk to avoid a public panic (Gurmankin, Baron, and Armstrong 2004). The very fact that an investigation is underway can provoke fear and suspicion. Perceived lies and distortions can lead to polarization, confusion, and the perception that the hazard is unpredictable and uncontrollable (Beder and Shortland 1992).

During the anthrax attacks, many officials tried to balance uncertainty and reassurance (Brown 2001). However, journalists sometimes interpreted experts' hedging language as evidence of stonewalling or incompetence, rather than a portrayal of the uncertain nature of the situation, and then looked for sources who would speak with less caution (Lowrey 2006).

In many disasters, local organizations are the most trusted sources of information. Federal officials are often less trusted than other sources in terrorism situations. News coverage after an attack can boost the trustworthiness of local officials and emergency responders if their message reflects greater disclosure and empathy (Wray et al. 2004). However, since 9/11, emergency management organizations increasingly utilize top-down communications, centralized authority, and command-and-control models rather than community-based approaches (Ellemor and Barnett 2005).

Public understanding of hazard information and warnings is greater when the news quotes scientists, emergency managers, and local politicians (King 2004). Although journalists often regard scientists as the most credible sources for technical information, they must translate their expertise for lay audiences. As controversy increases, scientists often become crowded out by political sources (Miller, Boone, and Fowler 1990; DiBella, Ferri, and Padderud 1991).

In an effort to appear objective, reporters often interview sources to convey at least two perspectives in a story. They often choose sources based on location, media routines, or topical specialization (Sigal 1986; Tuchman 1978). Journalists tend to rely on a small group of dependable sources, rather than seek new sources for each story (Tuchman 1978). The more times sources are quoted, the more credibility they achieve. The more influential sources become, the more likely their voices will be amplified. News worker socialization, media conglomeration, public relations information subsidies, and the dominance of a few news services further increase to their influence (Reese, Grant, and Danelian 1994).

When journalists are unable to sort out whether there is a real threat to citizens, they often merely report that a controversy is occurring and identify key players on each side (Beder and Shortland 1992). Quotes legitimize a news story by lending authenticity and credibility (Tuchman, 1978). In general news coverage, government officials are quoted more often than any other source type (Sigal 1973; Whitney et al. 1989; Hoynes and Croteau 1991).

Conflicting quotes create the impression that interview sources are involved in a dispute. Specialization of expertise and fragmentation of knowledge contribute to this perception. In crisis situations,

disagreements among experts are caused by limited authority, data, and resources for addressing risks, failure to disclose uncertainties and limitations of risk assessments, and failure to address stakeholder interests and concerns (Covello et al. 1986). These disagreements can erode public trust, leading to the belief that risks are continually underestimated, ignored, or covered up (Furedi 2002).

In a crisis, journalists need instant access to information that may not yet exist, experts that are not accessible, or statements about issues that sources may not feel prepared to address (Nelkin 1987). When communication channels break down, and then journalists are forced to interpret competing sources of information, conflicting reports contribute to outrage.

During the anthrax attacks, authoritative sources frequently disagreed, resulting in confusing, mixed messages. Many conflicting messages resulted from health experts' inexperience with anthrax. The situation raised questions they could not answer. Some sources were unwilling to say "I don't know" when facts were unavailable, while others were compelled to release information before all the important facts were known. Conflicting information heightened journalists' concern that there was more to the story that the public needed to know (Cortes 2001). When the FBI and CIA were stumped, they often second-guessed their earlier statements. For example, federal officials initially declared that the anthrax incidents were not acts of terrorism, then linked them to 9/11, and finally concluded that they were probably domestic terrorism unrelated to 9/11 (Ricchiardi 2001).

In news coverage, hypotheticals are alerts about foreseeable threats and vulnerabilities. Speculation often occurs in the absence of centralized expertise. Expert opinion, rather than statistical data, often provides the basis for predictions (Zilinskas, Hope, and North 2004). Reporting about a hypothetical can intensify outrage if it is inaccurate, fails to disclose presuppositions on which the hypothetical is based, does not indicate how likely the posited events will occur, or omits preventive measures (Jamieson, et al. 2003).

During the anthrax attacks, when the Pentagon restricted information available to the press, many journalists turned to unofficial sources for speculation about possible outcomes (Guckenberger 2002). Even

authoritative sources provided rumors, sweeping claims, conspiracy theories, and speculation about future attacks (Ratzan 2001). More than a year after the attacks, hypothetical scenarios about future attacks continued to appear in the news. For example, a March 18, 2003 *Philadelphia Inquirer* story stated that "a little more than two pounds of anthrax spores spilled into the air over a city the size of New York could be expected to kill more than 120,000 people unless state and federal officials respond much more aggressively than they now plan to, according to the first comprehensive computer model of such a terrorist act" (Lin 2003).

The use of unnamed sources also promotes unsubstantiated rumors (What the Polls 1998). Most readers are troubled by unnamed sources, and those who doubt the credibility of stories that use unidentified sources are more likely to perceive bias (Gump 2000). For example, in an Oct. 25, 2001 NPR interview, bioweapons policy consultant Matthew Meselson remarked, "A political person, or even an outside expert who isn't authorized and fully knowledgeable and fully in contact, may not know exactly what's right. A lot of things have been attributed to unnamed sources, which is certainly the worst thing of all, 'unnamed government sources.'"

Deadline pressure may compel journalists to quote an unnamed source rather than search for someone who will go on the record with the information. In a rush to cut corners to break new aspects of a story, journalists sometimes provide only passing clarification about a source's identity and agenda (Geimann 1998). News shapers who are not part of an event but merely offer opinionated commentary often are not identified fully (Soley 1992).

Based on this risk communication literature, the present study examines patterns of sourcing that appeared in news coverage of the anthrax attacks. Eight hypotheses were used to guide this analysis:

H1: Emergency management/security officials will be the top source type during the outbreak phase because the initial anthrax outbreaks were reported before health agencies developed a coordinated communication system.

H2: Health officials will be quoted most often in specific advice stories during the outbreak period, assuming they

are primarily in charge of explaining new developments and preventing panic.

H3: Politicians will be quoted most often in vague advice stories during the impact period, assuming that politicians are the most likely to tell the public to not panic, while journalists turn to other sources for practical advice.

H4: The print media will quote first responders more often than the national broadcast media, because newspapers and AP can provide more local crisis information to citizens.

H5: Local and state health officials will be quoted as off-record sources more often than other sources because of the executive order requiring all anthrax information to be released from federal agencies.

H6: Stories containing uncertainty factors will quote politicians and victims more often than first responders, assuming that first responders are more likely to provide practical recommendations and documented facts and less likely to provide opinionated statements about fears, mysterious infections, or false alarms.

H7: Stories containing speculation will quote politicians more often than first responders, assuming that politicians are more likely to speculate about hypotheticals.

H8: Scientists and health officials will be quoted in explanation stories more often than other source types, assuming that scientists and health officials are more likely to provide definitions and elucidating descriptions of processes.

Method

This content analysis examined 833 stories from major U.S. newspapers, as well as the Associated Press newswire and transcripts from National Public Radio and four U.S. television news networks (ABC, CBS, CNN, and NBC). Within the sample, 457 (55%) of the stories came from 272 newspapers, 93 (11%) from AP, 168 (20%) from NPR, and 114 (14%) from the television networks.

The time frame was Oct. 4-Dec. 31, 2001. The study divided the anthrax crisis into three basic phases: outbreak, impact, and post-impact. To increase the reliability of the coding of the anthrax coverage, it was most efficient to divide the categories into outbreak (pre-event, no-problem, warning, and threat), impact, and post-impact (relocation and techfix). Because of the rapid onset, there were no pre-event or no-problem stages. The outbreak phase, which accounts for the warning and threat stages, began when the first anthrax story appeared on Oct. 4, when a Boca Raton photo editor lapsed into unconsciousness from exposure to anthrax spores. The impact phase began Oct. 15 when anthrax letters were sent to members of the national media and Congress. The Congressional scare began on Oct. 15, when U.S. Senate Majority Leader Tom Daschle talked to reporters after an envelope containing a suspicious powder was opened in his office. The post-impact phase, which accounts for the relocation and techfix stages, began on Nov. 12, after reporting of new attacks ended, and the phase extended through Dec. 31, so the decline in coverage could be evaluated.

The unit of analysis was an individual story, defined as a news story or opinion article in the Lexis-Nexis Academic Universe database mentioning "anthrax" in the headline or lead. Lexis-Nexis searches rendered 5,389 news stories that fit these inclusion criteria. The final sample represented one in every 7th article in the universe. Story corrections, abstracts, letters to the editor, non-U.S. publications, obituaries, reprints, sports stories, and digests/round-up summaries were excluded, as well as stories less than 150 words and material originating from another publication.

In order to evaluate search terms and categorization schemes, 20 stories were randomly downloaded and analyzed by three coders. The results of this pilot test were used to further refine the original coding instrument. After categories were tested and coders were trained to reduce intercoder bias, five coders then independently coded the final sample of 833 stories. The intercoder reliability coefficient, Cohen's kappa, was .88 ($p<.05$). Expressed as a number between 0 and 1, with 1 corresponding to 100 percent agreement, Cohen's kappa measures the agreement between two raters who each classify the same number of items into mutually exclusive

categories (Cohen 1960). In a follow-up qualitative analysis, a sub-sample of 150 stories was examined to determine common themes and risk perception factors. Chi-square analyses were used to identify significant differences in sourcing across disaster phases and across types of media, advice, attribution, uncertainty factors, and explanations.

The six uncertainty factors were outrage rhetoric, speculation, conflicting reports, off-record attribution, vague advice, and confusing incidents. Each variable that comprised the outrage rhetoric, speculation, and confusing incident factors was coded as a separate question that simply asked whether the story mentioned the concept or not.

Outrage rhetoric, language that described a negative public reaction to the attacks, consisted of mentions of terrorism/bioterrorism, contagion, and fear/panic. These three concepts were sub-categories of outrage rhetoric. Speculation about hypotheticals included conjecture about food or water contamination, anthrax spraying by crop dusters or other aerosol dispersion, economic consequences, a 9-11 link, or possible perpetrators. The conflicting reports variable was defined as a statement within a story that mentioned conflicting reports; coders were not asked to evaluate whether various statements within a story were conflicting. Off-record attribution was defined as sourcing that did not identify interview sources by name. Vague advice was defined as a statement that merely instructed audiences to not panic, to remain calm, or to live life normally. The two sub-categories of the "confusing incidents" variable were hoaxes/false alarms and mysterious infections.

Comparability factors were five types of information that can assist citizens in assessing their risk of anthrax exposure: risk explanations, specific advice, antidotes, process explanations, and definitions of key terms. The three sub-categories of risk explanations were risk comparisons, estimates of citizens' general risk of anthrax exposure, and estimates of citizens' risk of exposure from handling personal mail. Risk comparisons were defined as explanations that compared one risk with another or that discussed tradeoffs. For general risk estimates, coders recorded whether a story stated or implied that an average citizen is at risk or in danger of becoming exposed to

anthrax. For mail risk, coders recorded whether a story stated or implied that incoming personal mail is risky or dangerous.

Specific advice was defined as a statement that offered practical strategies for avoiding anthrax exposure. Antidotes were mentions of antibiotics or anthrax vaccinations. Process explanations were defined as statements that mentioned dormancy of spores, anthrax testing methods, strategies for identifying a perpetrator strain of anthrax, incubation of spores, or preparedness. Key term definitions were statements that defined anthrax, weaponization, inhalation infection, and anthrax infection through the skin.

Coders were asked to record any of 66 different source types that appeared in each story. These categories then were recoded into 12 new categories: city/county health officials, state health officials, federal health officials, fire/rescue/health care workers, law enforcement/military officials, emergency management/security officials, scientists, local/state politicians, federal politicians, other politicians, victims, and other citizens.

Federal health agency sources were Secretary of Health Tommy Thompson and representatives from CDC and other NIH agencies, EPA, and FDA. Fire/rescue/health care workers were firefighters, EMTs, doctors, and nurses. Law enforcement/military officials were police, security officers, military personnel, and FBI officials. Emergency management/security officials were officials from FEMA, CIA, and the Office of Homeland Security.

Scientists were researchers from universities, Los Alamos National Laboratory, and the U.S. Army Medical Research Institute of Infectious Diseases. Local/state politicians included mayors, governors, state legislators, and other county, city or state politicians. Federal politicians were Congressmen and White House officials, including President Bush, Vice-President Cheney, Attorney General John Ashcroft, White House spokesman Ari Fleisher, and other White House advisors. Other political officials were judges, political candidates, and politicians from other countries, and former politicians. Victims were patients, plaintiffs, representatives from the U.S. Postal Service, the Supreme Court facility, and journalists. Other citizens were representatives from advocacy groups, professional organizations, religious groups, schools, and citizens who were not anthrax victims.

Results

Coverage peaked during the second week of the crisis, but the amount of coverage remained intense for nearly a month after the initial story. Although a third of the newspaper stories appeared on the front page, most page-one stories did not appear until 2-3 weeks after the initial anthrax infection was reported. Overall coverage peaked dramatically Oct. 15-22, when Dan Rather's assistant became infected, various media outlets began receiving powdery letters, Sen. Tom Daschle's staff member opened a tainted envelope, and spores were discovered in the building where mail is processed for legislators.

The first hypothesis, asserting that emergency management/security officials will be the top source type during the outbreak phase, was not supported. The findings suggest the opposite conclusion. Emergency management officials were quoted the least often of all source types during the outbreak phase (0.4%), while federal (13.5%) and local/state (9.6%) politicians were the most prominent sources (Table 1).

TABLE 1: Sourcing during three crisis phases

SOURCE TYPE	Outbreak (df=11)	Impact	Post-Impact (df=11)	All phases (df=55)	X^2
City/county health	38 (7.1)	138 (8.8)	14 (8.5)	190 (8.3)	n.s.
State health (df=2)	53 (9.8)	101 (6.4)	18 (11.0)	172 (7.6)	8.94[a]
Federal health	61 (11.3)	183 (11.6)	26 (15.9)	270 (11.9)	n.s.
Fire/rescue/health care (df=2)	48 (8.9)	145 (9.2)	27 (16.5)	220 (9.7)	8.50[a]
Law enf & military	65 (12.1)	177 (11.2)	10 (6.1)	252 (11.1)	n.s.
Emerg mgmt/security (df=2)	2 (0.4)	60 (3.8)	2 (1.2)	64 (2.8)	18.51[b]
Scientists	48 (8.9)	120 (7.6)	13 (7.9)	181 (7.9)	n.s.
Local/state politicians	52 (9.6)	146 (9.3)	12 (7.3)	210 (9.2)	n.s.
Federal politicians (df=2)	73 (13.5)	155 (9.8)	11 (6.7)	239 (10.5)	7.64[a]
Other politicians	18 (3.3)	86 (5.5)	5 (3.0)	109 (4.8)	n.s.
Victims	55 (10.2)	179 (11.4)	11 (6.7)	245 (10.8)	n.s.
Other citizens/groups	26 (4.8)	84 (5.3)	15 (9.1)	125 (5.5)	n.s.
All sources	539	1,574	164	2,277	n.s.
X^2	25.58[b]		28.17[b]	119.03[c]	

Numbers in parentheses = percentages of column totals. a= $p<.05$; b=$p<.01$. n=833 stories.

Table 1 shows that 23.7% (539) of the 2,277 source attributions appeared in the outbreak phase, while 63.5% (1,574) appeared in the impact phase and 6.6% (164) in the post-impact phase. Federal politicians were top sources during the outbreak phase, federal health officials in the impact phase, and fire/rescue/health care workers during the post-impact phase.

During the outbreak phase, there were significant differences in the frequency that various types of sources were quoted (X^2=25.58, df=11, p<.001). Sources quoted most during the outbreak phase were federal politicians (13.5%), law enforcement/military sources (12.1%), and federal health agency officials (11.3%). Significant differences in sourcing also occurred during the post-impact phase (X^2=28.17, df=11, p<.001). Top sources during the post-impact phase were fire/rescue/health care workers, state and federal health officials, and citizens. State health officials were more likely than other sources to be quoted during the post-impact phase than in the impact phase. Emergency management and security officials were quoted least in all phases of the crisis. Federal politicians were quoted more often than other sources during the outbreak phase.

The second hypothesis, which asserted that health officials will be quoted most often in specific advice stories during the outbreak period, was supported. City/county, state, and federal health officials provided specific advice during the impact (86/286 = 30%) and post-impact (5/10 = 50%) phases more often than other sources (Table 2).

Advice appeared in 22% of all stories, and specific advice was mentioned three times more often than vague advice. Vague advice, which appeared in 5.5% of stories, often implied that exposure risks were controllable, by encouraging citizens to be on alert for suspicious behavior or items, be cautious, and prepare for danger. It typically recommended that individuals get back to business as usual, be optimistic, or manage stress.

An example of vague advice, which appeared in an Oct. 15 NPR story, encouraged Americans to "go out and shop and have fun, be on a wartime level of heightened alert, and report anything suspicious." An Oct. 19 AP story reported that "experts advise the public to be cautious but go about their daily routines [and] maintain a normal lifestyle." In an Oct. 26 *Houston Chronicle* story, a

TABLE 2: Sourcing in advice stories during three crisis phases

	Outbreak			Impact			Post-Impact (df=11)				
SOURCE TYPE	Specific	Vague	ratio	Specific	Vague	ratio	Specific	Vague	ratio	All advice	X^2
City/county health	8	4	8.2	26	10	10.1	1	0	8.3	49 (9.5)	n.s.
State health	8	6	9.5	22	8	8.4	1	0	8.3	45 (8.7)	n.s.
Federal health (df=5)	12	3	10.2	38	8	12.9	3	2	41.7	66 (12.8)	15.37[b]
Fire/rescue/health care	13	2	10.2	34	6	11.2	2	0	16.7	57 (11.0)	n.s.
Law enf & military	18	5	15.6	30	7	10.4	0	0	0.0	60 (11.6)	n.s.
Emerg mgmt/security	0	0	0.0	9	1	2.8	0	0	0.0	10 (1.9)	n.s.
Scientists	5	0	3.4	14	4	5.0	0	0	0.0	23 (4.5)	n.s.
Local/state politicians	11	4	10.2	27	8	9.8	0	0	0.0	50 (9.7)	n.s.
Federal politicians	15	8	15.6	29	10	10.9	1	0	8.3	63 (12.2)	n.s.
Other politicians	2	1	2.0	14	2	4.5	0	0	0.0	19 (3.7)	n.s.
Victims	15	4	12.9	33	5	10.6	2	0	16.7	59 (11.4)	n.s.
Other citizens/groups	2	1	2.0	10	2	3.4	0	0	0.0	15 (2.9)	n.s.
All sources	109	38	2.9	286	71	4.0	10	2	5.0	516	n.s.
X^2							20.81[a]				

Numbers in parentheses = percentages of column totals. a= p<.05; b=p <.01. n=833 stories

psychologist advised readers to "stay optimistic. Challenge negative or catastrophic thinking and, when you find yourself having negative thoughts, replace them with positive ones… Use positive strategies for managing the stress."

Specific advice offered practical tips or instructions for self-protection, such as how to identify suspicious mail, suspicious behavior among neighbors, and symptoms of infection. For example, an Oct. 25 NPR story stated that "people need to be vigilant. If they receive a package or an envelope that looks suspicious, they should not open it. Set it down, wash yourself off, and call law enforcement officials." Other specific advice explained "don'ts," such as don't get tested, don't buy gas masks or gloves, don't stockpile or hoard antibiotics, or don't take antibiotics without a doctor's permission.

Sometimes advice was erroneous, overstated, lacked substantiating facts, or contradicted public health recommendations. For example, an Oct. 22 CNBC story suggested that viewers could run an iron over mail for half an hour or microwave it for 20 minutes to kill any anthrax spores that might be enclosed. An Oct. 12 AP story advised readers to

> "treat suspicious materials like you would a dead rat. If in doubt, throw it in the garbage… A garbage dump would render it virtually as harmless as any other instance of the disease… Otherwise, if the material is opened, place it in a sealed container, wash down everything that might have been touched by the material with a bleach solution, and call authorities. You put anthrax in a sealed container, and it's just about as risky as a sealed can of beer."

Throughout the crisis, federal health officials were quoted most frequently in stories containing all types of advice, followed by law enforcement/military officials, fire/rescue/health care workers, and federal politicians. During the outbreak phase, federal politicians were quoted most frequently in advice stories, followed by law enforcement/military officials, and victims. Advice stories during the outbreak phase frequently quoted federal health officials, fire/rescue/health care providers, and federal politicians.

During the post-impact phase, half of all advice stories quoted health officials, particularly federal health officials. Significant differences in advice types appeared across source types in the post-impact phase. Federal health officials were most frequently quoted in specific advice stories, followed by fire/rescue and health care workers and victims.

The third hypothesis, which asserted that politicians will be quoted most often in vague advice stories during the impact period, was supported. Across all phases, federal politicians were more likely to provide vague advice than all other source types (16.2%; 18/111 mentions), followed by city/county health officials, state health officials, and local/state politicians (12.6% each; 14/111). Federal health officials were the only sources that provided vague advice during the post-impact phase (Table 2).

The fourth hypothesis, which asserted that the print media will quote first responders more often than the national broadcast media, was partially supported. First responders, who included fire/rescue/health care workers, law enforcement/military officials, and emergency management/security officials, accounted for 24.6% of the 1,662 print attributions (409) and 20.7% of the 614 broadcast attributions (127). As shown in Table 3, print stories were dominated by law enforcement/military officials (12.3%), federal health officials (11.9%), and victims (10.1%), while broadcast stories more frequently quoted federal politicians (12.5%), victims (12.4%), and federal health officials (11.7%).

Newspapers and AP provided the highest level of sourcing, an average of 3.0 and 2.9 sources per story, respectively. Television network stories provided an average of 2.4 sources per story, and NPR stories provided 2.0 sources per story on average. NPR quoted unofficial sources (scientists, victims, and citizens) the most frequently. Among NPR stories, 31.8% quoted at least one unofficial source, on average, compared with AP (28.5%), newspapers (22.7%), and the TV networks (17.9%).

NPR was the only media type that reflected significant differences in coverage across all source types. NPR quoted victims and victim group representatives most often, followed by federal health officials, federal politicians, and scientists. Sources that appeared in

TABLE 3: Sourcing across four media types

	Papers	Associated Press	TV Networks	NPR (df=11)	All media (df=33)	X^2
City/county health (df=3)	127 (9.2)	13 (4.7)	31 (11.3)	19 (5.6)	190 (8.3)	11.54[b]
State health	99 (7.1)	21 (7.6)	25 (9.1)	26 (7.6)	171 (7.5)	n.s.
Federal health	161 (11.6)	37 (13.4)	29 (10.6)	43 (12.6)	270 (11.9)	n.s.
Fire/rescue/health care (df=3)	146 (10.5)	13 (4.7)	31 (11.3)	30 (8.8)	220 (9.7)	9.20[a]
Law enf & military (df=3)	170 (12.3)	35 (12.6)	24 (8.8)	23 (6.8)	252 (11.1)	9.44[a]
Emerg mgmt/security	37 (2.7)	8 (2.9)	7 (2.6)	12 (3.5)	64 (2.8)	n.s.
Scientists	109 (7.9)	23 (8.3)	16 (5.8)	33 (9.7)	181 (8.0)	n.s.
Local/state politicians	138 (10.0)	22 (7.9)	31 (11.3)	19 (5.6)	210 (9.2)	n.s.
Federal politicians (df=3)	124 (9.0)	38 (13.7)	35 (12.8)	42 (12.4)	239 (10.5)	8.35[a]
Other politicians	68 (4.9)	11 (4.0)	12 (4.4)	18 (5.3)	109 (4.8)	n.s.
Victims (df=3)	131 (9.5)	38 (13.7)	27 (9.9)	49 (14.4)	245 (10.8)	8.85[a]
Other citizens/groups (df=3)	75 (5.4)	18 (6.5)	6 (2.2)	26 (7.6)	125 (5.5)	8.84[a]
All sources	1385	277	274	340	2,276	n.s.
X^2				24.42[a]	70.50[c]	

AP=Associated Press; numbers in parentheses = % of column totals.
a=p<.05; b=p <.01; c=p<.001. n=833.

newspaper stories most often were law enforcement/military officials, federal health officials, fire/rescue/health care workers, and local/state politicians. AP wire stories quoted federal politicians, victims, and federal health officials most frequently. Stories produced by the four national television networks quoted federal politicians, local politicians, local health officials, and fire/rescue and health care workers most frequently.

City and county health officials were most likely to be quoted by the television networks, then newspapers, NPR, and the Associated Press. Federal politicians were quoted most often by the AP, followed by television, NPR, and newspapers. Victims, including postal officials and others representing potential victims, were quoted most frequently by NPR, then AP, television networks, and newspapers. Citizens and citizen groups were quoted most often by NPR, followed by print media and television. City/county, state, and

federal health officials were quoted more than twice as often in print media (458/1662, 27.6%) as in broadcast (173/614, 11.9%) media (X^2=13.89, df=6, p<.05). Local, state and federal politicians were significantly most likely to be quoted in television stories (78/274, 28.5%), then AP (71/277, 25.6%), newspaper (330/1385, 23.8%), and NPR (79/340, 23.2%) stories (X^2=16.54, df=6, p<.01).

The fifth hypothesis, which asserted that local and state health officials will be quoted as off-record sources more often than other sources, was partially supported. As shown in Table 4, on-record to off-record attribution ratios showed that off-record stories were most likely to quote state health officials (1.0) than other sources across all phases, but city/county health officials were the least likely of all sources to be quoted in off-record stories (3.0).

Off-record attribution accounted for 42.3% of all attribution during the anthrax crisis. The outbreak phase featured the highest level of off-record attribution, relative to on-record attribution. The ratio of on-record to off-record attribution was 1:1.3 during the outbreak phase, 1.6:1 during the impact phase, and 1.2:1 during the post-impact phase. As a group, first responders were quoted the most frequently in off-record stories (1.1) during the impact phase. During the post-impact phase, local politicians, emergency management/ security officials, local health officials, fire/rescue and health care workers, and officials from state and federal health agencies were quoted the most frequently in off-record stories.

During the outbreak phase, federal politicians, law enforcement/ military officials, and state health officials were quoted as unnamed sources more often than other source types. The sources used as unnamed sources most frequently in the impact phase were law enforcement/military officials, federal health officials, and federal politicians. After the attacks ended, the most common off-record sources were fire/rescue/health care workers, federal health officials, and state health officials.

Significant differences in attribution appeared across 82% of the source types. Highly significant differences appeared in attribution of city/county health officials, emergency management/security officials, and scientists. Local health officials and fire/rescue and health care workers were quoted in off-record stories more often in

TABLE 4: On-record vs. off-record attribution during three crisis phases

	Outbreak (df=11)			Impact (df=11)			Post-Impact (df=11)			All phases (df=55)			X^2
SOURCE TYPE	On	Off	ratio	On	Off	ratio	On	Off	ratio	On	Off	ratio	
City/county health (df=2)	33	5	6.6	105	33	3.2	4	10	0.4	142	48	3.0	35.61[c]
State health (df=2)	17	36	0.5	101	77	1.3	6	12	0.5	124	125	1.0	17.48[b]
Federal health	34	27	1.3	183	118	1.6	9	17	0.5	226	162	1.4	
Fire/rescue/health care (df=2)	19	29	0.7	145	103	1.4	8	19	0.4	172	151	1.1	16.13[b]
Law enforcement/military	25	40	0.6	177	129	1.4	6	4	1.5	208	173	1.2	
Emerg mgmt/security (df=2)	0	2	0	60	52	1.2	2	0	0	62	54	1.1	35.61[c]
Scientists (df=2)	27	21	1.3	120	48	2.5	12	1	12	159	70	2.3	22.53[c]
Local/state politicians	21	31	0.7	146	104	1.4	12	0	0	179	135	1.3	
Federal politicians (df=2)	21	52	0.4	155	114	1.4	7	4	1.8	183	170	1.1	16.51[b]
Other politicians (df=2)	11	7	1.6	86	63	1.4	2	3	0.7	99	73	1.4	11.68[a]
Victims	22	33	0.7	179	109	1.6	8	3	2.7	209	145	1.4	
Other citizens/groups (df=2)	8	18	0.4	84	43	2	12	3	4	104	64	1.6	12.94[a]
All sources (df=2)	238	301	0.8	1541	993	1.6	88	76	1.2	1867	1370	1.4	119.03[c]
X^2	48.83[c]			40.55[c]			47.28[c]			119.03[c]			

Ratio=On-record: off-record attribution. Numbers in parentheses = % of column totals. a= p<.05; b=p <.01. n=833.

the post-crisis phase than in any other phase. State health officials and emergency management/security officials were quoted in off-record stories proportionally more often during the outbreak and post-impact phases. Scientists were quoted in off-record stories less often than other source types during all phases.

The sixth hypothesis, positing that stories containing uncertainty factors will quote politicians and victims more often than first responders, was not supported. Instead, first responders were quoted more frequently (1458, 32.2%) than politicians (1252, 27.7%) and victims (556, 12.3%) across coverage containing 4519 mentions of uncertainty factors (Table 5).

First responders were quoted more often than victims in stories mentioning most specific uncertainty factors: fear/panic (quoted in 24.2% vs. 10.8% of stories, respectively), contagion (16.8% vs. 12.9%), conflicting reports (24.5% vs. 9.0%), hoaxes/false alarms (28.3% vs. 11.7%), terrorism (22.9% vs. 10.0%), and mysterious infections (31.1% vs. 4.9%). First responders also were quoted more often than politicians in coverage of fear/panic (24.2% vs. 23.7%), conflicting reports (24.3% vs. 21.3%), hoaxes/false alarms (28.3% vs. 22.9%) and mysterious infections (31.1% vs. 8.8%). However, politicians were quoted more often than first responders in stories mentioning contagion (24.7% vs. 16.8%) and terrorism (25.6% vs. 22.9%).

When the pattern of infections began to reveal terrorism, reporters were often denied interviews at the local level and instead directed to media relations representatives at top federal law enforcement and federal health agencies. In the absence of a coordinated governmental communications system, this top-down approach prompted many journalists to seek alternative sources. Federal health officials were quoted most frequently in contagion stories, followed by victims, federal politicians, scientists, and local politicians. Stories mentioning terrorism or bioterrorism frequently quoted law enforcement and military officials, followed by federal politicians, federal health officials, victims, and local politicians.

An example of fear rhetoric in an advice story appeared in a *Spokane Spokesman-Review* story on Dec. 23, the end of post-crisis coverage:

TABLE 5: Sourcing in stories containing uncertainty factors

	Fear / panic	Contagion (df=11)	Terrorism (df=11)	All outrage rhetoric (df=11)	Conflicting reports	Hoaxes & false alarms (df=11)	Mysterious infections (df=11)	All uncertainty factors (df=55)	X^2
City/co health (df=6)	81 (9.2)	24 (6.6)	113 (8.1)	137 (8.3)	29 (10.8)	84 (10.1)	178 (23.0)	509 (11.3)	36.55[c]
State health (df=6)	83 (9.4)	32 (8.8)	110 (7.9)	134 (8.2)	33 (12.3)	66 (8.0)	166 (21.4)	490 (10.9)	35.61[c]
Federal health (df=6)	84 (9.6)	53 (14.6)	149 (10.7)	176 (10.7)	31 (11.6)	68 (8.2)	46 (5.9)	431 (9.6)	25.58[c]
Fire/rescue/health care (df=6)	106 (12.1)	28 (7.7)	120 (8.6)	157 (9.6)	46 (17.2)	87 (10.5)	194 (25.0)	697 (12.9)	35.07[c]
Law enf/mil (df=6)	88 (10.0)	26 (7.1)	156 (11.2)	177 (10.8)	12 (4.5)	120 (14.5)	35 (4.5)	548 (9.7)	37.97[c]
Emerg mgmt / security	19 (2.2)	7 (1.9)	43 (3.1)	51 (3.1)	7 (2.6)	27 (3.3)	12 (1.5)	213 (2.5)	n.s.
Scientists (df=6)	66 (7.5)	35 (9.6)	126 (9.0)	144 (8.8)	20 (7.5)	51 (6.2)	25 (3.2)	481 (7.2)	30.48[c]
Local/state pols (df=6)	80 (9.1)	35 (9.6)	132 (9.5)	152 (9.3)	20 (7.5)	83 (10.0)	32 (4.1)	506 (8.5)	22.83[c]
Federal politicians (df=6)	83 (9.4)	40 (11.0)	151 (10.8)	162 (9.9)	23 (8.6)	73 (8.8)	26 (3.4)	444 (8.8)	35.61[c]
Other politicians (df=6)	45 (5.1)	15 (4.1)	75 (5.4)	84 (5.1)	14 (5.2)	34 (4.1)	10 (1.3)	302 (4.3)	22.95[c]
Victims (df=6)	95 (10.8)	47 (12.9)	140 (10.0)	173 (10.5)	24 (9.0)	97 (11.7)	38 (4.9)	556 (9.8)	27.05[c]
Other citizens (df=6)	49 (5.6)	22 (6.0)	81 (5.8)	94 (5.7)	9 (3.4)	38 (4.6)	13 (1.7)	313 (4.7)	23.86[c]
All sources (df=66)	879	364	1,396	1,641	268	828	775	4,519	135.20[c]
X^2		31.34 [c]	45.56[c]	33.55[c]		32.68[c]	43.25[c]	119.03[c]	

Numbers in parentheses = percentages of column totals. c=p<.001. n=833 stories.

> "A nation already afraid of terror from the skies woke up to a new fear in early October: death in the mailbox… The outbreak, coupled with the Sept. 11 terrorist attacks, sent many Americans to the verge of breakdown. It's bordering on mass hysteria."

And an Oct. 19 story in the *San Diego Union Tribune* pointed out

> "so contagious is this anthrax hysteria – not anthrax itself – that other nations are being swept up in it… Not in his dreams could Osama bin Laden have feverishly imagined that his mere specter would make us Americans – not to mention our European allies – afraid to open our mail and tremble at the very sight of an unidentifiable white powder."

Sourcing patterns appeared in coverage of hoaxes/false alarms and mysterious infections. Law enforcement/military officials were the most likely of all sources to be quoted in stories about hoaxes/false alarms, followed by victims, fire/rescue/health care workers, local health officials, and local politicians. Fire/rescue/health care workers were quoted most often in the stories that mentioned mysterious infections. Half of all sources quoted in these stories were health officials; 88% of these health sources were local or state health officials.

The seventh hypothesis, asserting that stories containing speculation will quote politicians more often than first responders, was supported. Politicians were quoted in 26.9% of stories containing 1,106 speculation mentions, as compared with first responders (24.4%). Overall, the coverage of speculation most often quoted law enforcement/military officers, followed by local/state politicians, federal health officials, scientists, and victims (Table 6).

State health officials were significantly more likely to be quoted in stories that mentioned aerosol dispersion of spores, followed by stories that speculated about food/water contamination, crop dusters, suspects, a 9-11 link, and economic consequences. In examining attribution patterns within each speculation type, only the coverage of aerosol dispersion was significantly different across source types. State health officials and fire/rescue/health care workers accounted

TABLE 6: Sourcing in stories containing speculation

	Food/water contam	Crop dusters	Aerosol dispersion (df=11)	Econ conseq.	9-11 link	Suspects	All speculation	X^2
City/county health	4 (10.3)	7 (7.8)	2 (6.5)	8 (8.9)	61 (8.4)	178 (8.9)	83 (7.5)	
State health (df=5)	6 (15.4)	11 (12.2)	9 (29.0)	5 (5.6)	54 (7.4)	166 (8.3)	83 (7.5)	14.14[a]
Federal health	4 (10.3)	11 (12.2)	3 (9.7)	5 (5.6)	64 (8.8)	217 (10.8)	109 (9.9)	
Fire/rescue/health care	7 (17.9)	8 (8.9)	8 (25.8)	8 (8.9)	56 (7.7)	194 (9.7)	93 (8.4)	
Law enf/military	1 (2.6)	6 (6.7)	2 (6.5)	7 (7.8)	96 (13.2)	218 (10.8)	135 (12.2)	
Emergency mgmt/ security officials	1 (2.6)	2 (2.2)	0 (0.0)	4 (4.4)	23 (3.2)	64 (3.2)	42 (3.8)	
Scientists	5 (12.8)	9 (10.0)	0 (0.0)	9 (10.0)	67 (9.2)	175 (8.7)	102 (9.2)	
Local/state politicians	3 (7.7)	9 (10.0)	1 (3.2)	10 (11.1)	79 (10.9)	179 (8.9)	112 (10.1)	
Federal politicians	3 (7.7)	12 (13.3)	1 (3.2)	11 (12.2)	74 (10.2)	180 (9.0)	120 (10.9)	
Other politicians	2 (5.1)	6 (6.7)	2 (6.5)	7 (7.8)	43 (5.9)	102 (5.1)	65 (5.9)	
Victims	2 (5.1)	4 (4.4)	2 (6.5)	8 (8.9)	66 (9.1)	222 (11.0)	101 (9.1)	
Other citizens/groups	1 (2.6)	5 (5.6)	1 (3.2)	8 (8.9)	42 (5.8)	115 (5.7)	61 (5.5)	
All sources	39	90	31	90	725	2010	1106	
X^2			34.00[c]					

Numbers in parentheses = percentages of column totals. a= p<.05; c=p<.001. n=833 stories.

for 54.8% of sources quoted in aerosol dispersion stories, and federal health officials were the third most common source type.

The eighth hypothesis, asserting that scientists and health officials will be quoted in explanation stories more often than other source types, was partially supported. Health officials were quoted in 30.6% of stories that included 3,074 explanations, followed by first responders (24.3%), politicians (20.8%), victims (10.6%), scientists (8.1%), and citizens (5.6%). Across specific source types, fire/rescue/health care workers were quoted the most frequently in explanation stories, followed by federal health officials, victims, state health officials, and law enforcement/military officials (Table 7).

Sourcing differences appeared in coverage of four types of explanations: risk comparisons, estimates of relative risk, process explanations, and definitions. Sources were most likely to be quoted in stories that included definitions (56.8% of all stories), followed by risk estimates (29.4%), process explanations (9.0%), and risk comparisons (4.7%). Fire/rescue/health care workers were the most common source in stories that explained relative risk, risk comparisons, and processes. Victim group representatives and federal health officials were the most frequently quoted in stories containing definitions.

Significant patterns appeared across the explanation stories that quoted state health officials, fire/rescue and health care workers, and law enforcement officials. Both state health officials and fire/rescue/health care workers were quoted most frequently in stories containing risk comparisons, followed by process explanations, risk estimates, and definitions. Law enforcement officials followed a different pattern; they were quoted most often in stories containing definitions, followed by risk estimates, process explanations, and risk comparisons.

Highly significant differences in sourcing appeared in coverage of risk comparisons. Health officials were quoted in 43.2% of stories that included risk comparisons, and fire/rescue and health care workers were quoted in another fourth of this coverage. Similarly, health officials were quoted in 37.0% of stories that included process explanations, and fire/rescue and health care workers were quoted in another 19.6% of these stories. Also, scientists were more

TABLE 7: Sourcing in stories containing four types of risk explanations

SOURCE TYPE	Risk comparisons (df=11)	Gen. exposure risk estimates	Process explanations (df=11)	Definitions of key terms (df=11)	All explanations	X^2
City / county health	22 (15.1)	84 (9.3)	35 (12.7)	148 (8.5)	289 (9.4)	
State health (df=3)	27 (18.5)	97 (10.7)	37 (13.4)	151 (8.6)	312 (10.1)	11.58[b]
Federal health	14 (9.6)	97 (10.7)	30 (10.9)	198 (11.3)	339 (11.0)	
Fire/rescue/health care (df=3)	37 (25.3)	115 (12.7)	54 (19.6)	171 (9.8)	377 (12.3)	25.88[c]
Law enf /military (df=3)	6 (4.1)	84 (9.3)	13 (4.7)	189 (10.8)	292 (9.5)	9.29[a]
Emerg mgmt/ security	1 (0.7)	19 (2.1)	4 (1.4)	55 (3.2)	79 (2.6)	
Scientists	9 (6.2)	68 (7.5)	25 (9.1)	146 (8.4)	248 (8.1)	
Local/state politicians	6 (4.1)	61 (6.7)	13 (4.7)	149 (8.5)	229 (7.4)	
Federal politicians	6 (4.1)	88 (9.7)	22 (8.0)	158 (9.0)	274 (8.9)	
Other politicians	5 (3.4)	37 (4.1)	7 (2.5)	87 (5.0)	136 (4.4)	
Victims	6 (4.1)	103 (11.4)	18 (6.5)	200 (11.5)	327 (10.6)	
Other citizens/groups	7 (4.8)	52 (5.7)	18 (6.5)	95 (5.4)	172 (5.6)	
All sources (df=33)	146	905	276	1747	3074	74.46[c]
X^2	41.45c		40.45c	25.19b		

Numbers in parentheses = percentages of column totals. a= p<.05; b=p <.01; c=p<.001. n=833 stories.

likely than emergency management officials, politicians, victims, and citizens to be quoted in stories containing process explanations. Stories that included definitions quoted victims and representatives of victim groups most often, followed by federal health officials, law enforcement and military officials, fire/rescue and health care workers, and federal politicians.

Discussion

Although most past research about media and disasters has been limited to news media roles only in the warning, preparedness, and recovery phases (Perez-Lugo 2004), it was useful to examine how interview sources in news coverage of the anthrax attacks framed risks throughout the entire disaster. In the first two weeks of the crisis, officials declared that the fatal anthrax infection in Florida was accidental and caused by exposure to outdoor streams. This reflected Couch's no-problem stage, when people argue that contamination does not pose a real threat.

The news coverage was less intense before other journalists began receiving anthrax letters, which may have reflected the warning stage. Also, when postal workers began dying, the effects of the attacks could be seen, and the threat became a reality to the entire nation. Relocation occurred when workers were evacuated from numerous buildings that had tested positive for anthrax. Although specialists used chemicals and other methods to decontaminate these buildings, the public never received a tech-fix for preventing anthrax exposure or treating items that may have been contaminated.

Predominant sourcing shifted from federal politicians to federal health officials shortly after numerous journalists began receiving anthrax letters, nearly a month after the first victim died. After the anthrax incidents ceased, fire/rescue and health care workers became the top source type through the end of the crisis coverage. State health officials, typically more trusted than federal officials, were more likely to serve as interview sources after the attacks ended but still were less prominent than federal health officials. Politicians and health agency officials were far more prominent in anthrax coverage throughout the crisis than emergency management and security officials.

Local and state health officials were less likely than federal sources to provide advice during the crisis, although law enforcement officials served as a primary source of advice. Practical advice was mentioned nearly three times as often as vague advice. Health officials were quoted most often in stories containing specific advice during the outbreak period, when citizens first became aware of a threat, and also during the onset of the crisis. Politicians were associated with vague advice during the impact phase, as predicted, and federal health officials were the most likely to be quoted in vague advice stories throughout the crisis. After the anthrax incidents stopped, federal health officials also provided the most specific advice in stories.

National Public Radio quoted victims most often, including postal officials and others representing potential victims. NPR also frequently interviewed federal health officials, federal politicians, and scientists. Newspapers, AP, and television networks quoted federal officials and politicians more frequently than NPR did. Local health officials, other first responders, and politicians were more likely to serve as interview sources for television and newspaper stories than for radio or wire stories. Law enforcement/military officials were more likely to be quoted in the print media than in broadcast channels.

Despite the journalistic convention of fully identifying interview sources, nearly half of the sources were unnamed. During the outbreak phase, characterized by the highest level of off-record attribution, federal politicians were most commonly attributed as unnamed sources. State health officials also were frequently quoted in off-record stories during the outbreak phase, when the Bush administration put a gag on local/state officials and CDC officials. During the first two weeks of the crisis, all reporter questions were supposed to be directed to federal officials in Atlanta or Washington (Franke-Ruta 2002). First responders were common off-record sources in all phases. Law enforcement/military officials were frequently unnamed during the outbreak and impact phases, while fire/rescue/health care providers were often off-record sources during the post-impact phase. During the impact phase, emergency management/security officials and state health officials were proportionally more likely to appear in off-record stories than other sources.

First responders were quoted more often than politicians and victims across coverage of conflicting reports, hoaxes/false alarms, and mysterious infections, but politicians were quoted more often than first responders in stories mentioning contagion and terrorism. Among first responders, the law enforcement/military officials were the most commonly quoted of all sources in stories that mentioned terrorism and hoaxes/false alarms, while fire/rescue/health care workers were quoted the most frequently in stories mentioning fear/panic, conflicting reports, and mysterious infections.

Stories containing speculation most often included quotes from law enforcement/military officials and local/state politicians, and politicians were quoted in speculation stories more often than first responders. State health officials and fire/rescue/health care workers were quoted most often in stories that speculated about aerosol dispersion of spores and food/water contamination. First responders were commonly quoted in stories about confusing incidents. Fire/rescue/health care workers were quoted most often in stories mentioning mysterious infections. Coverage of hoaxes and false alarms, which implied that the true hazard was unknowable and that the warning process was ineffective, most often included quotes from law enforcement officials.

Stories that included explanations of risk and processes, risk comparisons, and definitions quoted fire/rescue/health care workers the most frequently. Fire/rescue/health care workers were the most common source type in stories that explained relative risk, risk comparisons, and processes, while victim group representatives and federal health officials were the most frequently quoted in stories containing definitions. As a group, health officials were quoted in nearly half of stories that included risk comparisons.

Implications

As expected, health officials were quoted most often in stories that provided practical advice during all phases of the crisis. Since health officials were in a better position to share precise risk information with the public, it was not surprising that politicians provided more vague advice than health officials. This suggests health agencies should avoid diluting practical advice by mixing it with vague advice, which is not helpful to citizens.

In keeping with reporting routines, journalists from all media channels tended to seek out first responders as interview sources, and TV reporters were more likely than print journalists to interview politicians. Although television stories can be instantly conveyed to wide audiences, print stories provide more detailed information and are often posted immediately on websites that citizens seek in emergency situations. First responders, health agency representatives, and others who work with journalists should craft and repeat simple, practical messages for every media interview, so that the public receives clear information through all channels about how to respond to the crisis.

Surprisingly, the most prominent coverage did not appear until nearly three weeks after the first infection was reported. In light of the uncertainty and outrage inherent in the crisis, it also was surprising that advice did not appear in nearly 80% of the stories. It was logical to assume that emergency management/security officials would have assumed leadership in communicating advice to the public. However, they emerged as the least prominent sources during the crisis, while politicians were the most prominent sources overall.

Speculation about dreaded scenarios was expected to come primarily from politicians and victims, but the results showed that hypotheticals most often appeared in stories quoting law enforcement/military officers. Also, stories that speculated about aerosol dispersion of spores most frequently quoted state health officials and first responders.

Although it was assumed that scientists and health officials would be quoted most often in stories providing definitions and explanations, health officials and first responders were the main sources of this information. State health officials and first responders were quoted most often in stories containing risk comparisons, while law enforcement officials appeared in stories containing definitions, and scientists often were quoted in stories containing process explanations.

Scientists and health agencies are presumably better prepared to provide explanatory information about processes, uncertainties, risk comparisons, and definitions of unfamiliar terms. However, this study shows that politicians and first responders, including law

enforcement officials, often are asked to provide this kind of detail. This finding indicates that public health agencies should provide pre-event risk communication training for law enforcement, emergency management, fire/rescue, and key politicians at the local level and establish communication networks among these potential interview subjects so the public receives the explanatory information they need during a crisis.

It was assumed that local and state health officials would be used as off-record sources more often than other source types, in light of the federal policy prohibiting these officials from talking to reporters. However, the very sources that were authorized to speak, the federal politicians, were the most likely to be quoted off record. In light of traditional on-record attribution conventions, it was surprising that nearly half the coverage included off-record attribution and that unnamed sources were so prevalent during the impact phase – the period in which authoritative sources were most urgently needed. This finding indicates that while top-down communication from federal agencies to the public can avoid confusion and conflicting reports, it also can prevent trusted local leaders from sharing critical information with residents when they need it the most.

Several limitations should be considered when interpreting the findings. The results reflect the subjective judgments of five raters, although the level of interrater reliability was high. Second, the researcher identified some of the key uncertainty and comparability factors through recoding categorical data. Third, the study recorded the presence of themes in news coverage without linking content characteristics to audience attitudes. Third, the study did not address the content of visuals, which can leave important impressions on viewers and readers. Fourth, the stories in the sample were drawn from the Lexis/Nexis database rather than from a random sample. Although this might reduce the generalizability of the results, there is no obvious reason to believe the stories in the database are significantly different from those not in the database.

Despite these limitations, the findings provide grounds for future research inquiries. For example, a follow-up study might use content analysis to identify common sourcing patterns during various stages of other contamination disasters, as well as natural disasters

and technological accidents. Another study might qualitatively examine how different types of interview sources discuss advice, outrage rhetoric, speculation, conflicting information, hoaxes, and explanations, and then compare these findings with data from a post-crisis survey of these sources. This might uncover challenges and constraints that shaped the messages delivered to the public through the news media.

The findings highlight the routines that journalists use in disaster situations fraught with dread and uncertainty, as well as the types of information they seek during different phases of a crisis and by different types of sources. They also illuminate the need for media relations officials to proactively provide practical advice to offset the consequences of outrage and to efficiently package this advice for different types of media channels.

Most outrage studies measure audience responses to a particular hazard. In contrast, this study examined the presence of various factors known to provoke outrage within the news coverage of a disaster. Thus, this study illuminates the roles that news coverage play in framing and mediating risk perceptions among various stakeholders in dread situations. It also operationalized new factors that may contribute to public outrage. In particular, speculation about hypothetical situations, use of unnamed sources, and discussion of conflicting reports should be further evaluated as media variables that may significantly provoke outrage.

The findings provide implications for first responders, policymakers, and media relations representatives responsible for disaster communications. During the initial and impact phases of a crisis, local officials should be permitted to talk on the record with journalists and provide citizen advice because they are often more trusted and may better understand the immediate local situation. Although local newspapers and radio/television stations are more effective conduits of urgent information for local victims and vulnerable populations than national media outlets, newspaper reporters generally may be more likely than radio reporters to interview local health officials and first responders. Even in command-and-control crisis situations where local officials are not supposed to talk with the media on the record, they should monitor

statements in national media coverage that may impact their local area, in case they need to provide contradictory but potentially life-saving information off the record.

Although disclosure boosts public confidence in officials, interview sources should exercise caution when discussing hoaxes and false alarms. Since terrorists use hoaxes to attract media attention and create fear, sources can avoid becoming a terrorist's tool by withholding information about new incidents until test results confirm the presence of a biohazard. To reduce outrage, which is often provoked by speculation and fear of terrorism and contagion, communicators should routinely provide specific advice for self-protection within the context of clear explanations about risks and scientific processes. Providing explicit context when discussing advice and information is critical during the initial and impact phases of a crisis, when risk explanations could reduce uncertainty and distortion of the threat.

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