



**Delivering the Scary News:  
Newspaper Sourcing in a Bioterrorism Crisis**

**Kristen Alley Swain, University of Mississippi, USA**

**Abstract**

This study examines patterns in news sourcing and play, in light of risk communication factors. A content analysis of 457 U.S. newspaper stories about the 2001 anthrax attacks revealed that more stories included outrage rhetoric than risk explanations. Stories containing uncertainty factors appeared more often during the impact phase than any other crisis phase. The more sources a story used, the less likely it was to include vague advice and explanations. The more play that a story received, the less likely it was to include explanations. Health agency and law enforcement officials dominated the coverage, while scientists, victims, and citizens were quoted least often. Stories quoting experts received higher play than stories quoting non-experts. A relatively large proportion of stories quoted unnamed sources, only one source, or non-experts, indicating a lack of access to authoritative interview sources, especially during the outbreak and impact phases of the crisis.

**Keywords:** crisis communication, news sourcing, framing, risk perception, terrorism, reporting routines



The 2001 anthrax attacks outstripped America's capacity to cope with large-scale adversity. This content analysis examines U.S. news coverage during the crisis, as a case study in public communications during a non-conventional war disaster.

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. Health and Human Services 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 cutaneous cases of anthrax infection were identified, and five of the inhalational cases were fatal (Bioterrorism, 2001; Cole, 2003). 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. As in other crises, anthrax coverage spiked then gradually became shorter, less dramatic, and placed greater emphasis on legal, scientific, and political considerations (Greenberg et al, 1989). The news served as the primary source of public information for warnings and predictions because of its broad reach and potential to influence knowledge, attitudes, and behaviors.



## **Uncertainty and Outrage**

Uncertainty often manifests itself through outrage rhetoric, contradictory or confusing evidence, speculation, or lack of source credibility. Uncertainty can arise from lack of scientific knowledge about how a hazard causes adverse health effects, imprecision in risk assessment methods, disagreement among experts or data sources, or imprecise language (Covello et al, 1987; Morgan & Henrion, 1992).

In a threatening situation, uncertainty often leads to outrage because indeterminate risks can breed infinite fear. When individuals are upset about uncertainty, they believe they are in danger; when they are not upset, they tend to think they are not endangered. People tend to be more concerned about their feelings of outrage than the hazard itself and may be more outraged by trivial risks if they are imposed. Outrage often leads people to perceive a greater risk than actually exists. Outrage also can be provoked by the perception that a threat is artificial or controlled by others (Slovic, 1987). A risk is particularly controversial when large numbers of people have little or no individual control over it and when there is vast uncertainty about the true level of risk associated with it (Lave & Romer, 1983). News coverage of a hazard can promote outrage if it fails to connect specific events to larger issues (Wilkins, 1987), amplifies or ignores risks, or emphasizes drama over scientific facts (Covello et al, 1987; Hornig, 1993; Lang & Lang, 1966).

A risk is unknown if it is not observable, not evident to those exposed, or if its effects are delayed or unknown to science. Risks that are both dread and unknown are likely to produce broad social, economic, and policy consequences and to provoke moral trepidation or perceived threats to future generations. Dread risks can cause direct damage and provoke indirect damage mediated through fear. Indirect damage caused by responses to the 9/11 terrorist attacks included reduced air travel after the attack and a dramatic one-year increase in fatal car crashes related to interstate highway travel among Americans trying to avoid the fate of the passengers killed in the four fatal flights (Gigerenzer, 2006). And during the anthrax attacks, many hospitals were inundated with "worried well," paranoid citizens. Ultimately, hysterical public reactions hindered the health system's ability to treat those in need of medical care (Tucker, 2002).



When news coverage of a hazard exaggerates social and economic responses, it can contribute to consequences far more serious than the initial threat (Flynn, Slovic & Kunreuther, 2001; Singer & Endreny, 1992). 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). The emotional and behavioral consequences of terrorism, including emotionalism in story headlines, photographs, and loaded words, can complicate an otherwise successful public health response (Stein et al, 2004).

Comparability, the characteristic of a message that explains risk comparison, is an antidote for outrage (Klaidman, 1991; Covello et al, 1987). Individuals often evaluate unfamiliar risks by comparing them with familiar ones. To promote comparability, news accounts must explain an unfamiliar threat in ways that alarm the public when appropriate but without causing audiences to ignore alarms when danger is still present (Lowrey et al, 2004). Messages that help audiences compare risks may explain gradients of risk, costs of reducing a risk, tradeoffs among risks, weighing of costs vs. benefits, estimated deaths or injuries/illnesses across time, time between exposure to a hazard and its effects, links between exposure to a hazard and health impacts, why health effects are unlikely, how contamination can be prevented, how infections can be treated, or how risks are reduced through preventive measures (Covello et al, 1987; Johnson, 2004; Gordon, 2003).

### **Sourcing**

In an effort to promote objectivity, reporters frequently interview sources to convey at least two perspectives in a story. Particular sources often are selected based on the journalist's location, organizational routines, or topical specialization (Sigal, 1986; Tuchman, 1978). The ideal interview source is reliable, trustworthy, authoritative, and articulate (Gans, 1980).

Journalists often 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. However, quoting only a few experts repeatedly in coverage of an issue can imply that



a situation is beyond the control of citizens and that only these experts could possibly understand the problem (Soley, 1992). The more influential a source becomes, the more likely his or her voice will be amplified (Lasorsa & Reese, 1990) because of news worker socialization, media conglomeration, public relations information subsidies, and the dominance of a few key news services (Reese, Grant & Danelian, 1994).

Direct quotes from interview sources legitimize a news story by lending authenticity and credibility. Quotes construct social reality, a web of mutually self-validating facts (Tuchman, 1978). Guided by professional conventions, reporters prefer to interview public officials from dominant institutions in society whose views rarely stray from the status quo (Soloski, 1989). Previous content analyses show that current and former government officials are consistently quoted more often than any other source type (Sigal, 1973; Whitney et al, 1989; Hoynes & Croteau, 1991). News stories often quote news shapers who are not part of an event but merely offer opinionated commentary. These sources often are not identified fully (Soley, 1992). Journalists also frequently quote other journalists (Herman & Chomsky, 1988).

Perceived risk depends on audience trust in information sources (Hoban & Kendall, 1992). When journalists are unable to ascertain the level of threat to citizens, they often merely inform the public that a controversy is occurring and identify key players on each side (Beder & Shortland, 1992). This strategy empowers interview sources to suppress facts, manipulate information, or announce unfounded conclusions. Then the public cannot decide which sources to trust and what advice to follow (Americans Trust Physicians, 1997). Journalists often regard scientists as the most credible sources for technical information but must translate their expertise in ways the public can understand. In controversial situations, scientists sometimes are crowded out by political sources (Miller, Boone & Fowler, 1990) and the scientists who do serve as interview sources are quoted more often in newspapers rather than on radio or television (DiBella, Ferri & Padderud, 1991).

Warning systems often produce false alarms, leading to confusion, rumors, mistrust in the warning systems, and desensitization to future warnings (Slovic, 1987). During the anthrax



attacks, officials withheld information from journalists because they feared widespread panic. However, the lack of information itself alarmed the public (Chandler & Landrigan, 2004) because the resulting coverage often was conflicting, shallow, and lacked authoritative validation (Hobbs et al, 2004). Although many officials tried to balance uncertainty and reassurance, these messages ultimately sowed chaos and confusion (Brown, 2001). 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 et al, 2004). Experts later concluded that a greater public understanding of the anthrax threat would have helped reduce fear and panic (Cortes, 2001). Shortly after the attacks, most Americans believed that government officials did not tell Americans everything they needed to know (Berke & Elder, 2001).

Top-down, one-way communication tries to bring public belief in line with expert views. When officials speak about a hazard, their main goal is to convey, “Have faith; we are in charge” (Coleman, 1995). Merely discussing uncertainty can reinforce anxiety and reduce public confidence (Krimsky & Plough, 1988). Official statements, meant to assure the public that the mail, airlines, or water supply is safe, may have the opposite effect. Instead of alleviating concern, such statements can increase anxiety and avoidance of an activity previously assumed to be safe. The very fact that an investigation is underway can provoke fear and suspicion (Slovic, 1987).

When stories advise the public to ignore scare-mongering statements, they may imply that those in charge are spreading deliberate distortions, which in turn can lead to polarization, confusion, and the perception that the hazard is unpredictable and uncontrollable (Beder & Shortland, 1992). 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, the ones officials might wish to reassure, tend to doubt that such benchmarks offer a valid risk comparison (Johnson & Chess, 2003).



Conflicting reports contribute to uncertainty and outrage. Specialization of expertise and fragmentation of knowledge can contribute to public disputes among experts. Disagreements among experts also are caused by limited authority and resources for addressing risks, lack of data that addresses fears, failure to disclose uncertainties and the limitations of risk assessments, and lack of understanding about stakeholder interests and concerns (Covello et al, 1987). These disagreements can erode public trust, leading to the belief that risks are continually underestimated, ignored, or covered up (Furedi, 2002; Frost, Frank & Maibach, 1997). While stating that a risk is insignificant can create public suspicion that officials are suppressing important information that could put citizens at risk, exaggerated stories spread quickly when officials overestimate death rates for infected patients (Alm & Vacor, 1987; Altman & Kolata, 2002).

During the anthrax attacks, authoritative sources frequently disagreed, resulting in confusing, mixed messages (Hobbs et al, 2004). 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). Within the first month of the attacks, top officials were depicted as bumbler who failed to move aggressively against anthrax-tainted mail while offering shifting explanations of the danger (Kurtz, 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).

When communication channels break down, journalists must filter and interpret multiple, competing sources of information. In order to explain the difference between science and unverified opinion, 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, 1995). Health agency sources often seek an effective way to convey information about



a threat in a way that alarms the public when alarm is appropriate but does not cause audiences to discount news reports after long periods in which danger is covered only as a possibility (Lowrey et al, 2004).

Media speculation often occurs in the absence of centralized expertise, particularly when sources predict uncontrollable outcomes or continually warn of possible dangers (Furedi, 2002). Media-constructed conflict often portrayed a responsible government doing its best to deal with a hazardous situation pitted against non-experts expressing fears of the unknown. During the anthrax attacks, journalists frequently asked critics to speculate about possible outcomes. When the Pentagon began restricting information to the press, this led to increased speculation (Guckenberger, 2002). Even authoritative sources provided rumors, sweeping claims, and conspiracy theories, and repetitive network television news coverage highlighted speculation about future attacks (Ratzan, 2001).

Media relations officers prevent reporters from gaining access to information and experts when they do not know whether access will help rather than hinder an emergency response. But when journalists are denied access to authoritative sources, they must turn to less qualified or unnamed sources. 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.’”

The use of anonymous sources is a prevalent criticism of media work and a top concern among newsrooms across the U.S. (Hickey, 1998). Deadline pressure often compels 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). A Pew Research Center poll indicated that anonymous reporting has a negative impact on public perception of the news because it promotes unsubstantiated rumors (What the Polls Say, 1998).





Most readers are bothered by unnamed sources, and those who doubt the credibility of stories that use unidentified sources are more likely to perceive bias (Gump, 2000). However, a content analysis of *Time* and *Newsweek* found that 81% of the articles in the national and international sections quoted unnamed sources (Wulfemeyer, 1985).

During the anthrax attacks, some anonymous reports were leaks from FBI/CIA briefings. For example, some facts about the composition of weaponized anthrax were leaked to CNN, *U.S. News and World Report* and *Newsweek* magazines, which used anonymous attribution for this information (de Armond, 2002). Statements from anonymous government sources also were used in stories about a public investigation of Stephen Hatfill, a scientist who worked for the U.S. government on biowarfare matters, who was never charged with a crime (Kincaid, 2002).

The present study is based on the assumption that news coverage of anthrax contained uncertainty factors as well as explanations to help citizens put risks into context, that interview sources influenced story frames, and that stories with higher levels of play were more newsworthy. Two research questions and three hypotheses were used to guide an examination of the relationship between sourcing and play vs. the presence of uncertainty factors and explanations in anthrax coverage:

R1: Which source types were prominent in the anthrax coverage?

R2: How did sourcing change over time?

H1: Stories containing explanations will quote experts more often than stories containing uncertainty.

H2: Stories containing uncertainty will use unnamed sources more often than stories containing explanations.

H3: Stories that quote experts will receive higher play than stories quoting non-experts.

H4: Stories containing uncertainty will be highlighted in the impact phase more so than in the outbreak or post-impact phases.

H5: Stories containing uncertainty will receive higher play than stories containing explanations.



## **METHOD**

This content analysis examined 458 stories pulled from 194 U.S. newspapers. The time frame was Oct. 4-Dec. 31, 2001. The first anthrax report appeared on Oct. 4, when a Boca Raton photo editor lapsed into unconsciousness from exposure to anthrax spores. By mid-October, anthrax-laced letters had been sent to members of the national media and Congress, and by Nov. 1, five people had died of anthrax infection and 12 others had been infected. The analysis extended through the end of December, so that the overall pattern and eventual decline in coverage could be evaluated. The coverage was subsequently divided into three time periods: outbreak, Oct. 4-14; crisis, Oct. 15-Nov. 11; and post-impact, Nov. 12-Dec. 31.

The unit of analysis was an individual story, defined as a news article in the Lexis-Nexis Academic Universe that mentioned “anthrax” in the headline and/or lead. Business and law journals, as well as wire services, were excluded. The sample was drawn from 194 newspapers in four U.S. regions: 29 from the Midwest, 40 from the Northeast, 51 from the Southeast, and 74 from the West.

The final sample represented one in every 32nd article in the universe. Story corrections, opinion pieces, abstracts, letters to the editor, non-U.S. publications, obituaries, reprints, sports stories, digests, and 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 457 stories. Using Cohen’s kappa, intercoder reliability was .88.

Correlations among variables were calculated using Pearson’s R. The codesheet contained 60 source categories developed through the pilot study. Coders marked a source category if it appeared in a story and could mark multiple categories. Finally, source data was collapsed into six categories: health agency, law enforcement, other government, scientists, citizens/citizen



groups, and victims. Coders also recorded the number of times each story used an unnamed source. Eight levels of play were calculated by combining the placement of stories (front page, section front, or interior) with word counts. Longer stories on the front page received the highest play rating, while shorter stories on interior pages received the lowest.

Stories containing uncertainty factors included material that could promote irrational risk decisions among audiences through outrage, confusion, panic, or lack of media credibility through sensationalism or off-record attribution. Uncertainty factors included outrage rhetoric, speculation, conflicting reports, off-record attribution, vague advice, and confusing incidents. Outrage rhetoric included mentions of terrorism or bioterrorism, fear or panic, and contagion. Speculation discussed various “what ifs”: suspects, food or water contamination, anthrax spraying by crop dusters or aerosol containers, economic consequences, a 9/11 link. Coders could select any number of these categories.

An article contained conflicting reports if it specifically mentioned conflicting reports; coders did not evaluate whether statements within a story were conflicting. Off-record attribution was coded for sources that were not identified by name. Vague advice merely recommended that audience members try not to panic. Confusing incidents included suspected but unconfirmed anthrax incidents, deliberate hoaxes, false alarms, scares or negative test results, mysterious pathways of exposure, and media organizations receiving suspicious letters.

Explanations included descriptions of relative risk, risk comparisons, processes, specific advice, and definitions of key terms. Risk explanations included estimates of citizens' general risk of anthrax exposure, estimates of citizens' risk of exposure from handling personal mail, and risk comparisons. Risk comparison was selected if a story defined or explained how one risk compared with another or if it discussed tradeoffs. A story contained specific advice if it mentioned a particular tip for avoiding anthrax exposure. An example of specific advice appeared in an Oct. 25 NPR story, which 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.”



Stories were coded according to whether they mentioned vaccines as preventives or antibiotics as antidotes to anthrax infection. Process explanations included dormancy of spores, anthrax testing methods, strategies for identifying a perpetrator strain of anthrax, latency/incubation of spores, and preparedness. Definitions of key terms included basic explanations of anthrax, weaponization, and basic infection types (inhalation and cutaneous). Transmission vectors were natural sources (streams, dirt, etc.), postal mail, equipment or other items with residue, and air currents.

Play reflected both length (word count) and story placement. Four categories of play reflected how much attention a story received. These categories, from lowest to highest, were: 1 = interior story 150-500 words; 2 = interior story 501-1,000 words; 3 = interior story 1,001-1,500 words; 4 = interior story 1,501 words or more; 5 = section cover story of any length; 6 = front page story 150-1,000 words; 7 = front page story 1,001-1,500 words; and 8 = front page story 1,501 words or more.

## **RESULTS**

Coverage peaked during the third week of the crisis, but the amount of coverage remained intense for nearly a month after the initial story. 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.

Three-fourths of stories stating that citizens were at no risk of exposure appeared in the first three weeks of the scare. Coverage did not begin to emphasize that anthrax was a threat to citizens until after the third week, when the risk was framed as moderate to serious. Nearly half of stories mentioned that an average person is at general risk of anthrax exposure, and half of the general risk coverage appeared in the first three weeks of the crisis. More than a third of coverage mentioned that an average person is at risk of exposure from handling personal mail.

R1, which identified prominent source types, found that health agency sources accounted for 27.1% of the 1,032 attributions, followed by law enforcement, 18.8%, politicians, 16.8%;



citizens, 12.0%; victims, 11.5%; and scientists, 9.7% (Table 1). Experts – health officials, scientists, and law enforcement officials – accounted for 55.6% of all sources. All stories quoted at least one interview source, and 22% quoted only one source. Stories quoted 2.3 sources, on average.

R2, which examined how sourcing changed over time, found that experts were quoted more frequently during every phase of the crisis than non-experts and were proportionally less likely to be quoted during the post-impact phase than during other phases (Table 2). Law enforcement officials were quoted most frequently during the outbreak and impact phases of the crisis but rarely during the post-impact phase. Health agency sources were most prominent during the outbreak and impact phases and were quoted more often than other source types in the post-impact phase. Other government sources most frequently appeared during the impact phase but accounted for below-average attributions in the other two phases. Citizens were interviewed most often during the outbreak and impact phases, while victims were quoted most often during impact and post-impact phases. Scientists were quoted most frequently during outbreak and impact phases.

H1, which stated that stories containing explanations will quote experts more often than stories containing uncertainty factors, was not supported (Table 3). Overall, 81.4% of stories quoting experts contained at least one explanation, while 80.3% of stories quoting experts contained at least one uncertainty factor. On the other hand, 63.1% of stories quoting non-experts contained at least one explanation, while 62.2% of stories quoting non-experts contained at least one uncertainty factor. Stories that quoted both experts and non-experts frequently mentioned anthrax definitions, transmission routes, terrorism, inhalation infection, and hoaxes/false alarms.

H2, stating that stories containing uncertainty factors will be more likely to use unnamed sources than stories containing explanations, was supported (Table 4). Coverage of outrage rhetoric and conflicting reports was more likely to include off-record attribution than on-record attribution. On the other hand, the coverage of speculation, hoaxes/false alarms, vague advice, risk comparisons, process explanations, and definitions was more likely to include traditional attribution than unnamed sources. Stories that quoted both named sources and off-record sources

were most likely to appear during the impact phase of the crisis, followed by the outbreak and post-impact phases. Overall, 39.7% of stories included at least one unnamed source.

H3, which asserted that stories quoting experts will receive higher play than stories quoting non-experts, was strongly supported. Among expert sources, only law enforcement officials were significantly more likely to appear in high-play stories than low-play stories (Table 5).

Overall, 59.7% of stories appeared on interior pages, 3.3% on section covers, and 37.1% on the front page (Table 1). The most common story was a relatively short, interior article of 501-1,000 words. Longer stories (1,001 words or more) appeared nearly twice as often on the front page than anywhere else. The play distribution was bimodal; most stories (68.8%) received very high play (front page and 1,001 words or more) or very low play (interior and 150-1,000 words). During the outbreak and post-impact phases of the crisis, more stories received low play than high play. However, during the impact phase, more stories received high play than low play (Table 6).

H4, which asserted that stories containing uncertainty factors will appear more often during the impact phase than any other crisis phase, was supported (Table 6). Speculation, including conjecture about a 9-11 link, was significantly more likely to appear during the impact phase. However, speculation about food or water contamination scenarios was more likely to appear during the outbreak phase than the impact phase. Reports of hoaxes and false alarms were four times more likely to appear during the impact phase than during the outbreak phase. During all phases, the uncertainty factors mentioned most often were outrage rhetoric, speculation, and hoaxes/false alarms.

H5, which stated that stories with uncertainty factors will receive higher play than stories with explanations, was not supported (Table 7). Overall, 40.4% of high-play stories contained at least one explanation, while 40.2% of high-play stories contained at least one uncertainty factor. Although a third of all stories appeared on the front page, most page-one stories did not appear until a month after the initial anthrax infection was reported. Stories that contained speculation



about a 9/11 link or outrage rhetoric, including mentions of fear/anxiety and terrorism, were more likely to receive low play than high play. However, stories that mentioned hoaxes or false alarms were more likely to receive high play than low play. Among explanation types, process explanations were more likely to appear in low-play stories than high-play stories, but practical advice and explanations about cutaneous infection were more likely to appear in stories receiving high play.

## **DISCUSSION**

In a crisis, the public often focuses on outrage but ignores scientific risk assessments. Thus, it was noteworthy that more anthrax stories included outrage rhetoric (77.9%) than risk explanations (42.8%). When outrage rhetoric accompanied hypotheticals and conflicting reports, the coverage amplified risk, highlighted panic, and emphasized drama.

Health agency and law enforcement sources dominated the coverage, while scientists, victims, and citizens were quoted least often. After peak coverage subsided, coverage was more likely to include comments from health agency sources and victims. Law enforcement officials and politicians were more prominent than scientists, in crisis coverage that needed risk explanations, perhaps because they were already considered to be the standard go-to authorities for a variety of stories.

Law enforcement officials may have received higher play than other sources because front-page stories often tracked new situations and investigations announced by the FBI and other agencies. Stories quoting experts received higher play than stories quoting non-experts, perhaps because the longer, more prominently displayed stories were follow-up stories.

Experts dominated every phase of the crisis but only accounted for about half the sources. Stories containing explanations did not quote experts more often than stories containing uncertainty factors. However, the finding that stories containing uncertainty factors were more likely to include off-record sources than stories containing explanations probably resulted from reporters' lack of access to officials during periods of higher uncertainty.



This also was evidenced by the prevalence of off-record sourcing in stories containing outrage rhetoric and conflicting reports. The large number of stories quoting unnamed sources or only one interview source also indicates lack of conventional access to authoritative sources. In light of journalistic conventions, an unusually large number of sources were non-experts or off the record, and an atypical proportion of stories quoted only one source.

Stories containing uncertainty factors were more likely to use unnamed sources than stories containing explanations. Stories using unnamed sources were likely to include several uncertainty factors: conflicting reports, speculation about hoaxes. However, these stories were also likely to mention risk comparisons, explanations about anthrax testing, risk explanations, anthrax definitions, and information about anthrax transmission.

Stories that quoted more sources were likely to mention terrorism and mysterious infections. These stories were likely to include definitions and explanations about transmission vectors. The more sources used, the fewer mentions there were of vague advice, the risk of handling personal mail, and general risk of infection.

Although hypotheticals, coverage of hoaxes/false alarms, and other uncertainty factors appeared more often during the impact phase of the crisis, stories containing uncertainty factors did not receive higher play than stories with explanations. A relatively large proportion of high-play stories did include at least one explanation, particularly practical advice and explanations about cutaneous infection. High-play stories also were likely to mention both hoaxes/false alarms and explanations.

The typical story was a relatively short interior article, yet a large proportion of the coverage consisted of long stories on the front page. Most of these high-play stories did not appear until media organizations began receiving anthrax letters and coverage began to emphasize risk to individual citizens. Overall, most anthrax stories received very high play or very low play. The more play a story received, the less likely it was to mention risk explanations, including the risk of handling personal mail and the general risk of infection.





Several limitations should be considered when interpreting the findings. The results reflect the subjective judgments of five raters, although the rate of intercoder reliability was high. Stories were drawn from an online database, rather than from a random sample of all coverage of the attacks, which reduces generalizability of the results. It was assumed that newspaper stories in the database would not be qualitatively different from stories not in the database.

Despite these limitations, the findings provide grounds for future research inquiries. Future research might explore whether the use of unnamed and non-expert sources in a crisis influence the level and types of public outrage. It might explore which types of experts provide the most effective explanations, especially when the public perceives a risk as more threatening than more common risks. A post-crisis survey also might evaluate whether audiences pay more attention to explanations and advice in stories that receive higher play.

In light of the outrage that followed media coverage of the anthrax attacks, this study highlights the necessity for reporters to seek sources who can provide context when discussing uncertainties and speculation, provide explanations, offer specific advice, assess risks to avoid over- or under-estimating the threat, and clarify contradictions.

**TABLE 1: Source and play category frequencies**

Source category	Source type	Freq	% of all attributions	Play level	Criteria (placement, length)	Freq	% of all stories
Health officials	Expert	280	27.1%	1 - Low	interior, 150-500	75	16.4%
Scientists	Expert	100	9.7%	2 - Low	interior, 501-1000	151	33.0%
Law enforcement	Expert	194	18.8%	3 - Low	interior, 1001-1500	38	8.3%
Politicians	Non-expert	173	16.8%	4 - Low	interior, 1501+	9	2.0%
Citizens	Non-expert	124	12.0%	5 - High	sect cover, 500+	15	3.3%
Journalists	Non-expert	42	4.1%	6 - High	front page, 150-1000	81	17.7%
Victims	Non-expert	119	11.5%	7 - High	front page, 1001-1500	72	15.7%
All sources		1032	100.0%	8 - High	front page, 1501+	17	3.7%

**TABLE 2: Sourcing across crisis phases**

Crisis phases	Experts		Non-experts		Expert to non-expert ratio
	Attri-butions	% of all attribs	Attri-butions	% of all attribs	
Outbreak	83	12.5%	65	9.8%	1.3
Impact	236	35.6%	185	27.9%	1.3
Post-Impact	54	8.2%	39	5.9%	1.4
Total	373	56.3%	289	43.7%	1.3

**TABLE 3: Sourcing in coverage of risk communication factors**

	Experts		Non-experts		Total	X <sup>2</sup> , df
	Attri- butions	% of all attribs	Attri- butions	% of all attribs		
<b>Uncertainty factors</b>						
<i>Outrage rhetoric</i> ***	294	56.2%	229	43.8%	523	38.81 (1)
fear/panic	150	59.5%	102	40.5%	252	
contagion	50	56.8%	38	43.2%	88	
terrorism *	249	55.5%	200	44.5%	449	18.26 (1)
<i>Speculation</i>	204	55.1%	166	44.9%	370	
9/11 link	145	54.5%	121	45.5%	266	
food/water contam.	7	63.6%	4	36.4%	11	
econ. consequences	14	48.3%	15	51.7%	29	
aerosol dispersion ***	22	55.0%	18	45.0%	40	74.67 (1)
mysterious infections ***	70	56.5%	54	43.5%	124	27.93 (1)
<i>Conflicting reports</i> *	39	61.9%	24	38.1%	63	14.18 (1)
<i>Hoaxes / false alarms</i> ***	166	59.1%	115	40.9%	281	35.02 (1)
<i>Vague advice</i>	18	69.2%	8	30.8%	26	
<b>Explanation types</b>						
<i>Relative risk explanations</i> *	152	60.6%	99	39.4%	251	20.77 (1)
<i>Risk comparisons</i> **	40	70.2%	17	29.8%	57	20.02 (1)
<i>Process explanations</i> ***	311	56.6%	238	43.4%	549	100.57 (1)
transmission routes *	297	55.9%	234	44.1%	531	51.20 (1)
dormancy/incubation	15	62.5%	9	37.5%	24	
anthrax testing **	37	69.8%	16	30.2%	53	29.58 (1)
perpetrator strain ID	15	68.2%	7	31.8%	22	
preparedness	10	66.7%	5	33.3%	15	
<i>Definitions</i> *	309	57.4%	229	42.6%	538	68.67 (1)

anthrax definitions **	306	57.5%	226	42.5%	532	56.23 (1)
weaponization	47	61.8%	29	38.2%	76	
cutaneous infection ***	116	55.8%	92	44.2%	208	27.63 (1)
inhalation infection	176	57.7%	129	42.3%	305	
<i>Practical advice</i>	67	57.3%	50	42.7%	117	

% = percentage of total stories per factor; \*=p<.05, \*\*=p<.01, \*\*\*=p<.001.

**Table 4: Use of unnamed sources across uncertainty factors and explanation types**

Risk communication factors	On-Record		Off-record		Total	X <sup>2</sup> , df
	Freq	%	Freq	%		
<b>Uncertainty factors</b>						
<i>Outrage rhetoric</i>	99	40.7%	144	59.3%	243	
<i>Speculation</i> *	141	56.2%	110	43.8%	251	14.84 (1)
<i>Conflicting reports</i> **	21	43.8%	27	56.3%	48	12.78 (1)
<i>Hoaxes / false alarms</i> **	183	67.3%	89	32.7%	272	10.12 (1)
<i>Vague advice</i> **	21	87.5%	3	12.5%	24	7.85 (1)
<b>Explanation types</b>						
<i>Relative risk explanations</i>	117	59.7%	79	40.3%	196	
<i>Risk comparisons</i> ***	24	51.1%	23	48.9%	47	19.71 (1)
<i>Process explanations</i> **	214	57.8%	156	42.2%	370	24.63 (1)
<i>Definitions</i> ***	211	58.1%	152	41.9%	363	39.51 (1)
<i>Practical advice</i>	47	58.8%	33	41.3%	80	

% = percentage of total stories per factor; \*=p<.05, \*\*=p<.01, \*\*\*=p<.001.

**TABLE 5: Play in coverage of source types**

	Low play		High play		Total	X <sup>2</sup> , df
Health officials	156	55.7%	124	44.3%	280	
Scientists	54	54.0%	46	46.0%	100	
Law enforcement *	95	49.0%	99	51.0%	194	8.74 (1)
Politicians	91	52.6%	82	47.4%	173	
Citizens	60	48.4%	64	51.6%	124	
Journalists	22	52.4%	20	47.6%	42	
Victims	62	52.1%	57	47.9%	119	
Experts ****	213	57.1%	160	42.9%	373	33.49 (1)
Non-experts	157	54.3%	132	45.7%	289	

% = percentage of total stories per source type; \*= $p < .05$ , \*\*= $p < .01$ , \*\*\*= $p < .001$ .

**TABLE 6: Uncertainty, play, and attribution patterns across crisis phases**

	Outbreak (Oct. 4-14)	Impact (Oct. 15-Nov. 11)	Post-impact (Nov. 12-Dec. 31)	TOTAL	X <sup>2</sup> , df
Outrage rhetoric	85 (23.8)	221 (61.9)	51 (14.3)	357	
Speculation ***	69 (27.5)	149 (59.4)	33 (13.1)	251	39.56 (2)
food/water contam. *	7 (50.0)	5 (35.7)	2 (14.3)	14	8.41 (2)
mysterious infections	21 (26.3)	49 (61.3)	10 (12.5)	80	
9-11 link ***	57 (31.8)	103 (57.5)	19 (10.6)	179	21.70 (2)
economic consequences	3 (13.6)	13 (59.1)	6 (27.3)	22	
aerosol dispersion	19 (61.3)	10 (32.3)	2 (6.5)	31	32.15 (2)
Conflicting reports	9 (18.8)	29 (60.4)	10 (20.8)	48	
Hoaxes/false alarms ***	33 (18.0)	136 (74.3)	14 (7.7)	183	28.00 (2)
Vague advice	8 (33.3)	15 (62.5)	1 (4.2)	24	

Low level of play	65 (23.9 %)	158 (58.1 %)	49 (18.0 %)	272	
High level of play	33 (17.8 %)	127 (68.6 %)	25 (13.5 %)	185	
Named sources	59 (21.4 %)	172 (62.4 %)	45 (16.2 %)	38	
Unnamed sources	39 (21.4 %)	114 (62.6 %)	29 (15.9 %)	182	
ALL STORIES	98	286	74	458	

% = percentage of total stories per factor; \*=p<.05, \*\*=p<.01, \*\*\*=p<.001.

**TABLE 7: Play in coverage of risk communication factors**

	Low play		High play		Total	X <sup>2</sup> , df
	Freq	% of stories	Freq	% of stories		
<b>Uncertainty factors</b>						
<i>Outrage rhetoric</i> *	199	43.4%	158	34.5%	357	6.32 (1)
fear / panic **	92	20.1%	83	18.1%	175	5.82 (1)
contagion	35	7.6%	26	5.7%	61	
terrorism **	169	36.9%	135	29.5%	304	6.05 (1)
<i>Speculation</i>	140	30.6%	111	24.2%	251	
9/11 link **	93	20.3%	86	18.8%	179	7.15 (1)
food / water contam.	8	1.7%	5	1.1%	13	
econ. consequences	14	3.1%	8	1.7%	22	
aerosol dispersion	21	4.6%	10	2.2%	31	
mysterious infections	43	9.4%	37	8.1%	80	
<i>Conflicting reports</i>	32	7.0%	16	3.5%	48	
<i>Hoaxes / false alarms</i> ***	89	19.4%	94	20.5%	183	15.47 (1)
<i>Vague advice</i>	16	3.5%	8	1.7%	24	
<b>Explanation types</b>						



<i>Relative risk explanations</i>	133	29.0%	63	13.8%	196	
<i>Risk comparisons</i>	33	7.2%	14	3.1%	47	
<i>Process explanations</i> ***	219	47.8%	151	33.0%	370	
transmission routes	209	45.6%	147	32.1%	356	
dormancy/incubation	9	2.0%	7	1.5%	16	
anthrax testing	28	6.1%	13	2.8%	41	
perpetrator strain ID	10	2.2%	6	1.3%	16	
preparedness	10	2.2%	2	0.4%	12	
<i>Definitions</i>	218	47.6%	145	31.7%	363	
anthrax definitions	215	46.9%	144	31.4%	359	
weaponization	34	7.4%	20	4.4%	54	
cutaneous infection ***	61	13.3%	66	14.4%	127	9.78 (1)
inhalation infection	117	25.5%	80	17.5%	197	
<i>Practical advice</i> *	39	8.5%	41	9.0%	80	4.75 (1)

% = percentage of total stories per factor; \*=p<.05, \*\*=p<.01, \*\*\*=p<.001.



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