

Miscommunication during the Anthrax Attacks: How Events Reveal Organizational Failures

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Abstract

This study of the anthrax attacks of 2001 treats risk communication as a series of events that can be analyzed to discern the strengths and weaknesses of organizations charged with responding to emergencies. To investigate how organizational practices shape risk communication, we use a method developed primarily for comparative-historical case studies called event-structure analysis. We analyze events leading to false media reports of anthrax infections in one New Jersey town soon after an infection by a potentially lethal strain of anthrax was confirmed in a nearby postal facility. This analytic method highlights the failures of organizations to institutionalize public health practices, which allowed contingent events to determine risk messages and responses.

Keywords: *risk communication, event-structure analysis, organizations, institutions, bioterrorism*

Introduction

The risk communication field has drawn heavily on case studies to derive suggestions for practice and directions for research. Some of the field's seminal works are in the form of case studies. For example, one of the earliest works in the field *Environmental Hazards: Communicating Risks as a Social Hazard* (Krimsky and Plough 1988) is comprised of case studies that explore communication between government agencies and communities. Wynne (1989) illustrated, through a case study of farming after Chernobyl, problems resulting from scientific experts' failure to consider indige-

nous knowledge. The National Academy of Sciences report *Understanding Risk: Informing Decisions in a Democratic Society* illustrates, through an appendix of case studies, failures in risk communication and the promise of integrating risk analysis and deliberation (Stern and Fineberg 1995). More recently, scholars used case studies to develop the concept of the social amplification of risk (Pidgeon et al. 2003), the idea that communication practices and other social variables may amplify or attenuate societal responses to risk.

Although interactions among actors are often clearest in the narratives of case studies, researchers have only recently used case studies to analyze how organizational dynamics affect the ways that actors communicate about risk. In this paper, we apply a systematic method for analyzing case studies that can identify how organizational factors and institutional expectations affect communication. Our aims are to introduce a method that can be applied to a broad range of questions about risk communication and to show how organizations enact, or fail to enact, institutional expectations about risk communication as they confront a particular risk. Our analysis of institutions contributes to the study of organizations and risk by showing how expectations about proper organizational behavior emerge as organizations interact.

Our focus on improving methods in this field is important because while the risk communication field has been advanced by case studies, the studies themselves are not notable for their methodological rigor. Some case studies include sections about the selection of interviewees or the interviewing process, but they skimp on explaining the methods used for data analysis. In fact, it is not unusual for risk communication case studies to fail to include any information about analytic methods. Although the social sciences include dif-

ferent kinds of case studies (e.g., Ragin and Becker 1992) and different approaches for analyzing qualitative data (e.g., Miles and Huberman 1994), risk communication case studies have not drawn from the full range of available analytic methods. In short, risk communication case studies are rich, but the methods sections, if not the methods themselves, are weak.

In an effort to improve risk communication case study methodology, this paper applies a systematic form of data analysis, event-structure analysis, to failed risk communication about anthrax. To our knowledge, there are no other studies that analyze risk communication as a series of events, which is the approach taken in event-structure analysis. Advocates of systematic social science approaches to history argue that narratives of case studies—such as those typically written about risk communication—are limited in their power to explain events (McCullagh 1978; Tilly 1981, 8; Griffin 1993), particularly when the narrative is complicated or when the sources report inconsistent details. A narrative serves as rich raw material for explanation (Thompson 1978, 199), but more “information and insight” is needed, as well as a method that makes the analyst’s assumptions and generalizations explicit (Griffin 1993). Event-structure analysis allows the researcher to systematically assess the time order and causal connections between events in an episode to discover which circumstances and events were critical in determining outcomes (Griffin 1993; Hawthorn 1991). Our goal was to see if applying event-structure analysis, by using the software program ETHNO, improved our understanding of a specific risk communication problem: an erroneous televised report on Cable News Network (CNN) about two workers from an Eatontown, New Jersey postal facility having become “ill” from anthrax. Our study asks whether ETHNO improves our deconstruction of the events of this small but revealing episode during the anthrax attacks so we can better understand the organizational dynamics behind this flawed risk communication.

The following sections outline research on the organizational and institutional factors that affect risk communication and explain how event-structure analysis can be used to analyze these factors. We describe the events in New Jersey leading to the false reports and then outline the purposes and processes of applying event-structure analysis, showing how this method allowed us to reconsider and then systematically test our hypotheses for outcomes. We conclude by discussing the specific implications of our findings and the potential usefulness of event-structure analysis for the risk communication field.

Risk Communication and Organizations

While the meaning of the term “risk communication” is debated among practitioners (e.g., Lundgreen and McMakin 1998) and academics, an oft-cited definition is offered by the National Research Council’s report: “Risk communication is an interactive process of exchange of information and opinion among individuals, groups, and institutions. It involves multiple messages about the nature of risk and other messages, not strictly about risk” (National Research Council 1989, 21). Event-structure analysis is a method that examines these processes of interaction step by step to reveal the constraints these actors face.

The NRC definition mentions the interactions of groups as well as individuals, but because of risk communication’s roots in psychological theory, studies in this field often focus on the individual level of analysis. Such studies have particularly failed to explore in detail organizations that are the sources of messages, including the processes that affect organizations, and thereby messages. Thus, many influences on the purposes, timing, form, and content of the message are left relatively unstudied.

Organizational theory is one of the most appropriate frameworks for explaining risk communication, allowing us to consider what is communicated, when, and by whom (Chess et al. 1992; Chess et al. 1995; Chess 2001). Our general claim is that organizations, as social actors, are crucial players in risk-dramas. In an important book on organizations and how environmental problems are defined, Beamish (2002) demonstrates this point. He explores how configurations of interests shape what issues and problems are paid attention to and which are ignored. Our social and cultural systems are organized to turn their faces toward the sudden and dramatic—the anthrax crisis is an obvious example—but that is insufficient, Beamish argues, to explain why organizations attend, or fail to attend, to environmental “problems.” Beamish finds that deeply embedded, often unexamined organizational routines bear the greatest weight in explaining how and why organizations define some issues as “important” while neglecting others. In other words, it is the particular configurations of organizational factors rather than the inherent magnitude of risk that commands resources and attention. Thus, organizations fundamentally shape what people come to regard as an environmental problem.

Organizational theory further suggests that expectations about the ways organizations *should* function greatly influence how they *do* function, and these expectations will affect how organizations define environmental problems. Any organization is influenced by a variety of social networks that extend from the outside in, and those networks sustain a variety of institutional norms that may even be contradictory (Meyer and Scott 1992). Organizations may attempt to manipulate the institutional environment by introducing innova-

tions, but researchers have generally argued that conforming to institutional expectations is more typical (e.g., DiMaggio and Powell 1983; Meyer and Rowan 1977).

An organization is treated as legitimate by its own members and by outsiders based in large part on meeting institutional expectations relevant to its field of operations (Meyer and Rowan 1977). A common approach of managers and consultants in many fields is to define legitimacy narrowly and technically as something achieved through proper structures and procedures. Institutional theory suggests that a much more complex definition of legitimacy is needed to explain the way routines and rules for behavior emerge (Lister 2003). Scott (2001), for example, suggests that legitimacy is provisionally produced by conforming to rules and laws, broader social values or norms, and cognitive expectations that are taken for granted.

Perceptions of legitimacy matter because they affect the organization's ability to attract external resources and to get members to comply with organizational procedures. Failing to follow institutionalized expectations could therefore threaten an organization's survival (Massey 2004; Stryker 2000). Risk communication in particular can be seen as one way that organizations respond to changing conditions and unexpected events in the institutional or physical environment as they attempt to manage perceptions of their legitimacy (Dowling and Pfeffer 1975). In this view, risk communication efforts are, in part, efforts to demonstrate that an organization is meeting institutionalized expectations about managing risk.

Tracing the way institutions influence organizations is often difficult. Many institutional practices are not formally codified into certification processes, laws, or organizational policies, and even when practices are codified, actors must interpret these requirements to suit the circumstances. Narrative accounts that are typically written for risk communication case studies cannot readily identify the moment-by-moment acts intended to meet such expectations. We propose using event-structure analysis as a tool for identifying how institutionalized expectations are assessed and enacted during a risk communication episode. In analyzing the actions of organizations as they attempt to meet institutional expectations, event-structure analysis allows us to appreciate that authority and legitimacy are at stake during crucial moments of interaction.

During the anthrax attacks of 2001, organizational dynamics very much affected risk communication (Bresnitz and DiFerdinando 2003; Chess and Clarke in press; Mebane et al. 2003; Robinson and Newstetter 2003; Tengelsen et al. 2002; Vanderford 2003; Riederer-Trainor et al. 2005). In the fall of 2001 in New Jersey, organizations jockeyed for authority through complex and often tense interactions among different

levels of government (local, county, state, and federal) and different kinds of agencies (law, health, and emergency response). We apply event-structure analysis to trace organizations' interactions with each other and with other audiences; to discern ways actors asserted specific institutional expectations about protocols for diagnosis and for public notification; and to identify the emergence of judgments about actors' success or failure in meeting institutionalized expectations. Observations about this case yield general lessons about organizational responses to unprecedented threats.

Methods

This case study focuses on Eatontown, a borough of 14,000 in suburban New Jersey, where two workers at the USPS Monmouth Processing and Distribution Center (PDC) were briefly hospitalized and reported as being "ill" from anthrax soon after an individual in nearby Hamilton had been confirmed as being infected with anthrax (see Chess et al. 2004).

Our research team set out to conduct several case studies of local communication about anthrax in New Jersey, including locations that were not contaminated with *B. anthracis* as well one that was. Preliminary interviews with health officials suggested different organizational responses. Therefore, we conducted four geographically based case studies including a) the case of a false report discussed here (Eatontown's Monmouth PDC facility); b) a case initially labeled "suspect" by the U.S. Centers for Disease Control (CDC) (Bellmawr); c) one with no contamination (Morristown); and d) one found to be grossly contaminated (Hamilton).

The present case was selected because of the false media reports we saw as evidence of a risk communication problem. Although several of our interviewees blamed the reports on the actions of one individual, our preliminary hypothesis was that interactions among organizations were likely one of the sources of this problem.

Because of our interest in dialogue among organizations as well as organizations' communication with various publics, we sought to interview key actors on the state and local level. Local newspaper coverage informed our initial selection of interviewees, who were asked to recommend other organizations and individuals. While we expected to interview law enforcement and public health personnel, snowball sampling led us to interviewees in a broader range of organizations. Data about the Monmouth PDC case are derived from 19 interviews with public health professionals, emergency responders, doctors, law enforcement officers, elected leaders, and other decision makers.

A standard interview protocol raised basic issues about risk communication including sources of information, audi-

ences, and messages. Because of our interest in organizational legitimacy, we focused on how decisions were made about what and when to communicate. Such questions also helped us understand dynamics within and among organizations. Asking organizations how they received information, and from whom, enabled us to track the potential sources of miscommunication. Further probing about informational concerns also provided a way to assess how organizational representatives viewed each others' credibility in general and information about anthrax in particular.

Because early interviews suggested that a meeting at the Monmouth PDC shaped later communication, we also asked more detailed questions about that event: who attended and why, what information was transmitted, and how meeting attendees perceived that information. Media coverage and agency documents provided additional data. All quotes and information, unless otherwise noted, were obtained in interviews. To ensure confidentiality, we use ambiguous references to interviewees' gender.

Prior to using ETHNO we did more traditional content analysis, coding data by topic and by kind of organization. We also developed a chronology of events, based on newspaper reports and interviews. By virtue of the interviewing and coding, the meeting at the Monmouth PDC (described following) seemed central to understanding communication problems. The goal of using ETHNO was to test the two hypotheses that we had now developed, that the meeting was the source of the miscommunication problems and that organizational dynamics played a role in miscommunication. After outlining the basic narrative, we then describe the purposes and techniques of event-structure analysis in more detail and show how we applied ETHNO to analyze the following narrative.

The Basic Narrative of the October 29th Meeting

Officials in New Jersey were still assisting in recovery efforts from the September 11, 2001 terrorist attacks in New York City when they found out that the anthrax-contaminated letter to newscaster Tom Brokaw had passed through the Hamilton, New Jersey postal facility. They were now faced with a second unexpected attack involving scientific uncertainty and unclear lines of authority.

On October 18, 2001, the postal facility in Hamilton was closed and workers were advised to take antibiotics after a worker there was confirmed as having an anthrax infection (Bresnitz and DiFerdinando 2003). The USPS's Monmouth Processing and Distribution Center (PDC) in Eatontown—which employs over 700 employees to sort mail for two ZIP codes—is about 30 miles from Hamilton, and the two plants

October 4:	Announcement of first case of inhalation anthrax
October 16:	U.S. Senate Office Building closed
October 18:	First New Jersey case confirmed: Trenton and Hamilton postal facilities closed
October 21:	First death of postal worker, Washington, D.C.
October 28:	New Jersey: Inhalational anthrax case confirmed
October 29:	Monmouth PDC meeting
October 31:	New York state: Fourth death from inhalation anthrax
November 31:	Connecticut: Fifth death from anthrax

Source for national events: GAO. 2003. *Better Guidance Is Needed to Ensure Appropriate Response to Anthrax Contamination*. Washington, DC: Government Accountability Office, Report No.: GAO-04-239.

Figure 1. Timeline of Events near the Monmouth PDC in Relation to National Events

routinely exchanged mail and equipment (Diamond 2001a; Diamond et al. 2001). Two weeks earlier, the first known recipient of an anthrax-contaminated letter had died in Florida (see Figure 1). The facility closure in Hamilton heightened Monmouth PDC workers' concerns about their own risk for anthrax, and they demanded to have the Monmouth PDC facility tested (Diamond 2001a; 2001b).

One hospital in the Eatontown area began offering nasal swabs to screen for anthrax in people who thought they might be infected. Television footage showing media workers and Senate staff members from contaminated facilities in line for swabbing had given the impression that nasal swabbing was the test for diagnosing anthrax infections (Bresnitz and DiFerdinando 2003). On October 29, 2001, two Monmouth PDC postal workers who had visited the hospital learned that their nasal swabs were positive for *Bacillus*. They were hospitalized and put on antibiotics. According to federal and state guidelines at the time, such preliminary screening indicates the presence of *Bacillus* bacteria—but not necessarily *Bacillus anthracis*. A number of different respiratory illnesses can produce a positive swab. Thus, these results and the clinical symptoms (without the substantiation of abnormal X-rays or other supporting evidence) did not meet federal or state criteria for suspected or potential anthrax infections (Chess et al. 2004). The hospital notified the local health officer about the swab results, but neither the hospital nor the health officer notified the state health department to initiate formal investigation, the key step that would have mobilized the official apparatus for declaring anthrax infections.

A meeting was called at the Monmouth PDC for the evening of October 29 at which an official from the New Jersey Department of Health and Senior Services (NJDHSS) was to talk to workers about their concerns, intending to tell them (as this official told us in an interview) why “the likelihood of a meaningful exposure in Eatontown [Monmouth PDC] was very low.” Once told about the two hospitalized

workers, this official presumably would have explained that the NJDHSS and U.S. CDC recommended against swabbing as a diagnostic test, that the two workers did not have other indications of anthrax, and that anyone with a respiratory infection would get a positive result from such a screening. During that day, workers invited the mayor to the meeting. The mayor invited the same local health officer whom the hospital had earlier notified about the two patients. In the meantime, however, the NJDHSS official scheduled to speak at the Monmouth PDC meeting was called to meet with the acting governor and the state's congressional delegation at the state capital to discuss the Hamilton plant. This prevented him or her from attending the meeting with Monmouth PDC postal workers.

The meeting at the Monmouth PDC proceeded that evening without the state health official. Workers, having heard about their hospitalized colleagues through the grapevine, started asking questions, and the local health officer told them what he or she had heard about the two hospitalized workers. Later that evening, the health officer's comments were relayed to the local newspaper by someone who had been at the meeting, not by the health officer. This led to a front-page story on October 30 about two "ill" postal workers from Monmouth PDC hospitalized with symptoms associated with anthrax (Eichenbaum and Hennessy 2001). The story was picked up briefly on the news ticker on CNN.

Media coverage now brought attention from county and state officials, including the NJDHSS official who had missed the meeting. Officials rebuked the local health officer for making comments that had been relayed to the press. Nonetheless, the officer responded to reporters' further inquiries, now downplaying the significance of the positive nasal swabs. New Jersey's state lab returned test results on October 31st showing that the two Monmouth PDC postal workers did not have anthrax (Diamond 2001b).

On October 30th, the USPS had a private contractor conduct environmental tests on the Monmouth PDC (the USPS asserted that the Monmouth PDC was randomly chosen, as part of a plan to test 200 facilities nationwide). On November 1st, a postal workers' union filed and lost a suit in federal court to close the Monmouth PDC until it could be proven anthrax-free. Preliminary test results on November 2nd showed no contamination in the facility, and this was confirmed on November 5th.

Applying Event-Structure Analysis to the Narrative

Because event-structure analysis is unfamiliar in the risk communication field, we describe how this systematic method yielded insights that we had not found by writing the

narrative account. Event-structure analysis allows us to consider which events—and which organizational conditions producing those events—were essential for determining the specific outcome. The central counterfactual is, if no meeting had been called on the night of the workers' hospitalization, would false reports of anthrax contamination have reached the media? Was this a case of one health officer speaking out of turn, or were there larger issues? In answering these questions, we would learn whether the miscommunication was a fluke or was likely to occur under a variety of scenarios.

Event-structure analysis uses the computer program ETHNO, developed by David Heise (1988, 1989) to assist in clarifying the substance of causal relationships embedded within narratives like the one recounted above. The researcher provisionally breaks the narrative into discrete events and enters each event into the ETHNO program. Starting at the top of the list of events, the program then queries the analyst systematically about the logical and possibly causal links between pairs of events. The researcher can set the query to test causality or mere time sequence. For this study, we set the query to read: "does [event y] require [event x] or a similar event?" The analyst then uses "expert judgment" about what was possible within a specific historical setting in answering whether each pair of events is connected (Griffin 1993, 1105; Hawthorn 1991, 78-80). For instance, in analyzing how the two postal workers received false positive tests for anthrax, we realized from interviews across our four case study communities that most hospitals had not conducted nasal swabbing. We therefore added "Hosp. swab policy" as a discrete event. When we ran the ETHNO program, it queried whether the event "2 workers positive swabs" required the event "Hosp. swab policy" or a similar event, and we replied "yes." The product of the finished set of queries is a diagram with lines connecting events that the analyst indicated were linked.

In answering queries, the researcher makes judgments about what was objectively possible, likely, or even inevitable at each step of social interaction by considering whether that step might have turned out differently. By assessing "counterfactual" narratives, the analyst essentially assesses the knowledge and the latitude for action that key actors had at each step (Hawthorn 1991). Thorough examination of the plausibility of different accounts given in documents or interviews may make it possible to reconcile inconsistencies in the data, to identify missing data, and to reveal the most significant events in the narrative. ETHNO also disciplines the analyst to explicitly consider whether each of the events on the provisional list is indeed required to explain the outcomes. The process of answering queries forced us to return repeatedly to our interviews, clippings, official directives,

and other sources to better specify the list of events and to confirm assumptions we were making as we performed the analysis. For example, through consulting notes and answering queries, we found that the union's specific demands to have the Monmouth plant tested had no direct effect on the events that made the meeting with Monmouth PDC workers consequential.

For this case, we started our formal analysis by entering just three events into ETHNO, thinking simplicity might suggest the clearest line for further inquiry. These events were:

- two Monmouth PDC postal workers hospitalized with "positive" nasal swabs
- at the meeting, local health officer tells workers about hospitalized co-workers
- local and national media coverage of "ill" mail sorters

Surprisingly, this analysis indicated that the meeting was unimportant. In our responses to the ETHNO queries during this initial round of analysis, we indicated that the workers' hospitalization might have made the news even if the meeting had not occurred or the local health officer had not attended because union members might have contacted reporters directly concerning rumors about their co-workers. This would likely have required confirmation by the hospital or by a local or state health official, but some sort of story about rumors might have been published. This example shows how counterfactual logic is integral to assessing sequences.

We were not yet convinced that the meeting was insignificant, and so we returned to our data to flesh out the sequence of events leading to the meeting. This second round of analysis affirmed our sense that the meeting was important, at least in producing these *specific* results, because it made us realize that local reporters had made witness reports about the local health officer's statements the center of their article (Eichenbaum and Hennessey 2001) when they were unable to get local or state officials to confirm the story (discussed below). In a third round, we added events that occurred after the meeting to consider the meeting's consequences. We confirmed the full analysis by running the program several times and confirming assumptions about the logic linking each step. Our completed analysis yielded the diagram in Figure 2.

The analysis shows how the meeting became a source of misinformation. Using ETHNO made it clear to us that if any of the three separate sequences of events leading to the meeting had been interrupted, media reports of "ill" workers would not have appeared. Using counterfactual logic, we see that the first sequence, which centers on NJDHSS representatives being called away from the Monmouth PDC meeting (Figure 2: "NJDHSS meeting with politicians"), mattered only because of bad timing. This sequence might well have been different. Even so, this sequence reveals that the state

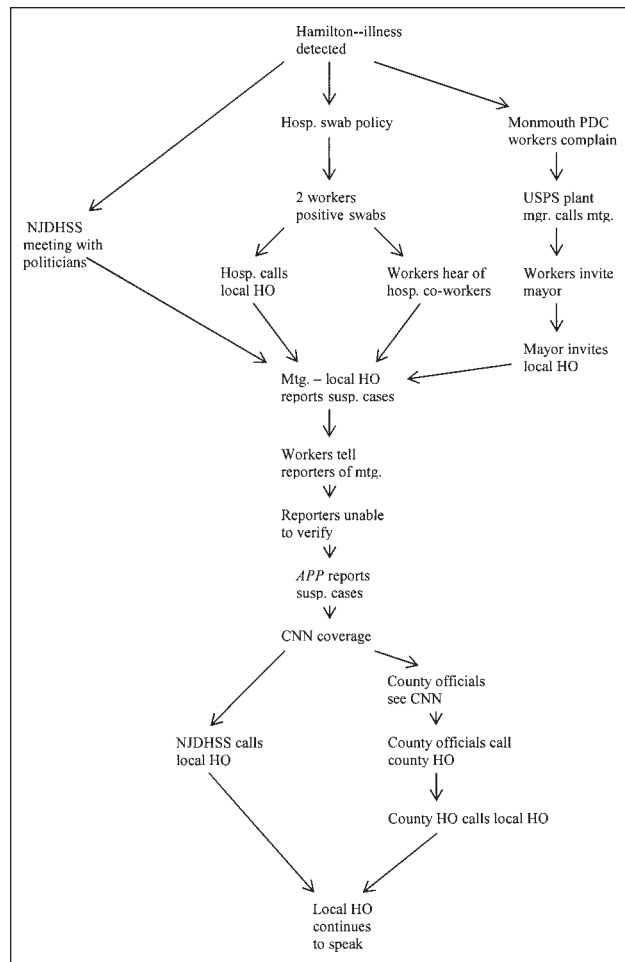


Figure 2. Analysis of Events leading to Miscommunication about Monmouth PDC

agency had not devoted attention to managing concerns at a site with connections to the contaminated Hamilton facility.

The second sequence, concerning the actions of the hospital (Figure 2: "Hosp. swab policy") is the central sequence. The hospital's decision to use swabbing gave workers a specific cause for worry and produced the centerpiece information—that workers were ill—that would be reported by the media. The third sequence (Figure 2: "Monmouth PDC workers complain") concerns union conflict with the management of the USPS, which provided workers motivation to seek and spread information about the possible anthrax infections.

In the single sequence of events following the meeting (Figure 2: "Workers tell reporters of mtg."), chance again mattered. The state health official that local reporters reached "said he was not aware of the Eatontown [Monmouth PDC] developments," and reporters wrote that they could not reach the local health officer or a county health official for

comment (Eichenbaum and Hennessy 2001). But beyond the chance elements, this sequence shows the further consequences of local practitioners and officials opting not to coordinate their actions with the state.

Taking the counterfactuals together, if circumstances had not put the local health officer in the position of communicating to workers what appeared to be official concern about possible anthrax exposure, workers might still have contacted local reporters to tell them of their hospitalized co-workers. But unless the local health officer or a spokesperson for the local hospital had also been available and willing to confirm the hospitalizations directly to the reporters, any resulting article could only have reported about workers' anxiety over their hospitalized co-workers. If reporters had been able to get comments about the precautionary nature of the hospitalization directly from the local health officer or from the hospital (discussed below), they might have run a smaller report or no story at all. The *specific* outcome was therefore determined by this peculiar combination of factors, but as our analysis below indicates, the potential for miscommunication existed due to a number of fairly stable organizational and institutional factors.

Organizational Dynamics, Institutions, and Chance

The sequences leading to and from the evening meeting reveal three sociologically significant patterns associated with the ways organizations reacted to the contamination in Hamilton and to their ongoing relations to the public and to other organizations. That is, research on organizations helps us interpret the sequences at the Monmouth PDC as events that were determined largely by organizational and institutional processes, not simply by the impulses of the local health officer. These patterns also reflect important links between risk communication and organizational dynamics. Institutionalized practices for testing and risk communication that guided federal and state public health officials did not necessarily guide local practitioners and officials. And the NJDHSS did not devote resources to handle risk communication about sites other than the contaminated Hamilton plant that might have enabled its staff to forestall false media reports.

Pattern 1: Failure to Institutionalize Guidance

One of the most sociologically significant findings of our study illustrates a failure to institutionalize public health guidance communicated by state and federal agencies. The NJDHSS and CDC had both distributed guidance that swabbing was not appropriate for diagnosing anthrax. Swabbing was effective, one official told us, for assessing the overall

exposure of workers in a defined area that was known to be contaminated. Swabbing was, however, too prone to false positives to serve as a reliable diagnostic test for individuals. In the view of state officials, risk communication was also best done by those at the state or federal level, who understood the emerging science (Bresnitz and DiFerdinando 2003). Specific local shortcomings in institutionalizing these directives in the Monmouth PDC case included a) the offering of nasal swabbing, b) the decision not to notify state officials, and c) the lack of preparation to communicate about anthrax at the local level. Each of these shortcomings is described below:

a) One hospital in the Eatontown area began offering nasal swabs in response to workers' requests, contrary to federal and state guidelines and cautions that swabbing was not a diagnostic tool. Because the hospital declined our requests for interviews, we do not know whether the hospital was unaware of the guidance or failed to heed the guidance it received. Although the state had an e-mail network that was an important source of information to some of those we interviewed, other interviewees were not on the network, including physicians and administrators at another hospital in the area.

b) Regardless, the hospital acted as if swabbing were an "anthrax test" and treated the local health officer as their link to the official public health system, setting events into motion. Staff from the Eatontown area hospital called the local health officer to report that two postal workers had what the local health officer recalled as "positive and suspect" nasal swabs. According to the local health officer, the hospital was taking a simple precautionary step by hospitalizing the workers. Because neither the hospital nor the local health officer notified the NJDHSS about the workers that day, the NJDHSS spokesperson that reporters interviewed had no information about the hospitalized workers (Eichenbaum and Hennessy 2001).

c) In the absence of a state spokesperson at the Monmouth PDC meeting, workers turned to the local health officer, who was not anticipating being called to speak. As the local health officer described:

That afternoon, that Monday I got a call from the hospital that there were two postal workers...they had two people that had appeared in the hospital, one with inhalation symptoms, and one lady was pregnant...so they hospitalized them and the nasal swabs came back with Bacillus growth, but it's not definitive. But they reported it to me as positive and suspect, and that's when I talked to the people [at the meeting] that night and they had questions and I said, 'Well, at this point there are two people in the

hospital,' but I very definitely said it was a suspect case, not definitive cases and we wouldn't know, we had to have further cultures and diagnostic tests before you could say anything more.

The local health officer felt social pressure to respond to workers and might have found it easier to withhold comment if no meeting had occurred and he or she had been contacted directly by reporters. However, this quote and subsequent media interviews show that the local health officer felt that he or she had conveyed the tentative nature of the tests, nuance that might have been lost when workers relayed the information to reporters. So it is more plausible to conclude that if reached for comment on the workers' information (with or without the meeting), the local health officer would likely have tried to explain that these were suspected, not confirmed anthrax infections. State and county health officials would have objected to this communication nonetheless, because the data did not meet federal criteria for a "suspect" case.

Pattern 2: Internal Organizational Conflict

The sequence "Monmouth PDC workers complain" resulted from internal organizational conflict. Our interviewees talked about long-standing tension between unions and the USPS and fundamental mistrust that resulted. To ensure their concerns were heard and acted upon, workers invited the mayor to the meeting who, in turn, invited the local health officer. The mayor stated:

The employees felt that hopefully there was enough political clout [at the meeting] and we could [encourage facility testing and "quarantine"]. That alleviated some of their fears. Many of them weren't sure about the practices that had been instituted by the federal government at that location with regard to protecting the employees, namely wearing masks and rubber gloves, the quality of the preventive measures that were being taken.

When the local health officer confirmed that the two workers had been hospitalized, this reinforced workers' worries. Union representatives and other workers interpreted the lack of answers from the USPS to their questions about anthrax and delays in plant testing as evidence that the USPS had not done enough to acknowledge hazards (Diamond 2001a; Diamond et al. 2001), and they were motivated to pass word to the media about the hospitalized co-workers.

Pattern 3: Limited Organizational Resources at the State Level

A contingent event related to the state agency's preparedness amplified the effect of Patterns 1 and 2. The high-

ranking state health official was called at the last minute into the meeting at the state capital. No one on the NJDHSS staff was sent to take his or her place. Thus, the local health officer became the de facto health official at the meeting. As the local health officer described: "I just happened to be there at the invitation of the mayor...and the next thing I knew I felt like I was the private, and all of a sudden they say, 'Well you're now the general, you're the health expert.'I mean, I know a lot, but I am not the be all, end all, one-stop shopping for anthrax."

Discussion

Some interviewees talked about the false media reports as merely the result of the incompetence of one person—the local health officer. As one interviewee put it: "I called [the local health officer] up after the fact and I tried to explain to them how bad of a move that was and they didn't have the facts and they were very defensive about it, and they felt that they had enough evidence to say what they said." Like this interviewee, we may be inclined to speculate about the motivation or competence of the local health officer, but event-structure analysis suggests a far more complex situation involving a variety of organizational failures that made the local health officer into a "general."

By using event-structure analysis to consider the conditions for social interaction (the historical setting) and to discover the specific links between events, we came to understand this episode as a series of cross-cutting attempts by several organizations to negotiate uncertainty and assert authority and legitimacy by choosing to enact specific institutions. The state and CDC expected other organizations to comply with their guidance to avoid swabbing as part of a set of practices they aimed to institutionalize. However, faced with patients demanding some action, a local hospital in effect chose to enact another common institution in medical practice of providing tests to worried patients. In this case, providing the swabs had negative consequences. Monmouth PDC workers and the local health officer treated these swabs as a preliminary test for anthrax exposure. The local media and CNN took information about "ill" postal workers as sufficiently supported because it appeared to have been produced and reported through official, institutionalized organizational practices.

With the additional information concerning the debates over the value of nasal swabbing, it may appear that miscommunication resulted from the repeated failures of *several* individuals—the local health officer and hospital employees—to follow federally proscribed public health procedures for testing and diagnosis that were designed to meet institutional expectations about medicine and state and county officials'

expectations about risk communication. But the local health officer and hospital employees, acting within their own organizational settings, had their own interpretations about what constituted responsive professional behavior (Meyer and Rowan 1977, 343). Unfortunately, local communication protocols were also unclear: local and county interviewees gave us different descriptions of communication protocols.

As Meyer and Rowan (1977) argue, managers in organizations issue formal procedures and policy statements (and, we would add, risk messages) but the implementation of procedures depends on staff members who work far from the view of managers. This managerial perspective reflects an unrealistically narrow view of organizational legitimacy as something achieved by having staff adhere strictly to procedures and standards (Lister 2003). Scott (2001) proposes that legitimacy also depends in part on cognitive expectations about proper organizational behavior. This is supported by the local health officer's statements to us and to the press representing his or her own actions as adequate and legitimate. Using event-structure analysis we find that in an organizationally complex public health system facing a changing threat, it was difficult for doctors and local officials to decide when to consult other authorities. The lack of coordination between state and local agencies just happened to be revealed in this case, because state officials did not provide backup staffing to cover a meeting for a facility that the state had not tested as positive for anthrax. Actions that appear to violate formal organizational procedures and policies occur all of the time and are often even understood as adequate by the organizational members themselves. Such events are seldom reported on CNN's news ticker to the embarrassment of county and state managers.

In a decentralized system where state health officials have little direct authority over hospitals and clinics (Bresnitz and DiFerdinando 2003), coordination depends on formal and informal organizational networks and on the spread of institutions. State officials we interviewed understood that under ordinary clinical circumstances, a doctor may communicate organizational responsiveness to patients by providing tests that the doctor views as medically unnecessary. But state officials disagreed with local providers who were offering *swabs* during a crisis as a way of mollifying patients, as state officials believed that giving unreliable tests could instead create specific and unwarranted worry about anthrax. They also had concerns about overtaxing state labs. We can view this episode as reflecting different views about which actions and comments were most likely to serve the public good. Lessons from this case include that:

- higher officials should recognize the potential for local interpretations of legitimate behavior as they try to institutionalize protocols,

- managers at all levels must be prepared to communicate about risk, and
- top officials should consider that responding to a range of audiences beyond those in immediate need may be needed to address public safety (on this latter lesson, see Chess et al. 2004).

Examining risk communication as a series of events shows that the unwanted consequences of seemingly chance events may be avoidable. For example, the senior health official was called to the governor's office at the same time as he or she was due at a speaking engagement—a seemingly chance event. However, when exploring this event in a broader organizational context, it was not improbable that a senior official in such circumstances would develop a scheduling conflict and hence be unavailable to brief workers. None of the other key variables are improbable, i.e., a hospital's failure to adhere to federal guidance, a health officer under pressure to speak off the cuff, unclear communication protocols at the local level, or reporters' difficulty accessing sources. Given the combination of the organizational and scientific uncertainty, the complex institutional environment, and time pressure, it is surprising that there are not more risk communication gaffes such as the one described. In fact, we could consider the confluence of such communication events a form of "normal accident," (Perrow 1999 [1984]) where the complexity of institutional factors, their ability to affect each other, time pressure, and uncertain science are "set off."

New Jersey officials can proudly say that no one died in New Jersey, despite the Hamilton facility being grossly contaminated. Following occupational health protocols, state officials kept the Hamilton facility closed and likely saved lives. The Monmouth PDC miscommunication, however, reflects the complexity of organizational interactions that were critical to risk communication. In the case of the Monmouth PDC, the miscommunication did not have major consequences, but we can easily imagine situations where it might.

Treating risk communication as a series of events is an intuitively satisfying approach for analysis and can be used to address a range of theoretical questions. As this case study shows, episodes of risk communication are moment-by-moment enactments of institutions that attempt to convey responsiveness, authority, and, ultimately, organizational legitimacy. One benefit of using event-structure analysis to reveal these enactments is that it produces a rigorous and replicable analysis that exposes the researcher's assumptions and generalizations about events and counterfactuals (Griffin 1993, 1106). These features make event-structure analysis a valuable tool for analyzing problems in risk communication, which as a field has been built through observations and lessons drawn from case studies. Apart from research on institutions and organizations, research on the events that con-

stitute risk communication episodes can also address basic questions such as what circumstances prompt risk communication campaigns, what types of actors demand official responses during emergencies, why organizations fail to communicate at moments when others demand information, how misinformation is spread, and what conditions enable managers to respond well to events beyond their control.

Endnote

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References

- Beamish, T.D. 2002. *Silent Spill: The Organization of an Industrial Crisis*. Cambridge: MIT Press.
- Bresnitz, E.A. and G.T. DiFerdinando, Jr. 2003. Lessons from the anthrax attacks of 2001: The New Jersey experience. *Clinics in Occupational and Environmental Medicine* 2, 227-252.
- Chess, C. 2001. Organizational theory and the stages of risk communication. *Risk Analysis* 21, 179-187.
- Chess, C., J. Calia, and K.M. O'Neill. 2004. Communication triage: An anthrax case-study. *Biosecurity and Bioterrorism* 2, 106-111.
- Chess, C. and L. Clarke. In press. Risk communication about the anthrax attacks of 2001: The organizational backstory. *American Journal of Public Health*.
- Chess, C., A. Saville, M. Tamuz, and M. Greenberg. 1992. The organizational links between risk communication and risk management: The case of Sybron Chemicals Inc. *Risk Analysis* 12, 431-438.
- Chess, C., M. Tamuz, and M. Greenberg. 1995. Organizational learning about environmental risk communication: The case of Rohm and Haas' Bristol plant. *Society and Natural Resources* 8, 57-66.
- Diamond, M.L. 2001a. Eatontown employees want tests. *Asbury Park Press*, October 24:A1.
- Diamond, M.L. 2001b. Two mail sorters' tests are negative. *Asbury Park Press*, November 1:A1.
- Diamond, M.L., P. Eichenbaum, and K. Hennessy. 2001. Shore mail handlers: Test us for anthrax; concern mounts with new cases in N.J., Washington. *Asbury Park Press*, October 26:A1.
- DiMaggio, P.J. and W.W. Powell. 1983. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review* 48, 147-160.
- Dowling, J., and J. Pfeffer. 1975. Organizational legitimacy: Social values and organizational behavior. *Pacific Sociological Review* 18, 122-134.
- Eichenbaum P. and K. Hennessy. 2001. 2 shore mail sorters ill; new attack threat. *Asbury Park Press*, October 30, 2001:A1.
- Griffin, L.J. 1993. Narrative, event-structure analysis, and causal interpretation in historical sociology. *American Journal of Sociology* 98, 1094-1133.
- Hawthorn, G. 1991. *Plausible Worlds: Possibility and Understanding in History and the Social Sciences*. Cambridge: Cambridge University Press
- Heise, D.R. 1988. Computer analysis of cultural structures. *Social Science Computer Review* 6, 183-96.
- Heise, D.R. 1989. Modeling event structures. *Journal of Mathematical Sociology* 14, 139-169.
- Krimsky, S., and A. Plough. 1988. *Environmental Hazards: Communicating Risks as a Social Process*. Dover, MA: Auburn House.
- Lister, S. 2003. NGO legitimacy: Technical issue or social construct? *Critique of Anthropology* 23, 175-192.
- Lundgren, R.E. and A. McMakin. 1998. *Risk Communication: A Handbook for Communicating Environmental, Safety, and Health Risks*. Columbus, OH: Battelle Press.
- Massey, J.E. 2004. Managing organizational images: Crisis response and legitimacy restoration. In D.P. Millar. and R.L. Heath (eds.) *Responding to Crisis: A Rhetorical Approach to Crisis Communication*, 233-246. Mahwah, NJ: Lawrence Erlbaum Associates.
- McCullagh, C.B. 1978. Colligation and classification in history. *History and Theory* 13, 267-84.
- Mebane F., S. Temin, C.F. Parvanta. 2003. Communicating anthrax in 2001: A comparison of CDC information and print media accounts. *Journal of Health Communication* 8, Suppl. 1, 50-82.
- Meyer, J.W. and B. Rowan. 1977. Institutionalized organizations: Formal structure as myth and ceremony. *American Journal of Sociology* 83, 340-363.
- Meyer, J.W. and W.R. Scott (eds.). 1992. *Organizational Environments: Ritual and Rationality*. London: Sage.
- Miles, M. and A.M. Huberman. 1994. *Qualitative Data Analysis: An Expanded Sourcebook*. Thousand Oaks: Sage.
- National Research Council. 1989. *Improving Risk Communication*. Washington, D.C.: National Academy Press.
- Perrow, C. 1999 [1984]. *Normal Accidents: Risk in a Technological World*. Princeton: Princeton University Press.
- Pidgeon, N., P. Slovic, and R.E. Kasperson. 2003. *The Social Amplification of Risk*. Cambridge: Cambridge University Press.
- Ragin, C.C. and H.S. Becker. 1992. *What is a Case? Exploring the Foundations of Social Inquiry*. Cambridge: Cambridge University Press.
- Riederer-Trainor, C., T. Wilkinson, W.D. Snook, G.L. Hoff, R. Griffin and R. Archer. 2005. When bioterrorism strikes: Communication issues for the local health department. *Health Promotion Practice* 6, 424-429.

-
- Robinson S.J. and W.C. Newstetter. 2003. Uncertain science and certain deadlines: CDC responses to the media during the anthrax attacks of 2001. *Journal of Health Communication* 8, Suppl. 1, 17-34.
- Scott, W.R. 2001. *Institutions and Organizations*, 2nd ed. Thousand Oaks, CA: Sage.
- Stryker, R. 2000. Legitimacy processes as institutional politics: Implications for theory and research in the sociology of organizations. *Research in the Sociology of Organizations* 17, 179-223.
- Stern, P., and H. Fineberg. 1995. *Understanding Risk: Informing Decisions in a Democratic Society*. Washington, D.C: National Academy Press.
- Tengelsen L., R. Hudson, S. Barnes, and C. Hahn. 2002. Coordinated response to reports of possible anthrax contamination, Idaho, 2001. *Emerging Infectious Diseases* 8, 1093-1095.
- Thompson, E.P. 1978. *The Poverty of Theory and Other Essays*. London: Merlin Press.
- Tilly, C. 1981. *As Sociology Meets History*. New York: Academic Press.
- Vanderford, M.L. 2003. Communication lessons learned in the emergency operations center during CDC's anthrax response: A commentary. *Journal of Health Communication* 8, Suppl. 1, 11-12.
- Wynne, B. 1989. Sheepharming after Chernobyl: A case study in communicating scientific information. *Environment* 31, 10-15, 33.