

Chapter 15

The Role of the Media in Bioterrorism

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15.1 Introduction

Journalism in a time of bioterrorism is not essentially different from journalism in any time of crisis. But crisis journalism is different, in degree if not kind, from the reporting of news in ordinary times.

Danger exaggerates tendencies and magnifies traits. Reporting the news in the presence of hazard is harder for its practitioners, and more disruptive to the people who provide the information they seek. Normally difficult aspects of the trade loom larger – the pressure of deadlines, the competition to be first, the need to use human voices to help tell a story. For news sources – which at such moments are likely to include many public officials – the urges to be stingy with information, to be non-committal, and to downplay uncertainty and disagreement are especially strong. The public also is not untouched when life or well-being is at stake. At such times, people pay unusual attention to the news media, which is often a conduit for actual instruction on how to behave.

The problem, however, is not simply that bioterrorism magnifies the timeless difficulty of producing good journalism. There are aspects of bioterrorism that make it particularly vulnerable to bad, misleading or irresponsible journalism. This chapter will describe reasons the subject is perilous, and suggest ways the perils may perhaps be avoided. The practical suggestions are directed primarily to public health officials, scientists, politicians, and their media representatives – and not to journalists – simply because the former groups are the intended audience of the book.

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15.2 Reporting Science

In many ways, journalism about bioterrorism is little more than a special case of journalism about science. Even when a bioterrorism story involves some broad public policy issue, the subject invariably rests on a substrate of science and technical knowledge. Consequently, understanding policy issues involving bioterrorism – to mention nothing of terrorist events themselves – requires knowledge of biological mechanisms, an appreciation of clinical decision-making in medicine, and a sense of how to conceptualize and evaluate relative risks. Many science reporters are conversant with these subjects, but some aren't. In any case, many stories on bioterrorism are written, produced and edited by journalists unfamiliar, and often uncomfortable, with scientific subjects. Scientists and policy-makers should keep this in mind at all times. Like it or not, they need to realize that to make themselves clear they may have to conduct a running seminar on scientific methods, concepts and reasoning. It goes – almost but not quite without saying – that the sources of information need to be conversant in those areas themselves.

Of all nationally compelling news events, those involving science are the ones in which successful communication most depends on simple command of the facts. Political, constitutional and national security crises may be well-served by the voice of authority, the reassuring (or beguiling) power of rhetoric, and even by the ability to deftly make a weak argument. But scientific crises – which are almost always health crises at some level – require expertise, first and above all. Opinion counts for little when evaluating hazards to life, or devising a response to them. Judgment and authority are useful tools only when wielded by people who know what they are talking about. This is a very hard lesson for policy makers to learn. But it is the first one they must if they want to increase the chance that the news media will do a good job.

What is the importance of the news media doing a good job? Of course, it is impossible to give a good answer to that. But it *is* possible to say how important the public thinks the media is at such times.

Two weeks after the first (and fatal) case of anthrax from a bioterrorism attack using the mail occurred in October, 2001, 78% of Americans sampled in a poll reported they were following the news of it “very closely”. This was a level of attention equal to that seen after the events of September 11 that year. Fifty percent said the media was not exaggerating the danger of anthrax; 42% said it was [1]. In the 110 days after the first case, the Office of Communications at the Centers for Disease Control and Prevention (CDC), the government agency coordinating the public health response to the attacks, conducted 23 press briefings and 306 television interviews, wrote 44 press releases, and took 7737 calls from the news media [2]. (Interestingly, 2½ times as many calls came directly from the public – 17,986 in all). The value of a well-informed and well-treated press in such times can scarcely be overstated.

Even when people providing information about bioterrorism are knowledgeable about the scientific issues and experienced in talking to reporters, they would do well to keep two ideas consciously in mind. One a principle and the other an observation, these two ideas are part of the natural mental apparatus of biologists. Their importance in helping guide investigations and solve problems – their heuristic value, in short – is largely unappreciated by non-scientists. A major task of any science communicator is to bring them into public consciousness and keep them there.

15.2.1 The Principle of Parsimony

The first is the Principle (or Law) of Parsimony. “One should always choose the simplest explanation of a phenomenon, the one that requires the fewest leaps of logic” and “the principle that entities should not be multiplied needlessly; the simplest of two competing theories is to be preferred” are two definitions of this principle, each converging on the notion that simpler explanations are more likely to be true than complicated ones [3]. When this principle is invoked in scientific argumentation it is often called “Occam’s Razor”, after William of Occam (1285–1349), a medieval English theologian and logician. Occam (whose name is a Latinized spelling of Ockham, his birth village south of London) criticized what he considered the unwarrantedly complex (and therefore, he thought, likely to be false) writings of his contemporaries. He wrote that when it comes to explaining things, “it is vain to do with more what can be done with less” [4].

Employing Occam’s Razor is particularly important (although not infallible) in medical diagnosis, where a physician ideally should account for all the important signs, symptoms and test results presented by the case. The clinician wielding Occam’s Razor assumes all newly appearing clinical phenomena are the result of a single disease, not the coincidental occurrence of two or more diseases. Consequently, a single diagnosis that explains all the clinical findings should be exhaustively sought, and abandoned with great reluctance.

Parsimony has two other corollaries besides Occam’s Razor. One is that events are likely to unfold in the future as they have in the past – that patterns and mechanisms tend to be stable and relatively unchanging over time. The other is that unusual diseases or presentations of diseases are, by definition, unusual and should not be readily invoked. This idea is captured in two admonitions nearly every physician is told at least once during his training: “common things are still common,” and “when you hear hoof beats, don’t think of zebras.” In sum, the natural impulse of physicians to resist acting on wild or untested ideas runs deep – so deep, in fact, that its power may not be fully appreciated by physicians themselves.

15.2.2 The Bell-Shaped Curve

The second idea that has heuristic value in times of bioterrorism is the bell-shaped curve. It captures the observation that outcomes arising from the same events or conditions are not identical, but differ from one another in ways that can be depicted visually and understood intuitively.

Most outcomes are similar to one another. They inhabit the fat, or humped-up, part of the curve, and define the average. A small number, however, are quite different from the rest, either much less or much more by whatever metric is in use. Those outcomes inhabit the two thin ends, or tails, of the curve. When this pattern is symmetrical on either side of the mean (or average) value it is called a “normal distribution.” Normal distributions have specific mathematical properties; for one, the rarity of certain outcomes can be calculated. In that sense, the bell curve can be used to predict the likeliness of future events. Not all biological events have a normal distribution, but many do [5].

15.2.3 Integrating Parsimony and Bell-Shaped Curve

These two ideas – parsimony and the bell curve – are constantly at play in biology and medicine. An intuitive understanding of how the concepts operate in widely divergent biological spheres – and the ability to employ them consciously when facing new or difficult issues – may be the chief benefit for journalists in taking more-than-introductory courses in biology. When it comes to bioterrorism, however, these two concepts are important for opposite reasons.

Bioterrorism dilutes the importance of parsimony. That’s because bioterrorism is an unnatural event even if its components – viruses, toxins, organs, medicines – are each natural and at some level behaving in familiar ways. Bioterrorism creates interactions that do not occur on their own. It produces conditions of unpredictable risk; it makes vulnerable people who aren’t normally vulnerable; it alters highly evolved mechanisms of transmission, distribution, and protection. The doomsday scenario of a crop-duster laying down a cloud of anthrax spores on Manhattan – an event modeled by inference, if not by name, in a recent journal article – falls entirely outside the natural history of anthrax spores, human beings and Manhattan [6]. It is safe to say that previous experience with anthrax outbreaks is not likely to be very helpful in predicting the outcome of such an event, or in planning for it. Unfortunately, it is hard even to predict *how* unhelpful the past is likely to be.

On the other hand, bioterrorism tends to magnify the importance of the bell curve as an informative idea. Because size of the dose, duration of exposure, mechanism of transmission, and numerous other variables are unknown and

unnatural, physicians and public health officials can not easily estimate an individual's risk during a bioterror event. In particular, it is difficult to identify occupants of the left-hand tail of a bell curve that depicts exposure to a pathogen. It's hard to say with confidence who is at very low risk of becoming infected, so that tail tends to be ignored and its occupants mentally swept into the fat part of the curve for safety sake when it comes to decisions about clinical monitoring, prophylactic treatment and other interventions. However, the bell curve that represents the side effects of interventions presents a different story. The existence of the right-hand tail – occupied by the few people who suffer serious side effects of, say, a vaccination – is either tolerable or intolerable, depending on the probability of the threat being guarded against. If the threat is high, then people will tolerate side effects (or at least the risk of them). If the threat is low, they will find side effects burdensome or unacceptable. But if the magnitude of the threat is unknown – is simply “non-zero” – then nobody can gauge whether the side effects experienced are worth the protection gained. This was the central conundrum posed by the federal government's recommendation of smallpox vaccination for certain hospital workers in 2003 [7]. It's useful for people who determine society's response to the threat of bioterrorism (or, needless to say, an actual act of it) to explain how the importance of different regions of the bell curve changes depending on circumstances.

Even if decision-makers do a good job of explaining this, however, they are likely to observe the operation of yet another bell curve – namely, the one that defines what is news and what is not. News is the noteworthy event. On any given day, this is more likely to be the odd and unusual event rather than the common and expected one. If dog-bites-man is the fat and uninteresting part of the human-canine interaction, then the two tails are where the news is: the clichéd man-bites-dog in one tail, and the pack-of-dogs-maul-man in the other tail. In practical terms, this means that even if the balance of events is well explained, the press is always going to devote more attention to the unusual, the dramatic, the damaging. Thoughtful communication with journalists (and, of course, good journalism itself) can keep this natural predilection from obscuring the larger, more subtle truth of events.

So how do these three things – expertise, and the ideas of parsimony and bell-shaped distribution of outcomes – come into play in actual news stories about bioterrorism?

There is only been one bioterrorism event in the United States that is captured national attention in recent times – the anthrax attacks of the autumn of 2001. (The intentional contamination of food with *Salmonella* by the Rajneeshee cultists in Oregon in 1984 was largely a local story [8]). Consequently, the examples in the rest of this chapter are drawn largely from that episode of recent history. The drama was long, with many unexpected turns of event. It captured nearly every important lesson about the media and bioterrorism that is likely to arise in the future.

15.3 US Anthrax Attacks – The Media and HHS

Policy makers and public health officials (and even to some extent, private medical care providers) face a difficult task when biological terrorism threats become real. Without warning they are called upon to describe events, provide advice, anticipate what may happen, and offer reassurance. These jobs are especially difficult when an event has no “natural history” experts can look back to for help. In the early hours and days when even the general trajectory of events is unclear, the tasks can be close to impossible.

It is obvious that under such circumstances, well-meaning and well-informed may give contradictory answers and advice. In order to prevent that, authorities sometimes choose to suppress information, limit access to people who know the most, or simply avoid the press altogether. All three strategies, to varying degrees, were tried during the anthrax attacks.

In terms of public confidence, one of the more damaging incidents occurred the day the outbreak became news, October 4 [9]. Tommy G. Thompson, who at the time was U.S. Secretary of Health and Human Services and the titular leader of most of the federal government’s civilian health workers, held a news briefing at the White House after learning of the first case. A 63-year-old man in Florida working as a photo editor at a tabloid newspaper was diagnosed with inhalational anthrax. He was described as an outdoorsman, and Thompson mentioned that “we do know that he drank water out of a stream when he was traveling through North Carolina last week.” Several further questions established the man’s age, home town, and a few other details. The press conference ended this way:

Mr. [Ari] Fleischer [White House press secretary]: The final question.

Q: Mr. Secretary, how likely is it that there have been other anthrax cases, in the past year, say, that just simply haven’t been diagnosed?

Sec. Thompson: It’s entirely possible.

Q: Possible, or—(off mike)?

Mr. Fleischer: Thank you very much.

Sec. Thompson: (To Dr. [Scott] Lillibridge [HHS physician and bioterrorism expert] Would you say it’s probable?

Dr. Lillibridge: Possible. As you heighten surveillance, you’ll get more.

Q: Can we just ask one other question? When was the last documented case of anthrax in North Carolina?

Sec. Thompson: I don’t—

Q: Can you check that?

Sec. Thompson: Well, we certainly will be checking all of that and getting information out as it goes in.

Q: Mr. Secretary, can you explain why he was drinking from a stream: And— (laughter)—should we know that? Why are you giving us that detail?

Sec. Thompson: Just because he was an outdoorsman and there's a possibility that— there's all kinds of possibilities.

Q: Did he contract it that way—Did he contract anthrax by drinking the water?

Sec. Thompson: We don't know. We don't know yet.

Q: Mr. Secretary, have you put—

Mr. Fleischer: Thank you.

Sec. Thompson: Thank you, Ari. [10]

It's little surprise that some listeners left the briefing with the impression there was a reasonably good chance the Florida case was naturally acquired, and that drinking from a stream might have been the route of transmission. It seems quite unlikely that the medical experts believed the former even at this early stage. The latter was virtually impossible given that the patient had inhalational disease and no cases of gastrointestinal anthrax had ever been reported in the United States [11]. However, the reluctance on the part of Lillibrige to provide a fuller explanation that might have appeared to erode Thompson's authority – along with Fleischer's abrupt termination of the briefing – guaranteed that misleading information would be reported, and that it would be attributed to a high administration official.

(Fleischer's unwillingness to extend the press conference may have been something akin to a reflex action. In his role as a political spokesman, leaving facts ambiguous and opinions uncertain is often the explicit goal of an encounter with reporters, and not an unfortunate outcome. However, this should never, ever be the case when the topic is scientific. Science is relatively impervious to spin, and incomplete or misleading answers are easily exposed. Even when there is no intention to deceive – and clearly there was none here – stopping reporters from asking questions about a technical subject when they have many left to ask is done at great peril.)

As it happens, news reports that day and the next generally overlooked Thompson's remark about the stream. In this country, MSNBC, CNN, United Press International, the Washington Times, and the St. Petersburg Times appear to have been the only ones reporting it. Outside the United States, the remark was noted in *The Times* (London), *The Daily Telegraph* (London), *The Scottish Daily Record*, *Agence France Presse*, and the Spanish-language news service EFE [12]. If people thought there was a good chance the Florida man acquired anthrax by drinking stream water, most were probably foreigners!

This curious result may have occurred because Thompson made his statement at the White House, where foreign news outlets have correspondents but most American newspapers don't. However, it is possible some American reporters didn't mention the remark in their stories simply because they knew

it made little sense. The Associated Press, for example, carried a story October 5 in which Jeffrey P. Koplan, director of the CDC, was paraphrased as saying “the patient has no digestive symptoms that would indicate the anthrax came from drinking contaminated water [13].”

Within a week, however, many newspapers – including such influential ones as *The New York Times*, *The Washington Post*, and *USA Today* – had discovered Thompson’s statement about the stream. By then nobody found the stream-contagion theory credible, and there was no evidence Thompson’s remark had done actual harm. Nevertheless, it was publicized widely. Reporters cited it as evidence in stories whose theme was the federal government’s confusing and incompetent performance in communicating with the public [14]. Patricia Thomas, a science journalist commissioned by The Century Foundation to analyze the interaction between government agencies and the press during the outbreak, observed: “As the crisis worsened and spread, Thompson never quite repaired the damage done by his off-the-cuff words about water [9].” Thompson himself was clearly stung by the criticism, telling an audience a year later at the Mayo Clinic’s National Conference on Medicine and the Media: “My instincts are to tell you what I know and what is happening. In fact, if you look back at some of the criticism I took last fall, it came about because I was too candid in telling the media what was taking place in our investigation that first day. I was too open with what our scientists were relaying to me and what they were doing. Of course, I never thought I’d have reporters criticizing me for being too open with the facts [15].”

Nevertheless, authority and candor (if that is, indeed, what it was) didn’t trump credibility and expertise. While people in the Bush administration apparently believed there was value in having Thompson be the spokesman, he came to the event with little technical grasp of the issues – and demonstrated it immediately. As a main source of information, he was eventually moved aside in favor of various epidemiologists at the CDC, and Anthony S. Fauci, head of the National Institute of Health’s National Institute of Allergy and Infectious Diseases. By then, however, considerable damage had been done in terms of public relations. The comment became one of the most memorable anecdotes of the entire outbreak. Worse, it became the pocket-portable symbol of what many people considered – rightly or wrongly – to be the federal government’s early mishandling of the crisis. A year later, Thompson’s remark was still being cited, albeit indirectly, by a prominent medical journalist, Lawrence K. Altman of *The New York Times*, in an article criticizing the federal government’s press relations on an entirely different matter – smallpox vaccination [16].

If having Thompson be a main source of information early in the outbreak had been the only government miscalculation, then the media’s overreaction to his stream comment would be especially objectionable. It was not.

15.4 US Anthrax Attacks – The Media and the CDC

The CDC's press office was barely functional in the first 2 weeks after the initial outbreak. Part of this was simply the result of volume: the office counted 2,229 requests about anthrax and 287 about bioterrorism between October 4 and 18, which is likely to have overwhelmed resources under the best of circumstances [9]. However, there were many other problems, which Thomas describes well in her monograph: "Those who got in touch with a press officer were likely to be referred elsewhere. If they asked about field investigations they were advised to call local officials in Florida, New York, New Jersey, or Washington. (There, press officers in the field sometimes bounced inquiries back to the CDC in Atlanta.) Reporters who asked about the search for the perpetrators were told to contact the FBI, which released prepared statements about the investigation but was otherwise tight lipped. If reporters called to follow up on comments made by Secretary Thompson or to ask about policy issues, they were usually referred to the public affairs office at HHS. And, although they did not realize this was happening, many reporters then had to wait while their requests were vetted by HHS officials in Washington [9]."

The idea that CDC functions as a mere consultant to states and cities in outbreak investigations is little more than a sophistry under normal circumstances. In the anthrax outbreak, it was simply wrong. CDC was at least an equal partner everywhere it sent investigators, from the start. With the outbreak potentially national in scope and with so much attention on the federal government's response to it, for CDC spokespeople to argue that providing information naturally "devolved" to state and local authorities was nothing short of infuriating. (Koplan believes this clarification of federal-versus-state roles in communicating with the media during emergencies is an especially important problem to solve [17]).

Providing reporters efficient access to informed sources is a tall order in a crisis, especially when events are happening in several places and many government agencies are involved. Nevertheless, providing such access is a priority whose importance can scarcely be overstated. Reporters can hardly be expected to abandon a subject simply because they cannot get information on it. Instead, they will turn to experts who are available, but whose knowledge of events is often second-hand or whose opinions may be colored by unstated agendas. Furthermore, policies that produce highly controlled and incomplete delivery of information to reporters lead to hypercritical and retaliatory journalism when things do not go well. Nearly every major news organization produced a story questioning the CDC's credibility and performance in communicating with the public [18]. Regardless of how unfair some of the criticism might have been, this analysis rapidly became part of the accepted history of the event.

Before reflexively limiting information or routing it through a single, scripted source, government authorities should ask: To what end? What is the advantage

of such regimentation? What are the hazards of letting epidemiologists, physicians and investigators speak freely and without supervision?

The prime advantage (they are likely to answer) is that when only a few people are allowed to talk to reporters, the chance that contradictory versions of events, or interpretation of them, will emerge is reduced. The press seeks conflict and reports it as news; a difference of opinion is the most rudimentary and common form of conflict. However, forbidding a multitude of informed sources from talking to reporters does not eliminate conflict. It merely transforms the conflict to differences of opinion between taciturn officials and the independent experts, while simultaneously giving the public insufficient information with which to reach its own opinion – not a good combination. An excess of detail and analysis – some of it contradictory – is not likely to produce more public confusion and negative reporting (although, of course, it is impossible to say this with certainty).

The second argument that officials will probably make in defense of controlling the flow of information is that such a policy does not waste the time of people who have other jobs to do. This is undisputedly true. But it is a false economy.

In a true health crisis such as an attack with a biological weapon, an effective public health response and clear communication with citizens are equally important. Any system that puts them in conflict or requires them to compete should be changed. Reassurance, which requires little time or expertise to deliver, is no substitute for information. In fact, unaccompanied by information, or in the presence of events that continue to go badly, reassurance makes people feel isolated and suspicious. The excessive number of calming messages during the anthrax attack drew criticism even from sympathetic quarters. Philip S. Brachman, an epidemiologist and anthrax expert who was retired from CDC after three decades of service, was quoted in one newspaper report: “We have an intelligent public in this country. Don’t treat them as children. [Officials] in the beginning got up and said, ‘Don’t worry.’ That’s nonsense. What I would do is say, ‘We’ve got a problem, you have every right to be fearful, I’m fearful too, and here’s what we’re doing’ [19].”

Giving the media more information than it asks for or can easily digest is a safer strategy than giving the media the minimum it will tolerate or only what it can understand with no help. Like anyone engaged in acts of construction, reporters are happy to have more building materials than they need. Authorities should not worry that too much information will confuse. In general, reporters will seek and use only the level of detail with which they are comfortable. Bad journalism is almost never the product of too many facts. The prominent science writer Laurie Garrett put it well: “If you build it, we will come. If you have a valid information source that is readily available and easy to get to, with openness and facilitation, it will be used. Most reporters will not search for unreliable facts elsewhere [20].” At the very least, a free flow of information will disarm journalists of their principal complaint in times of crisis – namely, that the people in the know are hiding things.

In a bioterrorism crisis, the CDC should consider designating a high official with scientific expertise – not a member of the communications staff – to function as a kind of *rapporteur* of agency deliberations. Ideally, this person should have some sense of what constitutes news and a fully reported story. He or she would be relieved of regular responsibilities but would otherwise function fully as an insider in agency activities.

Agency officials would continue to brief the press in time-limited sessions. During the anthrax and SARS outbreaks, this was done in daily or near-daily telephone press conferences lasting about an hour. However, there were almost always unanswered questions at the end. The *rapporteur* would remain on the line for an open-ended period to answer them, provide scientific context or background explanations, and generally seek to eliminate ambiguity and misunderstanding. This would enhance clarity and transparency. It would also require planning and institutional courage.

15.5 Getting It Right

The federal government eventually solved the problem of expertise in its communication with the press during the anthrax attacks. But the experts weren't able to end the press's – and the public's – relative lack of understanding about how the outbreak response was being conducted.

Over the course of the 7 weeks between the first diagnosed case (October 4) and the last (November 21), spokesmen for the federal government repeatedly made assessments and predictions that turned out not to be correct. From the press's perspective, this was perhaps the most memorable – the most “thematic” – aspect of the entire event. The illness in the Florida man was initially declared an “isolated case” with “no evidence of bioterrorism [10].” While indisputably true when uttered, these statements on the first day set a pattern of confident assertions overturned by events. In ensuing weeks, pronouncements that a letter containing anthrax spores had to be opened in order to release enough pathogen to cause inhalational anthrax [21]; that postal workers were only at risk for cutaneous anthrax [21]; and that ordinary citizens had nothing to fear from mail all turned out to be wrong [22]. The fact that each successive event inscribed a circle of risk with a wider radius (and with more people in it) did not help the credibility of the speakers or their agencies. A statement by Steven Wiersma, Florida's state epidemiologist, after the first victim died was notably different in tone and content from so much that followed: “I don't want to give anyone the slightest inkling that we know what caused this [23].”

Why did so many assertions turn out to be wrong? There's no certain answer. But my theory is that many smart and experienced people failed to anticipate events such as inhalational anthrax in postal workers and a nearly homebound woman because of an instinctive belief in parsimony. Those things simply seemed so unlikely – without precedent, actually – that planning for them was

unnecessary, and perhaps even irresponsible given the likelihood of unintended consequences and morbidities.

The tracks of this thinking are evident in what several high officials said when they were queried by reporters (and others) about why they had not taken steps some believe might have saved lives. Koplan, CDC director, described his and his colleagues' thinking quite clearly several times. In one of the earlier daily teleconferences with reporters, on October 25, he reviewed the entire sequence of events. It was a highly illuminating account of epidemiological thinking.

Back to this particular outbreak. I think people are somewhat surprised that we're learning things on a day-by-day basis, but that's really no different from any other investigation that we've done this year, 5 years, or over the last 50 years. The way the natural history of these investigations are, you always wish you knew on day 20—on day one what you know on day 20, and it's probably not going to be different here. We learn new things almost daily in this, and try to anticipate, of course, what's coming up the next day or the next week. It's obviously much more difficult when you've got a purposeful intent and someone malicious at the other end engaged in combat on this, and that is different from anything else we have done before.

A little later he describes how the belief emerged that a letter had to be opened to cause inhalational anthrax, and that contact with unopened letters containing powdered bacteria could only cause cutaneous anthrax.

The letters we had seen or had described to us—we didn't have the letter in hand, but the letters we had had described to us, both the one from The New York Post in New York and then the next set in Washington, D.C., the letter that was in the Hart Office Building that had been addressed to Senator Daschle, were described to us as well-taped, meaning that the seams along that letter were taped in a way that would have minimized, if not eliminated, the ability of a powder to seep out through openings around the letter. You would have to open the letter. And, indeed, we were told that the letter that was sent to Senator Daschle had to be opened by a scissors because of how well it was sealed.

So through this period of time we were still operating on the assumption that in order for a letter to convey this—the anthrax, it had to be either opened by someone who was opening mail, or in some way torn or disrupted in the sorting process, because the concept of a powder in a sealed letter was one that suggested that it would stay in that letter. And that was our epidemiologic experience with the cases we had seen so far. That construct obviously changed markedly with the report of inhalation anthrax in mail workers in the Brentwood facility in Washington where mail was not opened in the places where these individuals were exposed, or seem to have been exposed, and where the disease that they contracted was not cutaneous anthrax, which takes less spores, and is obviously less threatening than inhalational anthrax, and in which the physical characteristics are different. But to get a aerosolization of anthrax requires both air currents flowing around, and some larger quantity of smaller-sized spores to be present, and not easily explained at all by unopened mail. And with that, our current construct on the risk includes, obviously, letters that are unopened as well as letters that are open, that have had, been tampered with or have been maliciously placed in the mail with anthrax spores. [21]

The next day's teleconference featured this exchange about the possible risk from "cross-contaminated" letters – pieces of mail that don't themselves contain anthrax spores but which have come in physical contact with ones that do:

Reporter: On the cross-contamination possibility... does that mean the public is more at risk, and besides the 200-some different substations, are you looking at expanding the prophylaxis to perhaps whole zip codes?

Dr. Koplan: No, on that latter; just plain no. Let's get back to this issue of cross-contamination versus, you know, prim—whatever we're gonna call them—primary source criminal letters, or mailings. That where you indicated that there is an inhalation case in the State Department that's been reported, I think we all think that that would be highly unlikely to virtually impossible to occur, just by cross-contamination, and as well, without having these letters in hand, but based on what we've seen in other sites, there are probably multiple mailings that have gone out, and, you know, there may be several places in the federal government that have been deemed targets for these letters to go to. So I guess my own personal working hypothesis would be that this is not cross-contamination. It just wouldn't be enough material, infectious material from cross-contamination to do that. [22]

The day after that, Bradley Perkins, the CDC's lead epidemiologist in the Florida anthrax outbreak, was asked about why environmental sampling had not gotten down to the level of the ordinary household.

Reporter: Can I follow up on the first part of those? What about the idea of homes? Why aren't they being tested and people on Cipro if they also get their mail from the same place?

Dr. Perkins: To date the epidemiology suggests that the cases that have occurred have not occurred as a result of exposure in home settings. And that's why we're not focusing on them at the current time. If the epidemiology changes, we will—we will change along with that epidemiology. [24]

These quotations are a useful peek into the minds of two highly skilled and experienced epidemiologists. They reveal parsimony at work. They also show the unreliability of parsimony in biological terrorism, as the latter two assertions – that cross-contaminated mail, and mail received in the home would not cause inhalational anthrax – would soon prove incorrect. Although the route of exposure of a non-medical hospital employee in New York City was never found, it is likely to have been cross-contaminated mail, as no spores were cultured from her workplace or home. The anthrax source in the case of a nonagenarian woman in Connecticut also remained obscure, but as she rarely left her home and no gross contamination was found in it, the best inference is that she was infected by a cross-contaminated letter carrying a small number of bacterial spores.

A similar failure of intelligent and parsimonious thinking can be expected in any bioterrorism event for the reasons mentioned earlier – they have few or no precedents, and are likely to defy the natural history of the disease in question. Public health officials can count on being wrong much of the time.

The press is likely to focus on the wrongness, and on the “meaning” of the errors. Why? Because the press's only consistent specialty is political analysis, the divination of how events affect power. The journalist James Fallows has described this phenomenon: “No one expects Cokie Roberts or other political correspondents to be experts on controlling terrorism, negotiating with the

Syrians, or other specific measures on which Presidents make stands. But all issues are shoehorned into the area of expertise the most prominent correspondents do have: the struggle for one-upmanship among a handful of political leaders [25].”

This insight is most relevant for the media’s handling of matters of foreign or economic policy, but medicine and public health are not immune. The top officials of the New Jersey Department of Health and Senior Services noted this in their detailed account of the state’s experience in the anthrax outbreak: “As the situation continued, news reports focused on what decisions were made (e.g., the closing of a facility, use of antimicrobial agents) and how they were made. The media and public were interested in what the response to the event seemed to say about state decision making and readiness to address emergencies in general [26].” If a journalist doesn’t really understand the medical, statistical, and biological substance of a disease outbreak, he can at least appear to be knowledgeable about the interaction of individuals and agencies, and how events are believed to be changing their power and image. Much of this coverage is unavoidable. Some of it is even justified and illuminating [27]. In general, though, the public is better served by reporting that tries to reveal the substance of complex events and decisions rather than interpret them. Public health agencies are better served by this approach as well.

There is only one way to keep attention on the substance and that is to reveal the process of decision-making to the press and public as it happens. The best chance of keeping wrong decision and incorrect inferences from becoming the main story is to vicariously allow the non-experts to experience the difficulty and uncertainty of responding to events as they unfold.

This is not necessarily done by opening meetings and conference calls to the press (although letting reporters occasionally witness such events is a good idea). What public health officers and policy-makers need to do is simply describe to journalists how decisions were made. They should not wait until the decisions prove to be right or wrong before they describe the thinking that went into them. They should do it in something close to real time (which regular briefings, such as the CDC’s daily teleconferences, offered). Specifically, public health officials should review the choices they considered when facing a set of facts and uncertainties. They should describe what the arguments for each course of action were, directing reporters’ attention to the evidence and logic that advocates for each position brought to bear. They should reveal, at least in general terms, the magnitude of disagreement and the steps that led to its resolution – if, in fact, resolution preceded decision. CDC officials did a fairly good job of describing the logic of their thinking and the process by which decisions were reached. It occurred, however, almost entirely after the fact.

The prospect of following these suggestions probably would fill a public health official with horror. But it should not. People appreciate being spoken to candidly. Transparency is increasingly expected in government operations. The public appreciates being treated as intelligent enough to follow a complicated process undertaken on its behalf. The press is less likely to focus on process if it

is forced to face the substance in all its difficult and incomplete detail. Observers of all types are less likely to invoke race prejudice, obtuseness, and bad faith – all mentioned at one point or other during the anthrax attacks – if they understand how those in authority made their decisions.

Furthermore, people are more tolerant of uncertainty than decision-makers believe. While officials should be reassuring and do what they can to prevent panic, they should not shield the public from disagreement or discussions of what may happen if things get worse. Disagreement is likely to be uncovered soon enough, and many people's understanding of what constitutes a worst-case scenario is likely to be more frightening than anything the facts support.

15.6 The Potential for Public Panic

On the issue of the threat of public panic, the record of how people behave during mass casualty events may be instructive. The National Science Foundation funded a study in which epidemiologists systematically analyzed the public response to 10 disasters that occurred between 1989 and 1994. These included an underground gas explosion in Guadalajara, Mexico, that killed more than 200 people in 1992; the first bombing of the World Trade Center in New York in 1993; and the Northridge earthquake in California in 1994. The findings were revealing. One of the researchers described a few of the more salient ones:

Overall, the evidence suggested that victims tend to respond effectively and creatively. What we saw repeatedly in disasters was that victims formed spontaneous groups that have roles, rules, leaders, and a division of labor. This is the phenomenon of emergent collective behavior talked about extensively in the literature on the social science side . . . The literature and our study show that panic is relatively rare. There's a lot of talk about panic, and there's a general assumption that the public would panic in a bioterrorism event. My question is, where does the data come from to support that? In the events we studied, we were amazed to interview victims and health care workers who commented repeatedly on the absence of panic, complaints, or irrational behavior. Many emergency department workers said, "Gee, I wish things worked this smoothly all the time." Most people talked about an eerie feeling of calm that came over people during life and death moments. Panic happens in disaster movies but typically not in real disasters for reasons that probably are based in evolution. What we witnessed is that ordinary citizens are amazingly capable of avoiding deadly harm. [28]

William Patrick III, a former biological weapons worker quoted in this article also told David Brown of *The Washington Post* in late October, 2001 that he had not been contacted by government investigators or epidemiologists in the 3 weeks after the first anthrax cases.

Although this evidence is indirect, it suggests that if difficult decisions – and the hazards they create – are explained fully to the press and public, panic and irrational behavior are not likely outcomes. In fact, the usual assurances that things will probably be okay are more likely to seem believable if decision-makers reveal why they feel that way and give at least a hint of how events nevertheless might prove them wrong.

This strategy may improve the image of public health decision-makers during a crisis. But that is not the main reason for it. The chief benefit is that it gives the public a vicarious sense of control. Knowledge tends to allay fears even when uncertainty and danger are part of the knowledge. As evidence of this, public health officials need look no farther than medicine itself. Description and prognostication were what physicians chiefly did before they were able to cure – and people took great solace from that alone.

It is also possible that the act of preparing to describe the logic of a just-made decision to the press may itself be a useful tool in clarifying thinking and bringing unquestioned assumptions into consciousness. One wonders, for example, whether the assumption that mail had to be opened to cause inhalational anthrax – the assumption that may have contributed to the fatal infection of workers at the Brentwood postal facility – would have stood up had there been greater public scrutiny of the assumptions and arguments being made behind closed doors. After all, the first cases of inhalational disease, at the Florida tabloid newspaper office, were not definitively associated with open mail, and in fact no spore-containing letter was ever found there. Similarly, a somewhat more open discussion of the aerosolization potential of finely milled anthrax spores might have directed epidemiologists' attention to the researchers retired from the United States Army's biological weapons program – the only people with first-hand knowledge of the issue – sooner rather than later [29].

But even if the people who deliver information to the press are well-informed and they describe their decisions transparently, that would not guarantee that what appears in the newspaper and on television does not contain misleading information. There are crucial concepts that are second-nature to scientists but which are barely understood by the press and public. It is the job of public health officials to give the press a crash-course in these concepts. The most important one, as earlier suggested, is the usefulness of the bell-shaped curve in understanding the probability of complicated events.

15.7 Is There a Correct Answer?

Reporters and readers like to have concrete answers to questions. One of the more persistent queries, raised after the first case, was: How easy *is* it to contract inhalational anthrax? The answer was frequently given in number of spores, as inferred from experiments on monkeys. The number 8500 was often quoted; so was a range of 2500 to 55,000 spores [30]. Reporters considered this a rather imprecise answer to the question, and at some level it was. As cases of disease occurred without the recovery of infecting letters, the estimates were questioned widely in news stories, and offered as evidence of “how little we know about anthrax.” A Knight Ridder story of October 27, 2001 noted that an anthrax expert outside the government “said that officials have overestimated the amount of anthrax necessary – a minimum of 8000 spores – to cause inhalation

anthrax [31].” At the CDC teleconference of October 25, a reporter asked: “Are you all doing any work in the labs perhaps with animals to test the assumption that perhaps with this particular form of anthrax it could take less than 8000 spores to cause inhalation disease? [22]”

In fact, the estimates and the events were confusing and contradictory only if one believed there was an absolute threshold for infection. It was clear that most journalists thought of infection as analogous to a light switch – a certain number of spores will exert sufficient force to turn the light on, and fewer will not. But this is rarely, if ever, the case with infections, and certainly not with anthrax. The spore numbers are estimates of the number of the dose sufficient to infect 50% of the people exposed – the infectious dose 50%, or ID_{50} . Half the people exposed to it won’t become sick and possibly die, so it is far from being the minimum dose necessary to cause infection. Because there is no minimum dose, biologists use this mid-way dose as a measuring stick for the infectiousness of something. While the usefulness of the ID_{50} – and the bell-shaped distribution it implies – is not intuitively obvious at first, once it’s grasped many things are easier to understand.

First, it explains why precision isn’t possible in describing infectious dose, and thus why imprecision of itself isn’t terribly newsworthy. More important, it helps make the two most mysterious cases of the outbreak – the 61-year-old female hospital worker in New York City and the 94-year-old nearly home-bound woman in Connecticut – somewhat less mysterious and frightening. That’s because if there is an ID_{50} , there’s also an ID_1 – the dose of spores that will infect 1 out of 100 people. For that matter, there’s also an $ID_{.1}$ – the dose that will infect 1 in a 1000 – and an $ID_{.01}$ – the dose that will infect 1 in 10,000. So if it turns out that spores can get out of an envelope and stick to other envelopes, and if a fraction of those spores can become airborne again, and if there are a lot of envelopes moving around putting up spores in whatever tiny dose is the $ID_{.01}$ – then it stands to reason that someone among the thousands of postal customers will get infected. In some sense, all those envelopes are out there probing the population for the rare person who’s susceptible to such a small dose. The envelopes are looking, so to speak, for the person who occupies the tail of the bell curve – because someone does occupy it. So, it should be no surprise when such a person appears [32].

The New York City patient – a relatively healthy working woman who was not especially old – doesn’t present any obvious reasons why she might have been susceptible to a small dose. But the 94-year-old Connecticut woman clearly has the major risk factor of age and its relative immunosuppression. In addition, she had the habit of tearing envelopes in half after opening them, which would have helped reaerosolize spores deposited on the outside through cross-contamination.

Similar confusion surrounded the issue of whether exposed people should undergo a three-dose course of anthrax vaccine after completing a 60 day course of antimicrobials. The large outbreak of inhalational anthrax caused by the accidental airborne release of spores in Sverdlovsk, Soviet Union, in 1979 recorded no infections more than 43 days after exposure [33]. Evidence from

monkeys, however, suggests that infection can occur after more than 60 days of latency [34]. Consequently, public health authorities offered vaccine, to be given along with 40 more days of antibiotics, to a large group of people, but did not recommend that they take it. The decision, instead, was left to the exposed people themselves.

This agnostic stance was widely criticized – perhaps with good reason – as being insufficiently clear and authoritative. A *New York Times* editorial called it “an unsatisfactory medical cop-out,” and added: “It is disappointing that officials who are in the best position of anyone to make sense of the admittedly sparse data on anthrax are throwing up their hands and leaving the decision to patients and doctors who have far less command of the subject [35].” However, the key piece of data informing any individual’s decision was not in the possession of the experts. That piece was the individual’s tolerance of risk. What to do depended on whether a person worried about being one of the few people (actually, monkeys) in the tail of the bell curve and wanted to do something about it, or whether he assumed he was in the fat part of the curve where most people reside and was willing to live with the slim chance he was wrong.

It is a subtle point – but one that has the advantage of being a statement of reality. Public health officials could have helped the press and public understand the “unrecommended offer” of vaccine better if they had explained it as yet another decision arising from an understanding of the bell curve – the orderly distribution of events in biological systems in which there are many more average events than exceptional ones.

The suggestion that such a concept could be taught to dozens of reporters on the fly isn’t entirely far-fetched. Journalists are used to getting one-on-one telephone tutorials from experts; it’s one of the chief privileges of the profession. Daily teleconferences with scientists and public health officials – the only reasonable way to manage news distribution during a bioterrorism event – provide the opportunity. The Internet even makes it possible for someone announcing a decision to help explain it with a diagram or graphic. At the moment, using the Internet to provide journalists with background information during a running news story such as the anthrax outbreak is almost entirely untapped. If there is another event like it, public health officials would be wise to at least post on an easily accessed site a dozen or so scientific papers that form the core evidence base for the disease in question.

Posting the core literature would have many advantages. It would show how information was acquired through observation, experimentation, and extrapolation. It would demonstrate how some interventions (such as the use of anthrax vaccine after human exposure to the bacterium), while “experimental” in a formal sense, is grounded in evidence and not likely to carry much of the uncertainty associated with experimental therapies as commonly understood. It also provides color. The description of the investigation into an anthrax outbreak at a Dickensian goat-hair mill in Manchester, N.H., in the 1950s was both fascinating and informative [36]. The fact that those epidemiologists swabbed anthrax spores off the factory president’s desk – which one of the

still-living investigators told me – revealed something about the cohabitation of man and spore at all levels of that industry.

The relationship between medicine and the media has never been especially easy or sympathetic [37]. Medicine values privacy and authority. The media seeks to publicize the private and is reflexively suspicious of authority. Medicine values nuance and caveat in communication. The media relishes definitive statements and often cannot tolerate subtlety. Medicine generally attempts to reassure. The media often seeks to present facts in the most arresting and frightening context that can be defended with claims of technical accuracy. The hostility between the two worlds is sometimes profound. The twentieth-century embodiment of medicine's ideals, William Osler, said with more than a little bitterness: "Believe nothing that you see in the newspapers – they have done more to create dissatisfaction than all other agencies. If you see anything in them that you know is true, begin to doubt it at once [38]."

On the other hand, the media does not do a bad job. On ProMED-mail, the main public website for breaking news in infectious disease epidemiology, about 90% of the postings "start with a raw newspaper article." In an analysis of 7 months of activity, 2.6% of outbreak reports from unofficial sources – mostly newspapers – turned out to be wrong. That compared favorably with a 1.7% rate of inaccurate reports from official health agencies [39]. As an independent and occasionally unruly force, the media also has an invaluable role in emergencies, including epidemics. This was noted by numerous observers during the outbreak of severe acute respiratory syndrome (SARS). In China, where control of the disease had consequences for the entire globe, the World Health Organization provided important assistance to local authorities, but "it was the press that kept the focus on and led to the resolute responses that occurred," according to one Western observer [40].

15.8 Lessons

The lessons from the anthrax outbreak were evident soon after it ended. For Sandra Mullin of the New York City Health Department, they were similar to ones another disease had just taught.

The media blitz surrounding the anthrax situation in New York City and elsewhere has far surpassed the crush of 1999. Nonetheless, West Nile provided a drill of sorts for the challenge public health is now facing. We learned most importantly about the need to address perceptions of risk, to have credible communicators, and to get information out in a timely and consistent way. In the past few weeks, this has meant getting facts out to the public rather than inventing ways to reassure the public. It has also involved acknowledging the seriousness of bioterrorism, but at the same time pointing out that thus far the morbidity and mortality associated with it are far surpassed by preventable illnesses like influenza and human immunodeficiency virus (HIV). Admitting when we do not yet have the answers has also been required. [41]

They're likely to be the lessons learned next time, too.

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