The Role of Internists During Epidemics, Outbreaks, and Bioterrorist Attacks

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Internists are well-positioned to play significant roles in recognizing and responding to epidemics, outbreaks, and bioterrorist attacks. They see large numbers of patients with various health problems and may be the patients’ only interaction with the medical community for symptoms resulting from infectious diseases and injuries from radiation, chemicals, and/or burns. Therefore, Internists must understand early warning signs of different bioterrorist and infectious agents, proper reporting channels and measures, various ways that they can assist the public health response, and roles of different local, state, and federal agencies. In addition, it is important to understand effects of a public health disaster on clinic operations and relevant legal consequences.

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INTRODUCTION

During the past half decade, well-publicized events, including the anthrax mail attacks,1 Hurricane Katrina,2 and severe acute respiratory syndrome (SARS)3,4 have reminded us that epidemics, disease outbreaks, bioterrorist attacks, and natural disasters can occur. Although there is debate over when and how they may happen, there is little question that such events could have significant and far-reaching health, social, and economic consequences. Moreover, smaller outbreaks, such as influenza and West Nile Virus,5 occur with greater regularity. Internists can play vital roles in identifying, responding to, and containing bioterrorist attacks and disease outbreaks if they understand their role in these events.

Internists may be among the first to recognize clues that a problem is occurring, especially as initial signs and symptoms may be subtle or mimic common disorders, prompting victims to contact their primary care physicians, rather than go to emergency departments.6 Furthermore, Internists’ broad range of medical knowledge, experience, and skills make them uniquely qualified to diagnose and treat a variety of potential health problems. Internists are also well-positioned to work with various health care personnel and services during a disaster. Therefore, Internists must understand early warning signs of bioterrorist and infectious agents, proper reporting channels and measures, and ways that they can help contain and treat the consequences of epidemics, outbreaks, and attacks.

IDENTIFYING BIOTERRORIST ATTACKS, EPIDEMICS, OR OUTBREAKS

During its initial stages, an attack, epidemic, or outbreak may not be obvious. Depending on the agent and its mode of transmission, the population density, and the population’s access to health care, it can be days or even weeks before anyone can recognize the problem. The early response may be crucial in containing the problem and minimizing resultant morbidity and mortality. Efforts have been made to develop biosurveillance systems to detect outbreaks and attacks.7–9

These systems collect pertinent data (e.g., pharmacy drug sales, emergency department visit chief complaints, and air samples) and search for irregularities that suggest a problem is occurring. However, these systems are by no means foolproof because they only look for a finite set of clues, do not cover every part of the United States, and may provide equivocal information. Moreover, there could be delays between the point that biosurveillance systems detect suspicious patterns and when the public health system responds. Therefore, Internists might be the first to become aware of a problem and pivotal in initiating the public health response.

Internists see large numbers of patients with various health problems and may be the patients’ only interaction with the medical community for symptoms resulting from infectious diseases and injuries from radiation, chemicals, and/or burns. So they could be the first to report attacks or outbreaks and initiate public health response. Indeed, there are examples of “astute” clinicians being the first to recognize epidemic or bioterrorist attacks (e.g., the 1999 New York City West Nile outbreak,5 the 2001 anthrax attack cases10,11 and the 2003 SARS epidemic in Vietnam12).

In some cases, bioterrorist and infectious agents cause distinctive signs and symptoms.1,8,14 For example, of the 10 inhalational anthrax cases in the 2001 attacks, all had fever, chills, lethargy, and chest x-ray abnormalities. Seven had mediastinal widening, and 8 had pleural effusions. All but 1 had elevated liver transaminases. A combination of these findings is highly suspicious for inhalational anthrax, especially in a young, otherwise healthy patient and/or when a patient initially experiences nonspecific influenza-like symptoms followed first by a brief period of apparent recovery, and then, by an abrupt resurgence of more severe symptoms.15

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However, in a majority of cases, early symptoms are vague and readily mistaken for more common upper respiratory infections (e.g., influenza, plague, tularemia, and staphylococcal enterotoxin B) or viral gastroenteritis (e.g., hepatitis A, cryptosporidium, and salmonella).

Therefore, in addition to looking for specific symptoms, Internists should remain vigilant about general trends and patient flow in their clinics.16 Any of the following may be the only sign that an attack or outbreak has occurred17,18:

1. a sudden, unexplained, significant increase in the number of patients, especially when it occurs outside influenza or allergy season;
2. a disproportionate number of patients presenting with similar symptoms (e.g., the 1993 Milwaukee cryptosporidium outbreak19);
3. many patients coming from the same location (e.g., household, school, restaurant, or workplace) or participating in similar activities (e.g., evening outdoor activities in the 1999 New York City West Nile Virus outbreak20 and dining in the same restaurant in the 2003 Pennsylvania Hepatitis A outbreak20);
4. patients reporting sick or dead animals (e.g., crows in West Nile Virus outbreaks21,22 and rabbits in tularemia outbreaks23);
5. physicians or other clinic staff becoming ill after coming into contact with patients (e.g., the 2003 SARS epidemic4);
6. a patient’s health rapidly deteriorates out of proportion to the presenting symptoms and diagnosis (e.g., a 30-year-old non-immunocompromised patient dying of pneumonia is rare);
7. an unusual number of patients fail to respond to treatments.

An Internist’s index of suspicion should be even higher when bioterrorism or epidemic alerts are issued.

**TREATMENT AND PROPHYLAXIS**

Internists must be prepared to address a wide range of physical, psychological, and social consequences of public health disasters. Patients may be injured by either a public health disaster or the ensuing mass panic. In addition, Internists may have to function as emergency physicians when emergency departments are overcrowded or unavailable. Specifically, Internists must be prepared to:

1. treat the exposed and infected. Different organ systems can be affected (e.g., meningitis from inhalational anthrax, sepsis from typhoidal tularemia, and pneumonia from influenza), so complete examinations are important. Websites providing extensive treatment and prophylaxis information include the Center for Disease Control and Prevention (CDC) [http://www.bt.cdc.gov/], Food and Drug Administration (FDA) [http://www.fda.gov/cder/drugpre-pare/default.htm], Department of Health and Human Services [http://www.hhs.gov/disasters/index.shtml], and National Library of Medicine [http://www.nlm.nih.gov/medlineplus/bioterrorsandbioterrorism.html];
2. administer prophylaxis to the exposed but not the infected. Determining exposure can be difficult as patients may claim that they have been exposed. In a large-scale epidemic or attack, public health officials may set up temporary stations for mass vaccination and prophylaxis. However, many patients may still appear at clinics requesting prophylaxis;
3. triage who gets treated in a large outbreak/attack. Internists will have to prioritize who should receive treatment, especially when necessary resources and skilled manpower are limited. Knowing when and how to ration treatments can be challenging, particularly in chaotic conditions. Although Internists may feel compelled to acquiesce to every patient’s needs, their primary responsibility in public health emergencies is the public.24 While clear guidelines have not been established and rationing decisions are rather controversial, certain groups such as essential personnel (e.g., health care workers, police, fire fighters, and other individuals integral in responding to a public health disaster) should receive priority. Essential personnel are needed to prevent more casualties and fatalities and could spread contagious diseases to many other people;
4. treat mental health consequences. Public health disasters can result in significantly increased mental health problems including anxiety, depression, and posttraumatic stress disorders.25–28 Evidence suggests that even people who witness, hear, or read about a disaster can be affected.29,30 Shortages of mental health professionals in a disaster often require Internists to handle patients’ mental health issues.31–35
5. treat comorbidity exacerbations. Evidence suggests that undue environmental stresses can exacerbate comorbidities such as heart disease and respiratory disease.36–42 In addition, during public health disasters, patients with certain chronic diseases (e.g., diabetes and chronic obstructive pulmonary diseases) may not have adequate access to maintenance treatments.44

**PROPER REPORTING AND THE PUBLIC HEALTH AND LAW ENFORCEMENT CHAIN OF COMMAND**

Figure 1 illustrates the public health chain of command. Internists suspecting an attack or epidemic should immediately inform the local or state health department and contain any possible threat in their clinics, especially if the agent is contagious. Providing information to wrong people (especially news media) may cause mass terror and delay the public health system’s response. Therefore, Internists must remain calm, understand how their words can be misunderstood and misconstrued, follow instructions from appropriate health, military and law enforcement officials, and allow properly trained public health officials to deal with the media.

Local authorities are responsible for the initial response to any public health emergency with appropriate state agencies providing additional support when necessary. Depending on the nature and magnitude of the problem, local or state authorities may choose to involve federal agencies. Unlike naturally occurring disease outbreaks, bioterrorist attacks are criminal acts and require intervention of law enforcement agencies.45

When there is a risk of contagious disease transmission across state lines or state efforts are deemed inadequate, the federal government assumes authority. The President makes executive decisions. The CDC administers federal quarantine
actions. Implementation of order could involve the Department of Defense or the Federal Emergency Management Agency (FEMA). For travelers seeking to enter the United States, the CDC has the authority to enact quarantine. In areas where the CDC’s Division of Global Migration and Quarantine personnel are not stationed, the Immigration and Naturalization Service and the United States Customs Service personnel are trained to identify travelers with potential epidemic.

**PRECAUTIONS AND LOCAL CONTAINMENT**

It is essential that health care professionals adequately protect themselves. They are needed to care for both victims of an outbreak/attack and “regular” patients and can inadvertently spread communicable agents rather quickly, especially to vulnerable members of the population. One study examined clinicians’ knowledge regarding proper infection control practices during a bioterrorist event and found numerous deficiencies.

Standard precautions should be exercised for all situations. Internists should wash their hands frequently and be careful when handling body tissues and fluids. Certain diseases require additional precautions (Table 1). Contaminated clothing should be removed promptly and placed in sealed plastic bags. Soap and warm water can wash off most noncontagious agents. Bleach is needed for chemical decontamination. Any health care worker who receives a needle stick from a potentially bacteremic anthrax-infected patient should receive prophylactic antibiotics.

Although the words *quarantine* and *isolation* have been erroneously used interchangeably, quarantine means the separation and confinement of currently healthy people who may have been exposed to a contagious disease, while isolation refers to the separation and confinement of people known or suspected to be infected with the contagious disease. When an infectious disease is confined to a specific locale, the authority to order quarantines usually rests with local or state public health officials. When the event spreads across jurisdictional boundaries within the state, such authority usually is relin-
Clinic patient volume can increase significantly from ill patients and concerned healthy patients (the “worried well”). This “worried well” phenomenon was seen after the 2001 Anthrax attacks. Clinists will have to offer reassurance to the “worried well,” relay appropriate disease information, and direct them to the right public health agencies and relevant websites (e.g., Fig. 1 and websites listed in “Treatment and Prophylaxis”) for information and mass prophylaxis (if needed). Clinics should minimize potentially contagious patients’ contact with health care workers and other patients either by temporal segregation (clustering potentially contagious patients later in the day) or spatial segregation (shunting potentially contagious patients towards specific rooms). Therefore, clinic schedulers and telephone operators should be aware of the signs and symptoms that suggest a patient is contagious.

Proper triaging is necessary. Minor issues and complaints may have to wait, but urgent problems must be addressed. The clinic will not operate with normal efficiency. Health care workers may become ill or be absent. Running additional tests, notifying authorities, taking on and off personal protective equipment, rearranging the clinic, and decontaminating rooms will cause operational delays.

Clinics that routinely run at peak capacity could become overwhelmed, especially if the clinic staff themselves become ill. Every clinic should have clearly established contingency plans and build an extra capacity that can handle unexpected surges in patients. Specifically clinics will need:

1. additional rooms to place and examine patients. Clinics should identify other patient areas (e.g., procedure, radiology, and operating rooms) that can be converted into examination rooms. Rooms not normally used for patients (e.g., offices or conference rooms) may be utilized if they meet basic requirements for patients who do not require isolation. Mobile clinics and hospitals may be available;

2. additional health care professionals and staff. Clinics should know where and how to reach additional personnel who are cross-trained to handle a wide range of responsibilities in an emergency;

3. diversion plans. When a clinic is overwhelmed, it must know when to close to additional patients and where to send them.

### Table 1. Bioterrorist agents as categorized by the Centers for Disease Control and prevention (CDC) and required precautions

| Agent | Standard precautions | Contact precautions (i.e., gowns and gloves) | Airborne precautions (i.e., negative pressure room and N95 masks for all entering the room) | Droplet precautions (i.e., surgical masks) |
|-------|----------------------|---------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------|
| Category A agents | | | | |
| Anthrax | * | | | |
| Botulism (Clostridium botulinum toxin) | * | | | |
| Plague (Yersinia pestis) | * | | | |
| Smallpox (variola major) | * | * | | |
| Tularemia (Francisella tularensis) | * | | | |
| Viral hemorrhagic fevers (filoviruses) | * | | If cough, vomiting, diarrhea or hemorrhage* | Surgical mask and eye protection if within 3 feet of patient* |
| e.g., Ebola, Marburg and arenaviruses (e.g., Lassa, Machupo) | * | | | |
| Category B agents | | | | |
| Brucellosis (Brucella species) | * | | If draining lesions* | |
| Epsilon toxin of Clostridium perfringens | * | | | |
| Food safety threats (e.g., Salmonella species, Escherichia coli O157:H7, Shigella) | * | | | |
| Glanders (Burkholderia mallei) | * | | If skin involvement* | |
| Melioidosis (Burkholderia pseudomallei) | * | | | |
| Psittacosis (Chlamydia psittaci) | * | | | |
| Q fever (Coxiella burnetii) | * | | | |
| Ricin toxin from Ricinus communis (castor beans) | * | | | |
| Staphylococcus enterotoxin B | * | | | |
| Typhus fever (Rickettsia prowazekii) | * | | | |
| Viral encephalitis (alphaviruses) | * | | | |
| (e.g., Venezuelan equine encephalitis, eastern equine encephalitis, western equine encephalitis) | * | | | |
| Water safety threats (e.g., Vibrio cholerae, Cryptosporidium parvum) | * | Only if patient is diapered or incontinent* | | |
| Category C agents | Emerging infectious diseases such as Nipah virus and hantavirus | | | |

Sources: City of Philadelphia Department of Public Health, Division of Disease Control, Summary of Biological Warfare Agents, and Saint Louis University, School of Public Health Center for the Study of Bioterrorism and Emerging Infections.

*Precaution is required.
LEGAL BARRIERS AND CONCERNS

Anytime medical treatment is administered, legal concerns come into play. Public health disasters are no exception. In a mass casualty setting, the ability to mount an adequate response may be hindered by the myriad of rules and regulations that govern the everyday practice of medicine. Laws vary from state to state, so Internists should be aware of their state’s specific regulations. Unfortunately, many states have not yet adequately addressed or clarified medico-legal issues and regulations in public health disasters. Some of these include:

1. licensing and admitting privileges. Internists willing to provide assistance may not be licensed in that state, have appropriate admitting privileges, or have the time or means to complete the necessary paperwork before administering treatment. Some states (e.g., Colorado) have introduced statutes that case some regulatory barriers by providing protection to health care workers during a public health disaster, such as allowing physicians to administer care even though they are not licensed in that state;

2. malpractice liability. While states do have “Good Samaritan” laws that offer some legal protection to physicians who aid strangers in “good faith,” the extent of these laws varies from state to state and currently do not cover all potential eventualities. “Good Samaritan Laws” may not apply when treatment is administered against a patient’s will.

3. maintaining patient confidentiality. Bioterrorist attacks and epidemics require physicians to quickly transmit patient and case information to other health care personnel and appropriate authorities. While such communication is paramount, efforts should be made to maintain patient confidentiality and transmit only necessary information. At present, it is unclear how Health Insurance Portability and Accountability Act (HIPAA) regulations would affect the public health and health care system response. In a public health emergency, the HIPAA Privacy Rule does allow disclosure of the following protected health information (PHI): for treatment by health care providers; to avert a serious threat to health or safety; to public health authorities for public health purposes; to protect national security; to law enforcement under certain conditions; and for judicial or administrative proceedings. However, during an emergency, misunderstandings of the Privacy Rule’s requirements may hinder the flow of PHI.

SUMMARY

As Internists could play a vital role in epidemics, disease outbreaks, or bioterrorist attacks, they must be knowledgeable, equipped, and prepared. In an emergency, potential legal and administrative barriers should be eased. Clinics should have appropriate contingency plans. Although the risk of large-scale attacks and epidemics seems low, the risk of smaller epidemics and local public health emergencies is much higher. Preparing for large events will help prepare for such smaller events.

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