

Educating health professionals, first responders, and the community about bioterrorism and weapons of mass destruction

ANTHONY J. SILVAGNI, DO, PHARM.D; LEONARD A. LEVY, DPM, MPH; ROBIN B. MCFEE, DO, MPH;
FOR THE NOVA SOUTHEASTERN UNIVERSITY-COLLEGE OF OSTEOPATHIC MEDICINE TASK FORCE
ON BIOTERRORISM AND WEAPONS OF MASS DESTRUCTION

Whether or not gas will be employed in future wars is a matter of conjecture, but the effect is so deadly to the unprepared that we can never afford to neglect the question.

General John J. Pershing
The final report of General John J. Pershing
Washington, DC: US Government Printing
Office; 1920:77.

The events of September 11, 2001, caused major changes in the lives of Americans, but the full meaning of that day—even as we approach its one-year anniversary—has perhaps not yet been realized. Clearly, the threat of terrorism in all its forms is real.

In the medical community, the horrific attacks on New York City and Washington, DC; the thwarted attack on United Airlines Flight 93, which crashed 80 miles east of Pittsburgh, Pa; and the anthrax attacks that followed in close succession all reinforced the need for increased training and education of health-care professionals in preventing and treating casualties of chemical and biological warfare and other weapons of mass destruction (WMD).

These events, just one year hence, continue to magnify the importance of educating healthcare professionals in surveillance, prevention, and the public health issues associated with WMD. Healthcare providers must be provided with up-to-date knowledge and training in rapid assessment skills so that they may initiate care when WMD are used against American targets again.

Background

Even before September 11, 2001, there were increased incidents and threats of terrorism in the United States and abroad on American civilian, diplomatic, political, and military targets. On American soil, several violent attacks on such targets

received wide media coverage, including the 1993 bombing in the underground parking garage of the World Trade Center, the 1995 bombing of the Alfred P Murrah Federal Building in Oklahoma City, Okla (see <http://www.oklahomacitynationalmemorial.org>), and the 1996 pipe bomb detonated in Centennial Olympic Park at the Summer Olympic Games (XXVI Olympiad) in Atlanta, Ga.

In recent history, the most well-known incident of chemical terrorism against a civilian target is the March 1995 attack in the Tokyo subway system organized by the Japanese apocalyptic cult *Aum Shinrikyo*. The group released a colorless and odorless gas—an organophosphate nerve gas known as sarin—reported to be 26 times more deadly than cyanide gas.¹ This attack killed 11 people and injured more than 5500 others, hospitalizing 1200.²⁻⁴ Most, however, are not aware of recent biological attacks on American soil.

In 1984, in a small Oregon town called The Dalles, a religious cult known as the Rajneeshees used *Salmonella typhimurium* to poison residents.^{5,6} Their bizarre plot, which centered on taking over the Wasco County government by infecting voters with salmonellosis before a crucial election, resulted in the poisoning of 751 people who ate at salad bars in local restaurants—with 45 of those victims requiring hospitalization.^{7,8} While many educators⁹ and media commentators¹⁰ credit this incident as the first and largest biological attack on American soil, the history of biowarfare indicates otherwise.

During Pontiac's Rebellion in 1763 on the Pennsylvania frontier—under the encouragement of the British commander-in-chief for North America, Sir Jeffery Amherst, and the ranking officer for the Pennsylvania frontier, Colonel Henry Bouquet—Captain Simeon Ecuyer, commanding officer of Fort Pitt, and William Trent, commanding officer of the local militia, gave blankets and handkerchiefs infected with variola major virus (smallpox) to American Indians who visited Fort Pitt for negotiations.¹¹⁻¹⁵ These blankets have since become known as the infamous “fever blankets.”¹⁶ Native populations in the Americas were long known to be particularly susceptible to the virus.¹⁴ As one US Army historian¹³ notes, “The disease, whether purposely disseminated or not, proved devastating to the Native American population.” Biological warfare vis-à-vis poisoned wells was also used by British troops in the Amer-

Dr Silvagni is the dean and a professor of family medicine at Nova Southeastern University–College of Osteopathic Medicine in Davie, Fla, where Dr Levy is associate dean for education, planning, and research and a professor of family medicine and public health, and Dr McFee is an assistant professor in the department of preventive medicine.

A complete list of task force participants appears at the end of this article.

Address correspondence to Leonard A. Levy, DPM, MPH, NSU-COM, 3200 S University Dr, Davie, FL 33328-2018.

E-mail: levyleon@nova.edu

ican Revolutionary War and by Confederates retreating from the Siege of Vicksburg (Miss) in 1863 during the American Civil War, during which attempts were also made to infect clothing with variola major virus and *Flavivirus* (yellow fever).^{13,14}

Historical documents record that chemical agents have been studied and/or deployed as weapons in battle since arsenic smokes were first used by the Chinese in 1000 BC.¹³ The first documented use of biological agents in warfare was in the time of the Carthaginian general Hannibal Bacara, who had his men hurl earthenware jars full of venomous snakes onto the enemy ships of Eumenes II of Pergomon in 190 BC.¹⁷

Modern understanding of chemical and biological warfare is mainly shaped by the events of World War I, however. Until that time, biowarfare was mainly an attempt to taint the enemy's food or water supplies or to make extant weapons more toxic (eg, arrowheads, spears, and sword blades) with diseased, infected, or decomposing organic matter. Similarly, until that time, chemical attack was mainly an attempt to target the enemy with the limited and controlled use of noxious gases, smoke, sprays, or acids (eg, "stink bombs," toxic clouds).

In World War I, warring nations for the first time committed themselves to the use of chemical agents of escalating lethality to assist in guaranteeing military victory. The first successful chemical attack came in the form of 168 tons of chlorine gas released from cylinders by the Germans, who wore protective masks, against British forces at Ypres (Ieper), Belgium, on April 22, 1915. German success in this attack was not decisive, but it was good enough to encourage further development of chemical arsenals on both sides. On September 25 of the same year, Allied troops at Loos (Loos-en-Gohelle), France, launched their own chlorine attack. This sequence of events set the warring nations on the first modern "arms race," as they "initiated a deadly competition to develop better protective masks, more potent chemicals, and long-range delivery systems to more widely disperse the agents,"¹³ evolving from chlorine to phosgene, trichloromethyl chloroformate (diphosgene), hydrogen cyanide, cyanogens chloride, and finally, one of the lasting emblems of World War I, a vesicant known as mustard gas.

Modern biological warfare began at this time too, but was used covertly, by the Germans only, and on both fronts. The German strategy for biological warfare in World War I centered on inflicting damage on the Allies' movements and provisions by infecting agricultural animals with strains of *Bacillus anthracis* and *Burkholderia pseudomallei* (glanders).^{13,17} Much of this secret campaign took place on American soil while the United States was still a neutral nation and was the result of the efforts of two German agents, Anton Dilger, a surgeon at Johns Hopkins University in Baltimore, Md, and Captain Frederick Hinsch, a dockworker. Dilger set up a laboratory to manufacture the bacteria while Hinch administered biological agents to horses, mules, and cattle that were destined for the European theater, infecting an estimated 3000 animals and

several hundred troops.¹³ The year 1915 is thus seen as the beginning of modern chemical and biological warfare.

After World War I, the next major use of chemical weapons was a mustard gas attack by the Italians in 1935 against Ethiopian troops, who were ill prepared to counter such a weapon. Similarly, Japan used a mustard agent and lewisite in its invasion of China in 1937.^{18,19} By this time, international consensus was against the use of biological and chemical weapons—although many nations, including the United States, reserved the right to retaliate in kind in the event of a chemical or biological attack.

Although chemical and biological weapons were not used in World War II, Japan developed a highly advanced biowarfare capability from 1932 until 1945.^{17,14} Unit 731, as the Japanese program was known, was located in Pingfan, Manchuria, and used human subjects—mostly Chinese prisoners of war and political prisoners—to test the lethality of various disease agents, including bacterial dysentery, *Vibrio cholerae* (cholera), *Yersinia pestis* (the etiological agent of bubonic and pneumonic plague), *B anthracis*, and *Salmonella typhimurium*.¹⁷ It is estimated that as many as 10,000 people were killed in such "experimental infections."¹⁷ Many future chemical and biological weapons programs—including those of the Soviets and Americans—were developed as a result of what was learned when Unit 731 was discovered and captured by the Soviets at the end of World War II.^{13,17}

The United States and most other nations from the 1940s onward had a stated battlefield policy of "no first use" with regard to chemical and biological agents,¹³ though nonlethal defoliants and riot-control agents were widely used in Vietnam. While the United States was involved in the Vietnam conflict—and struggling unsuccessfully to explain the difference between lethal and nonlethal agents to the public at home—nerve agents were used for the first time in combat in the Yemen Civil War between 1963 and 1967.¹³

Although there were several more close brushes in the 20th century with the use of chemical and biological weapons in a major war (most notably in the 1967 Arab-Israeli Six-Day War), the next time American soldiers would face such threats would be at the outset of the Persian Gulf War in 1991. Not since World War I had American soldiers been sent to battle against a credible threat of chemical and biological attack. After launching repeated chemical attacks (mustard agent and the nerve agent tabun) against Iran in the early 1980s, Iraq had been under United Nations censure since the mid-1980s for its use of chemical weapons.^{4,13} Further, shortly after the conclusion of the Iran-Iraq War (1980-1988), Iraq had used chemical weapons against minority Kurds seeking autonomy within Iraq's borders.^{13,19} The extent of the Iraqi chemical and biological program was not fully understood until after the conclusion of Desert Storm, but the United Nations to this day does not have a complete accounting of Iraq's current chemical and biological capabilities.²⁰ Currently, it is estimated that 17 countries around the world have offensive

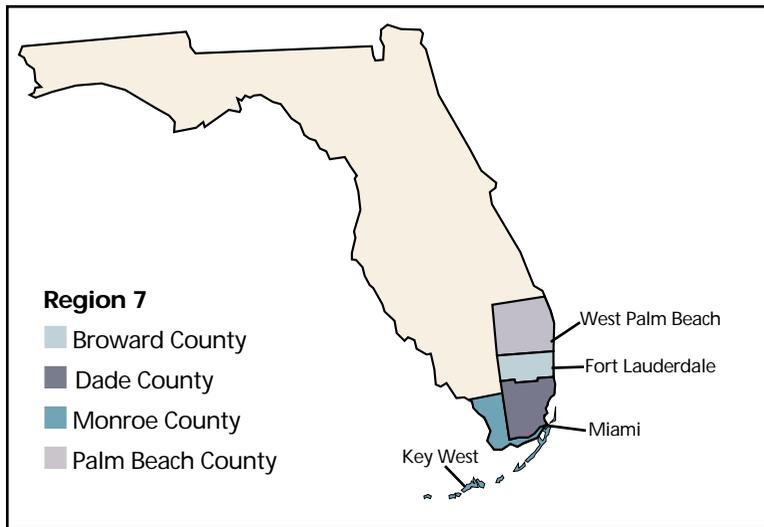


Figure 1. Region 7. Counties in South Florida served by the Nova Southeastern University–College of Osteopathic Medicine Task Force on Bioterrorism and Weapons of Mass Destruction.

chemical, biological, and/or nuclear weapons capabilities.²¹

Perhaps the largest problems warring nations and sub-nationals have had when using biological and chemical weapons are controlling the weapon enough to (1) prevent the accidental exposure of their own troops and followers^{4,13} and (2) retain the use of acquired territory after environmental exposure.¹⁷ The stunning realization the American public must now come to terms with is that, to the terrorist power structures that planned and executed the September 11 attacks, neither of these factors are deterrents to use and, in fact, both are anticipated assumptions.¹⁴

Appropriate use of medical countermeasures by a trained and educated army of first responders (eg, firefighters, police and other law enforcement personnel, emergency medical technicians) is now a matter of national security.

NSU-COM's involvement

Immediately after the inhalational anthrax death of Robert Stevens, 63, a photo editor for the American Media Inc (AMI) tabloid *The Sun* in Boca Raton, the Nova Southeastern University–College of Osteopathic Medicine (NSU-COM) in Davie, Fla, found itself deeply immersed in issues surrounding bioterrorism.^{22,23} Although the college is located in Broward County, its department of preventive medicine is based in the health department of adjacent Palm Beach County.²⁴ The chairwoman of NSU-COM's department of preventive medicine, Jean Marie Malecki, MD, MPH, is also the director of the Palm Beach County Department of Public Health (PBCDPH) and a member of the NSU-COM Task Force on Bioterrorism and Weapons of Mass Destruction. In addition, NSU-COM conducts a preventive medicine residency program located in the facilities of PBCDPH, the only college to do so in Florida—and the only one with such a connection in osteopathic medicine.

The value of a strong public health program was made evident in October 2001 when an additional case (Ernesto Blanco, 73) of inhalational anthrax was diagnosed in Boca Raton.²⁴ Because of the strong coordination between the private clinician and public health professionals in Palm Beach County, the index case (Stevens) was rapidly diagnosed and confirmed and resulted in the publication of a case definition that was transmitted to Florida hospitals.^{23,25,26} The case definition enabled the rapid detection and confirmation of the diagnosis of the Blanco case at a laboratory in Miami-Dade County. This second individual was hospitalized for three weeks, treated with ciprofloxacin, and went on to recover. Both individuals were employees of AMI in Boca Raton, Fla.

Between October 8 and 10, 2001, through the joint efforts of public health personnel, in conjunction with the Miami Branch Laboratory of the Florida Department of Health's Bureau of Laboratories, 1132 persons from AMI (employees,

employees' family members, and visitors to the building) received initial counseling, physical examinations, and antimicrobial prophylaxis for presumed exposure to *B anthracis*. Of the 1132 patients treated, 970 (88.2%) received ciprofloxacin.^{24,27} The two cases in Palm Beach County—including the index case—were among the 11 cases of inhalational anthrax and 12 cases of cutaneous anthrax confirmed by the Centers for Disease Control and Prevention (CDC) between October 4, 2001, and June 2, 2002.^{22,24,28,29}

Although the original delivery device used at AMI in Boca Raton has not been found, epidemiologic evidence suggests that the outbreak resulted from the intentional delivery of *B anthracis* spores through letters or packages mailed through the US Postal Service.^{30,31} After ten months of quarantine, the Federal Bureau of Investigation opened the AMI building in the last week of August 2002 for further investigation using "newly developed techniques" to track down *B anthracis* spores.³¹ By November 9, 2001, however, approximately 300 postal and other facilities were tested for *B anthracis* spores and approximately 32,000 persons received antimicrobial prophylaxis following potential exposure to the organism at their workplaces in Florida, the District of Columbia, New Jersey, and New York City.¹⁸ Before the fall 2001 outbreaks of bioterrorism-related anthrax, only 18 cases of inhalational anthrax had been reported in the United States throughout the 20th century, the most recent in 1978.^{21,32}

Evolution of NSU-COM's Task Force on Bioterrorism and Weapons of Mass Destruction

The call for help

Local public health officials, physicians, and the public had significant concerns about the 2001 bioterrorist attacks. Public health officials were concerned about the degree to which the

Upon program completion, physicians and first responders will be able to:

- List the most common diseases associated with bioterrorism and other weapons of mass destruction (WMD) and describe their pathophysiologies.
- Describe the natural history of *Bacillus anthracis* (anthrax), variola major virus (smallpox), *Francisella tularensis* (tularemia), *Yersinia pestis* (plague), and *Clostridium botulinum* (botulism).
- Discuss the most likely chemical, nuclear, and explosive WMD.
- Describe measures to diagnose and manage the diseases most associated with bioterrorism and WMD.
- List and describe the public agencies and resources available in the event of terrorist attacks.
- Provide accurate and appropriate information to the public and the media about the diseases most associated with bioterrorism and WMD.
- Identify, describe, and make use of the best methods available for environmental decontamination after a terrorist attack.

Figure 2. Physicians and first responders: Educational program objectives for each group

outbreak of anthrax would spread—as well as the possibility that terrorists would bring other chemical or biological agents to bear on the community. Many in the public health community expressed specific concerns about the possible appearance of other biological agents such as variola major virus, *Francisella tularensis* (tularemia), *Y pestis*, and *Clostridium botulinum* (botulism).

Physicians in South Florida and other communities around the country were highly concerned, if not anxious, because virtually none of them had ever seen a case of anthrax, and were therefore unfamiliar with its prevention, communicability, diagnosis, natural history, and management.²⁷ There was widespread concern about levels of public exposure to *B anthracis*. Many individuals sought care from local departments of health or private physicians and requested prescriptions of ciprofloxacin for the prevention of anthrax—or for treatment of what they presumed to be inhalational anthrax, in the case of those with upper respiratory tract infections.

Calls from the public to clinics, physicians, and local health departments increased manyfold during this period because of the fear of anthrax.^{18,27} Between October 8 and October 31, the CDC's Emergency Operations Center received 8860 calls from 50 states, Puerto Rico, and Guam, as well as 22 foreign countries. Of these calls, 590 (6.66%) were thought to represent

potential threats. Many of these calls were from physicians or other healthcare workers (40%), local or state health departments (14%), and police, fire, and emergency response departments (7%). In addition, for the week of October 21 through 27, the following states reported 2817 bioterrorism-related calls combined: Colorado, Connecticut, Louisiana, Maryland, Montana, North Dakota, Tennessee, Wisconsin, and Wyoming. Approximately 25 investigations were launched in each of these states, and 8 to 30 full-time personnel were engaged in responding to such incidents.¹⁸

In fact, NSU-COM had three potential incidents in the aftermath of September 11. In the first incident, an unidentified powder was sprinkled on a computerized mannequin used to emulate heart and lung sounds. Subsequently, two bomb threats caused the evacuation of faculty, staff, and the entire student body from the NSU-COM Health Professions Division (HPD). All three incidents were reported to local hazardous materials officials and were ruled out as hoaxes (A.J.S., oral communication, February 2002).

First task force meeting convened

On October 30, 2001, the dean of NSU-COM and the lead author of this article (A.J.S.) convened the first meeting of the Task Force on Bioterrorism and Weapons of Mass Destruction. The task force, in addition to NSU-COM faculty, included Robert G. Self, MD; James J. James, MD, DrPH, MHA; and Jean Marie Malecki, MD, MPH (also NSU-COM faculty); the directors of the health departments for Broward, Miami-Dade, and Palm Beach counties, respectively. Task force members from the faculty of NSU represent substantial expertise in the areas of preventive medicine, public health, rural medicine, infectious disease, toxicology, posttraumatic stress, environmental health, legal medicine, and conflict resolution.

Initial activities of the task force

As the task force began its work, there was no way to know the extent to which the anthrax outbreak would expand and whether further attacks were under way or soon to follow. The task force worked expeditiously, developing a comprehensive strategic plan for Florida and complementary educational programs for physicians and first responders (ie, firefighters, police and other law enforcement personnel, emergency medical technicians).

In developing the strategic plan and educational programs, the task force immediately turned its attention to the accumulation of knowledge and the maintenance of a database containing the most current and reliable information about bioterrorism and WMD. This was a dynamic process in which the task force was concerned with accommodating the new knowledge and procedures that continue to be generated daily. Provisions were made to ensure that relevant information is shared with task force members on a regular basis.

The task force put the highest priority on the rapid identification and execution of research that focuses on education

Bioterrorism and weapons of mass destruction: The role of physicians

- Bioterrorism and weapons of mass destruction: Setting the context
- September 11, 2001: Awakening and aftermath
- Weapons of mass destruction: An overview
- The physician's role in identifying sentinel events
- County health departments: A vital resource
- Initial response and appropriate follow-up
- Scared patients, anxious physicians
- Where do we go from here?

Figure 3. Physicians: Program outline

and training for the prevention, diagnosis, and treatment of injury as a result of chemical and biological terrorism and WMD.

Secondarily, the task force is engaged in identifying strategic partners to fund these efforts at the federal, state, and local levels. Finally, the task force is developing mechanisms to evaluate ongoing programs and the outcomes of each component of the plan.

Despite multiple terrorist events worldwide and domestically, as well as the most recent events of September 11, the nation's public health infrastructure for handling such events remains in great need.³³ Most of our healthcare professionals remain poorly trained to address a mass casualty event, especially resulting from the use of WMD. Public health principles of population management during terrorist events are inconsistently taught—if they are taught at all. Further, few clinicians can readily distinguish the toxidromes (ie, cascade of signs, symptoms, and illness associated with acts of bioterrorism).^{21,34}

Task force goals

It was essential that local, state, and regional needs and resources guide the direction of the task force. After deliberation, the Task Force on Bioterrorism and WMD agreed on the following goals:

- Develop cooperative activities for the purpose of sharing information and providing education and training in the South Florida area for physicians, other health professionals, health professionals in training, first responders, community and faith-based agencies, and the general public.
- Identify appropriate prevention and response measures for the healthcare workforce when the public is threatened or victimized by acts associated with bioterrorism and WMD.

Bioterrorism and weapons of mass destruction: The role of first responders

- Bioterrorism and weapons of mass destruction: Setting the context
- Weapons of mass destruction: An overview
- Biological agents: *Bacillus anthracis* (anthrax), variola major virus (smallpox), *Francisella tularensis* (tularemia), *Yersinia pestis* (plague), and *Clostridium botulinum* (botulism)
- Weapons of mass destruction: The public health response
- Environmental decontamination products and practices
- Terrorism and psychological issues

Figure 4. First responders: Program outline

- Collaborate with local, state, and federal governmental authorities and agencies, share information, and provide recommendations on issues concerning bioterrorism and WMD.

- Commit to research activities that foster a better understanding of the health issues associated with bioterrorism, WMD, and mass casualty events—preventing and reducing the physical and psychological injury and loss of life to victims and first responders.

The task force determined that the geographic region it would serve should mainly be the South Florida counties of Broward, Miami-Dade, Monroe, and Palm Beach, an area designated by the State of Florida as Region 7 (Figure 1).

As noted previously, the two main programs developed during the first meeting of the task force were intended to provide immediate provision of continuing education for the following groups:

- physicians in Region 7 practicing in urban, suburban, and rural settings, and
- first responders (eg, emergency technicians, firefighters, law enforcement agents).

Further, the task force has developed (or is developing) programs and activities for the following groups:

- **NSU groups**
 - College of Osteopathic Medicine's faculty and medical and public health students;
 - College of Osteopathic Medicine's interns and residents in the Center for Excellence in Medical Education, a consortium of the college's teaching hospitals; and
 - general NSU faculty and students from other disciplines in the NSU-COM Health Professions Division.
- **Community outreach**
 - other health and human service professionals;

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- public, community, service, and faith-based agencies; and
- students in the health professions from other educational institutions included in Region 7.

Educational programs for physicians and first responders

Within days, the task force was able to obtain a grant from a major pharmaceutical company willing to provide partial support for the implementation of the educational programs under development. Both programs were developed in a cooperative effort among NSU-COM, the Broward County Osteopathic Medical Association, and the Broward County Medical Association with the support of the departments of public health of Broward, Miami-Dade, and Palm Beach counties. The objectives of both programs were identified and were geared to the educational backgrounds and special needs of physicians and first responders (Figures 2 through 4).

Preclinical, clinical, and graduate medical education

In addition to the immediate provision of continuing education for practicing health professionals, the task force recognized that the education and training of medical students was an area of high priority. Medline and Medscape literature searches initially conducted in September 2001 and subsequently conducted on an ongoing, monthly basis, as well as concurrent telephone surveys of selected medical schools (L.A.L., oral communication, August 2002), failed to identify programs that address training voids in WMD, including specific courses designated for medical students. The immediate needs of NSU-COM were addressed in November 2001 by a series of interactive lectures for preclinical osteopathic medical students provided by NSU-COM's Robin B. McFee, DO, MPH, assistant professor of preventive medicine.

The task force agreed on a timetable of spring 2002 to ensure that instruction in bioterrorism and other WMD became an integral part of the required curriculum at NSU-COM leading to the degree of doctor of osteopathy. The task force determined that no medical student—and ultimately no student in the NSU College of Allied Health—will complete a course of study without receiving training in WMD and mass-casualty preparedness.

The 6-hour course (Figure 5) provides a comprehensive overview of the clinical, public health, and societal issues related to WMD. Preclinical students participate in an interactive and didactic program with carefully defined learning objectives, while clinical and graduate trainees are provided with a combination of video teleconferences and on-site lectures. The preclinical module is preceded by a 25-question survey designed to assess students' general knowledge of WMD, including basic management and general public health preparation. Future plans include computer-based interactive training programs.

■ Lecture 1: Weapons of mass destruction

An overview is provided that includes the history of terrorism, especially domestic events and local risks, agents of mass destruction—including the acronym BNICE (biological, nuclear, incendiary, chemical, and explosive)—and biomedical, preventive, and psychosocial considerations for the medical student and community clinician.

Two weeks after this lecture, the initial 25-question preclinical survey is repeated to assess the impact of this presentation.

■ Lecture 2: Nuclear, chemical, and biological weapons

An in-depth look at nuclear, chemical, and biological weapons with a focus on clinical decision-making. Special emphasis is placed on bedside skills, history taking, radiographic evaluation, and chemotherapeutic agents, as well as the long-term effects of exposure.

■ Lecture 3: The public health role in bioterrorism and weapons of mass destruction

Key lessons learned from preparedness drills include a strong public health infrastructure with dynamic surveillance and epidemiologic capabilities, command and control, good communications, rapid data sharing, and cooperation among all necessary groups (eg, law enforcement, the medical community, the government, and the public).

■ Lecture 4: The role of clinicians and students in a world of bioterrorism and weapons of mass destruction

Not all clinicians will practice at academic health centers or in university settings that have wide-ranging resources. The "first responder" to address the effects of a chemical or biological attack might be the community clinician. Special emphasis is focused on diagnosis, surveillance, personal protection, and public health and resource linkage.

Figure 5. Outline of the proposed 6-hour Nova Southeastern University–College of Osteopathic Medicine course on bioterrorism and weapons of mass destruction. This lecture series consists of four 1.5-hour sessions.

Partnership with area health education center

The task force entered into a partnership with the NSU-COM Area Health Education Center (AHEC) Program. The NSU-COM AHEC has extensive academic and community partnerships that will be used in collaboration with the task force's expertise in bioterrorism training. This collaboration will help to provide programming for primary care and public health professionals in rural and other underserved areas throughout South and Central Florida and elsewhere in the state. The West

Palm Beach Veterans Affairs Medical Center is now a major collaborator as well.

The task force–AHEC partnership has also expanded the development of educational programs. A regional workshop took place in February—conducted with the collaboration of one of the state’s leaders in primary healthcare services, Florida Community Health Centers Inc—for rural, community, and migrant healthcare providers in nearby Hendry, Martin, Okeechobee, and St Lucie counties. This workshop focused on the role of the community clinician in the recognition and detection of illnesses related to bioterrorism and WMD.

The AHEC and NSU-COM task force began planning a rural retreat for June 28 and 29, 2002, in Stuart, Fla. This retreat addressed bioterrorism and WMD and was geared toward community and migrant health center providers, specifically providers from more than a dozen outlying communities in rural South and Central Florida. Drs McFee and Howell gave presentations on Bioterrorism and Weapons of Mass Destruction Preparedness.

Training materials such as CD-ROMs and home study materials are also under development for dissemination to providers in outlying and remote sites. The first training module focuses on the community clinician’s role in addressing nuclear, chemical, and biological agents.

Research

There is a great need for new knowledge about the clinical effects of WMD, as well as the infrastructure requirements, preparedness, and resource management necessary to address mass-casualty events. Seemingly basic questions, such as “How many and what kind of antidotes need to be available to an emergency department?” and “Which medications should be available to the first responder paramedic?” risk opening discussions to lengthy debate in the absence of well-tested policies. The NSU-COM task force is currently pursuing research to address some of these issues systematically. We are also identifying voids of knowledge among healthcare providers, assessing antidote and resource stockpiling, developing preparedness algorithms to ensure adequate medications and staffing, and evaluating current training paradigms.

Recently, one of the members of the NSU-COM Task Force (Jean M. Malecki, MD, MPH)^{18,27,32,35} published initial findings on inhalational anthrax, as well as the side effects associated with widespread use of chemoprophylaxis as prescribed in the recent anthrax events that occurred in South Florida. In addition, further studies³⁶ are planned to characterize the biopsychosocial impact of bioterrorism, as well as identify opportunities to improve our response infrastructure.

Comment

The value and contribution physicians and medical students can make to healthcare—especially in the evolving problems associated with bioterrorism and WMD—should not be underestimated. The events of September 11 have demonstrated our

nation’s vulnerability to terrorism. Although not new to the United States, WMD present a very real threat to our nation. Until recently, we have not adequately developed our healthcare infrastructure or prepared clinicians to respond to such threats.

To prepare for the impact of another terrorist attack, it is necessary to train existing and future clinicians, advocate for greater hazardous materials legislation, strengthen the public health infrastructure, and promote coordination among the many organizations and professions that protect our society. Nova Southeastern University–College of Osteopathic Medicine has fostered the cooperation of diverse organizations to provide the best resources for our community. Such collaboration is essential, as there are many questions that remain unanswered and many problems that must be solved for thorough WMD prevention, preparedness, and response.

Furthermore, as of August 23, 2002, NSU has established a Center for Education and Research in Bioterrorism and Weapons of Mass Destruction Preparedness. This new center is expected to follow the work of the task force—making great early strides in presenting educational programs to the community, planning for an infrastructure to conduct research, and training students and local healthcare providers.

Ensuring that current and future health professionals are well versed in the potential threats of bioterrorism and WMD is a vital step in serving and protecting the public. As the majority of osteopathic physicians are practicing primary care medicine, they are more likely to identify patients presenting with the signs and symptoms at an early stage in chemical or biological terrorist attacks. Osteopathic physicians are also in an excellent position to educate their patients about bioterrorism and WMD preparedness. Osteopathic medical schools are in a unique position to provide coalition-creating leadership among diverse healthcare and public health organizations, preparing us for the inevitability of future threats.

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Nova Southeastern University–College of Osteopathic Medicine (NSU-COM) Task Force on Bioterrorism and Weapons of Mass Destruction

Leonard A. Levy, DPM, MPH, NSU-COM Task Force Chairman; Associate Dean for Education, Planning, and Research, NSU-COM; Professor of Family Medicine and Public Health, NSU-COM

Rosebud L. Foster, MSN, EdD, Clinical Professor of Public Health, NSU-COM Department of Family Medicine

Steven N. Gold, PhD, Professor of Psychology (Posttraumatic Stress), NSU Center for Psychology Studies

James T. Howell, MD, MPH, Chairman, NSU-COM Department of Rural Medicine; Professor of Public Health, NSU-COM

James J. James, MD, DrPH, MHA, Director, State of Florida's Miami-Dade County Health Department in Miami

Charles C. Lewis, MPH, PA-C, Assistant Professor of Public Health (Environmental Health), NSU-COM

Walter R. Livingstone, MS, MPH, Administrator in the Office of Emergency Management, Miami-Dade County Health Department

Jean Marie Malecki, MD, MPH, Chairwoman, NSU-COM Department of Preventive Medicine; Clinical Associate Professor in the Department of Preventive Medicine, NSU-COM; Director, Palm Beach County Health Department

Robin B. McFee, DO, MPH, Assistant Professor of Preventive Medicine, NSU-COM; Bioterrorism Preparedness Coordinator, NSU-COM Area Health Education Center (AHEC) Program

Morton J. Morris, DO, JD, Vice Chancellor and Deputy Provost of the NSU-COM Health Professions Division (Legal Medicine)

Kevin P. Nugent, REMPT-P, Emergency Medicine Technician; Program Director, Emergency Medicine, NSU-COM

Robert G. Self, MD, Medical Executive Director, State of Florida's Broward County Health Department in Fort Lauderdale

Anthony J. Silvagni, DO, PharmD, Ex Officio, NSU-COM Task Force; Dean, NSU-COM; Professor of Family Medicine, NSU-COM

Joel S. Spalter, MD, Assistant Professor of Internal Medicine (Infectious Disease), NSU-COM

Honggang Yang, PhD, Dean at the Graduate School of Humanities and Social Sciences (Conflict Resolution), NSU

Steven B. Zucker, DMD, MEd, Associate Dean for Community Affairs, NSU-COM AHEC; Professor of Family Medicine, NSU-COM; Program Director, NSU-COM AHEC



The American Osteopathic Association (AOA) and the American Association of Colleges of Osteopathic Medicine (AACOM) created a joint task force on

bioterrorism in December 2001.

The mission of the combined AOA-AACOM Task Force on Bioterrorism is to educate osteopathic physicians and osteopathic medical students to recognize and respond to biological agents that may be used in terrorist attacks. In addition, the task force will also assist osteopathic physicians in responding to questions regarding bioterrorism from their patients and the rest of the public. More information on the AOA-AACOM Task Force on Bioterrorism is available in the April 2002 issue of *The DO*. Current resources and contact numbers for state public health laboratories are available at the AOA's Bioterrorism Preparedness Resources Web page on the AOA's Web site: <http://www.aoa-net.org/Executive/911resource.htm>.

Members of the profession who have questions for the task force can call (800) 621-1773, Ext 8150, or (312) 202-8150; send an e-mail to smcgill@aoa-net.org; or send a fax to (312) 202-8450. They can also write to Sharon L. McGill, MPH, Secretary of the AOA-AACOM Task Force on Bioterrorism, American Osteopathic Association, Division of Public Health, 142 E Ontario St, Chicago, IL 60611-2864.

Weapons of Mass Destruction. Conventional Arms. Regional Disarmament. Replies from the United Nations System and International Organizations. Reply from the Caribbean Community Original: [English]. Reply from the North Atlantic Treaty Organization Original: [English]. Reply from the Organisation for the Prohibition of Chemical Weapons Original: [English]. Reply from the Organization for Security and Co-operation in Europe Original: [English]. Reply from the United Nations Office on Drugs and Crime Original: [English]. Presentation on theme: "Weapons of Mass Destruction & Bioterrorism" Presentation transcript: 1 Weapons of Mass Destruction & Bioterrorism Ronald R. Blanck, D.O. LTG, USA (Retired) President University of North Texas Health Science Center. Presidential Decision Directive 39, issued in June 1995, directs that the Department of Justice and the Federal Emergency Management Agency are the Lead Federal Agencies for Crisis Management and Consequence Management of terrorist incidents. FEMA has led interagency efforts which identified areas requiring additional capability and subsequently developed the interagency strategic plan to correct those shortfalls. Weapons of Mass Destruction & Bioterrorism Ronald R. Blanck, D.O. LTG, USA (Retired) any explosive, incendiary, or poison gas, bomb, grenade, rocket having propellant charge more than four ounces, missile having an explosive charge of more than one quarter ounce, mine or device similar to the above poison gas disease organism radiation. any weapon or device that is intended, or has the capability, to cause death or serious bodily injury through the release of poisonous chemicals disease or radiation. WMD : Significant casualties from terrorist use of: Nuclear Device Chemical D