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Nurses' Perceptions of Content and Delivery Style of Bioterrorism Education

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The long-term purpose of this study was to assess the effectiveness of a problem-solving computerized bioterrorism education and training (CBET) program compared with a standard bioterrorism education and training (SBET) program. The content and delivery preferences of nurses employed in two major hospitals in Los Angeles and San Diego that would be relevant to the design of the SBET and CBET scenarios were assessed. During the focus groups, nurses also considered culturally sensitive delivery aspects. Notable findings from the focus groups are discussed in this study. Recommendations based on these findings are proposed as this project moves into subsequent phases.

After the September 11, 2001, terrorist attack on the World Trade Center, it became clear that terrorists would use any means to further their cause to disrupt the American way of life. More importantly, this attack demonstrated that America was vulnerable to terrorists' attacks. The death of several postal workers from inhalation of anthrax and the psychological impact on the nation underscore the potential devastating effect of this and other biological agents if used by terrorists. However, the delay in diagnosing anthrax exposure and treatment resulted in adverse outcomes for some individuals. These events raised concerns by government officials and the American people that biological or chemical acts of terrorism are likely to reoccur and may result in casualties on a mass scale. Thus, bioterrorism preparedness is a priority for the government and military. It also is a concern for the private and public healthcare sectors (Langan & James, 2005). However, little is known of the concerns and preferences of nurses for the content and delivery of bioterrorism training. Such healthcare personnel are strategically placed in providing early recognition and management of bioterrorism threats in acute care hospital settings and play a key role. Thus, it is critical to listen to their voices in the design of a bioterrorism education program.

The purpose of this study was to conduct participatory research, using a focus group approach, aimed at assessing the content and delivery preferences of nurses employed in a major hospital in the San Diego area or employed as nurses in hospitals in the Los Angeles area and enrolled at the University of California, Los Angeles (UCLA) School of Nursing.

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Bioterrorism Agents of Concern

History shows that the two agents most likely to be used for biological warfare are anthrax and smallpox (Gordon, 1999; Ligon, 2001). Anthrax is an ideal bioterrorist weapon because it is easily aerosolized, and

effective weapon delivery systems exist that could be readily obtained by terrorists' organizations. Smallpox has been one of the most feared diseases for centuries because it is highly contagious and easily spread from person to person (Franz et al., 1997; Ligon, 2001; Veenema, 2000). Like anthrax, smallpox is an ideal bioterrorism weapon because of available delivery systems, it is cheap to develop, and it has a long shelf life. Moreover, this agent is considered a threat to national security (Rotz, Khan, Lillibridge, Ostroff, & Hughes, 2002). The concern for use of this agent by terrorists prompted the United States to resume smallpox inoculation (Annas, 2002).

Blendon et al. (2003) showed that Americans have beliefs about the disease that are not supported by scientific evidence. Most alarming was the fact that most respondents believed that there was a medical treatment for smallpox, that cases of the disease have been reported within the last 5 years, and that vaccinations early in their lives currently protect them against the disease.

A recent study by Young and Persell (2004) revealed that junior and senior baccalaureate nursing students at one university lacked knowledge of the pathogenic nature of bioterrorism agents. For example, students in this study believed that they could be infected by victims of inhalation of anthrax. Moreover, these students showed little concern about smallpox. Perhaps most alarming was that students would not be willing to care for victims if there was a lack of protection for both themselves and their families. Moreover, they did not believe that bioterrorism was a threat to their geographical region. These findings suggest incongruence between education on bioterrorism education provided by the faculty and actual practices by students. Young and Persell recommended that future research be aimed at determining the issues of delivery format and content for bioeducation and training. These studies highlight the need for public education about anthrax and smallpox, especially for healthcare providers, as these individuals are the first line of defense against biological attacks and other types of disasters.

Lack of Knowledge on Management of a Biological Weapon Exposure

Currently, nurses want to know what is expected of them and how to respond during mass casualties; they also want to know what they need to know for events that produce mass causalities of any nature (Langan & James, 2005). It is likely that biological weapons will be used on troops during armed conflict, as well as on an unsuspecting civilian population by terrorists. To minimize casualties and the public panic that follows from such attacks, it is imperative that knowledge of symptom recognition, early diagnosis, and treatment be provided for both military and civilian nurses. Military nurses are currently deployed with troops in the Persian Gulf and are expected to provide comprehensive patient care, which includes biowarfare care. Civilian nurses will be asked to provide the same quality patient care in the event of domestic attacks by terrorists using biological weapons. Because nurses in general do not frequently see patients exposed to biological agents, a bioterrorism preparedness-training program needs to be established that is readily accessible, tests knowledge, and evaluates the nurses' retention of that knowledge.

The aims of this qualitative study (Phase 1: preintervention) using focus interviews with military and civilian nurses were to (a) consider areas of emphasis in a bioterrorism education and training program that nurses would find informative; (b) inform on ways to deliver the program in a culturally sensitive manner; and (c) assess the pros and cons of computerized versus didactic program delivery formats.

METHODS

Design

This qualitative study using focus group discussions was conducted to encourage participants to ''think aloud'' about the areas of emphasis that participants might find particularly informative; to consider any culturally sensitive delivery aspects; and to consider the pros and cons of bioterrorism delivery formats, including computerized versus didactic-type delivery styles. The ultimate purpose of this Phase 1 study was to inform the development of a problem-solving computerized bioterrorism education and training (CBET) program.

Subjects and Setting

A semistructured interview guide (SSIG) developed by the authors and refined by a community advisory board was used to collect and analyze focus-group data from 26 registered nurses at two sites: the UCLA School of Nursing (UCLA-SON) and the Naval Medical Center San Diego (NMCSD).

Three focus groups were conducted, with 7–11 eligible participants per group. Two focus groups were conducted at NMCSD and one at UCLA, resulting in a sample size of 26 nurses. Nurses were considered eligible if they reported themselves to be employed for 6 months or greater.

Of the 26 nurses who participated in the focus group discussions; 15 (58%) were women. The mean age of the

respondents was 35 years. Respondents were mixed in terms of ethnicity, with 9 being African American or Hispanic of Pacific Islander (36%), 13 being White (55%), and 2 (9%) being of other ethnicity. Two participants did not specify their race/ethnicity. Of the sample, 22 nurses (85%) reported the bachelor of science in nursing as their highest degree; 3 (8.7%) reported the master's of science in nursing as their highest degree, and 1 was prepared at the associate degree level. Twenty-two nurses (85%) reported 5 or more years of nursing experience, whereas 1 reported less than 5 years. Two participants failed to report years of experience.

Procedure

Flyers were posted at the NMCSD and the UCLA-SON. Interested persons called the contact number of the research staff and were informed of the study in detail. Eligible participants were taken to a private room and given additional details about the study. After written informed consent was obtained, the focus groups were conducted by a well-trained research facilitator in a private area within each site.

Semistructured Interview Guide

An SSIG was pretested and modified in a culturally sensitive and linguistically appropriate manner by a community advisory board. The SSIG guided each session by the use of open-ended questions. At the end of each focus group, a sociodemographic profile was completed.

Data Analysis

Data were captured by audiotape and transcribed to protect the identity of focus group participants. The analysis was done directly from the transcripts. Upon completion of the focus group sessions, the investigators oversaw transcription and content analysis of the taped recordings, and content analysis was performed using the constant comparative method (Glaser, 1978). This method involves a line-by-line analysis of the transcribed interviews by coding data into relevant sentences and phrases. Concurrent coding and analysis continued until unique categories were no longer identified. Intercoder reliability was assessed by two independent coders who had experience in content analysis. Trustworthiness of the data (Lincoln & Guba, 1985) and control for naturalistic inquiry were ensured by credibility, transferability, dependability, and confirmability.

Sociodemographic Information

Questions were asked regarding date of birth, age, ethnicity, gender, education and degrees completed, and years employed in the setting.

RESULTS

Content Emphasis

A major concern for the NMCSD focus group participants was that the content should be relevant, meaningful, and practical based on the day-to-day realities of nurses. Discussions on what they would like to see emphasized in the materials revealed that basic knowledge about smallpox and anthrax needed to be reviewed, particularly within the unfamiliar context of bioterrorism.

> We need the training materials to cover the physiology and basic treatment of the agents that are more likely to be used by terrorists, those more likely for us to be exposed to, and those we will most likely have a good chance of survival with. (NMCSD)

> A discussion on what people have seen and done... experienced... I know there have been people out there that [sic] have been at the 9/11 site and things like this where bioterrorism has occurred and they've been involved in it. It would be great to have some interaction time with those people. (NMCSD)

Exposure/Transmission Modes

> I need information on where we would most likely be exposed to anthrax/smallpox. How would we most likely be exposed...? What would be the potential risks? How widespread could it be? If it's in something that was delivered, is it something that would affect a large amount of people in the area it was deployed? (NMCSD)

> The areas of most value are recognizing the forms of transmission and being able to contain the situation. (UCLA)

Recognition/Signs and Symptoms

For focus group participants, recognition of the signs and symptoms of smallpox or anthrax infection versus any other disease that could present in similar fashion required highly visualized training.

> Early recognition and diagnosis is what we need. Our suspicion is a lot more important at the point a patient presents than lab results, which may come days later. (NMCSD)

> Before we send them home on Motrin, we need to recognize, from how a patient presents, whether to think about anthrax or smallpox. Seeing the pox makes it easier to diagnose for smallpox. (NMCSD)

> Working in ER, you need to really know your stuff, to be able to differentiate whether the person walking through that door has smallpox, SARS, chickenpox...or it could be botulism, you know. These days, you have to be ready. (UCLA)

Diagnosis Phase

The consensus was that guidelines are needed for diagnosing and being able to confirm that the signs and symptoms are either anthrax or smallpox, or the result of some other agent of known or unknown etiology. Simultaneous to undergoing the process of diagnosis and confirmation, the question was posed by some as to when would nurses recognize that they were dealing with the results of a bioterrorist attack?

> I'd like to know how the patient would present to me. . . what I could possibly confuse it with. . .what it could mirror. . .to prevent misdiagnosis and therefore mistreatment? (NMCSD)

> We need diagnosis instructions based on: (a) the physical presentation or what the patient looks like; (b) the interview: What's going to clue us onto a bioterrorism incident? What questions should I be asking the patient to ensure I'm on the right track? What is the key verbiage to use, and to follow-up on if the patient uses certain terms? (c) the clinical presentation: What immediate tests can I do to validate my suspicion (e.g., inhalation may warrant chest x-ray)? What is that going to look like? What changes/indications will there be? (NMCSD)

Containment: Decontamination/Isolation

> Once you start to suspect. . .how do we confirm our suspicion? We have to have some kind of ready resource that would allow us to look at it and then say. . .do we need to put this person in reverse isolation. . .should we clear out the ER? (NMCSD)

> If I suspect a biological agent, my concern is that we should put this person in a reverse isolation room if this is going to be something that can spread easily via this person coughing, touching things, touching other people. (NMCSD)

> A good part of the training would be the critical and stress debriefing and the psychological component. . .consoling people and reassuring them when there has been a bioterrorist attack. (NMCSD)

> As we saw in 9/11, it was very emotional and it was something that was never seen before. . . It's important for professionals to learn how to address the psychological aspects of getting some kind of bioterrorist attack. (UCLA)

Communication Chain(s)/Communication Command System

The communication links of the healthcare chain were a major procedural concern, not only in terms of how nurses accessed relevant information for themselves (through a national or international database) but also in terms of how and when nurses should report information up the chain that would be relevant to the needs of those in higher authority. The role of Public Health officials was questioned and discussed in this context. As one NMCSD focus group participant noted, ''Nurses are an important point of contact in the public communication chain, and we should learn to do that well.'' The range of concurrent concerns and suggestions covered three main personnel groupings: (a) first responders to an incident of possible anthrax or smallpox infection; (b) hospital staff (and patients) present during the smallpox/anthrax patient intake; and (c) the public health communication personnel.

> After notifying the county health department, who realistically is going to report to public officials as required by law? Am I going to do it. . .am I going to delegate it to my Corpsman. . .is that only a position type of role. . .Can the ward clerk call and say. . .we've got something going on over here? (NMCSD)

> We need instructions on the public health aspects (e.g., notifying CDC) to find out if there's an occurrence. . .if it's only happening in my military community. . .in the general population. . .where has this person been. . .? (NMCSD)

Reference Materials

There was general agreement in both focus groups on the need for reference materials, with a consensus among NMCSD participants on a preference for the algorithm card format. However, there were also the issues and questions that arose during the discussion on public health communication about national and international databases that kept up-to-date on information on emerging infectious diseases, airborne pathogens, contaminated water, and so on. Because the latter questions were raised regarding the intersection between nursing and public health communication, they are not quoted here under ''Reference Materials'' but will be considered later under ''Recommendations.''

> Up-to-date references are necessary, and I prefer online to hard-copy references. The ''little blue books'' on biological and chemical agents have been around for years, and the current information hasn't changed substantially. (NMCSD)

> We have great posters in the ER where, if something came in, you could read it quick in a picture of the problem. And numbers, they want you to call them right away. (UCLA)

Delivery Formats

It was apparent from both NMCSD and UCLA participants that in considering the practical applications, each participant response was mitigated by the current realities of day-to-day situations. NMCSD participants

appeared to want more interactivity within the lecture format; they appreciated the role that the instructor could play as a reference or for clarification. UCLA participants were in favor of didactic training, in part because their schedules accommodate or provide dedicated time to didactic training sessions as opposed to computerized training, where the individual would be challenged to find time for it.

> At my hospital, when we have a didactic class that we have to go to for the recertification, they make sure they schedule a few different days and times for us to show up so we could schedule our work or our school schedules around it, so we have an option of when to go. But when you're on the unit and you have patients who are critical, you don't have the time. I would like it where we had the ability to access that site from home and still get credit at our facility because I have certifications, things that I have to fill out that I'm behind on now because I don't have time at work. (UCLA)

However, the nurses revealed an interest in hands-on approaches to education:

> A live ''mock code'' scenario would be very interactive. As we do for other things, we could do a mock: after the nurses have taken their training, they just. . .(surprise!). . . encounter some patients presenting with the classical symptoms during one of their shifts. (NMCSD)

> And even to be able to handle things like the protective gowns, the masks, the different devices that are out there, be able to see them. I have nothing to be able to associate it with except a picture or a statement on a screen. (NMCSD)

Finally, an option was considered important.

> People know how they learn best, and if you have the option to go to a class or just do a computer program, you can make that decision for yourself just like they do in a university setting. (UCLA)

Motivation/Retention Tools

Both NMCSD and UCLA-SON focus groups were in agreement that motivation and retention were inseparable. As discussions evolved, it became apparent that respondents preferred different approaches to optimizing processing and retention of information such as sequential presentations; applicability to everyday life and practice; fear of a threat; repetition (mnemonics); and review, visual presentations, interactive presentations, and dramatized presentations. Following are some of the comments on this theme:

> The target audience needs motivation to learn these materials. Even though there are actual incidences of chemical biological uses in terrorist acts, it still seems rare. . .far removed from something that applies directly to where I work now. Since it is something I may never see in my lifetime, my motivation is lessened towards chemical/biological treatment and diagnoses. (NMCSD)

> I think that repetition is very important. . . Listening to it one time is great, but in a month you might forget. . . I need interaction and I need to talk about it. . . I learn better that way. (UCLA)

Pros and Cons of Online Versus Didactic Training

There was a diversity by participants about the pros and cons of online and didactic modalities. Intergenerational differences and time efficiency were discussed. These comments were followed by additional suggestions for successful online delivery.

> I'm a computer person. . .I learn very well with the modules that, like CEU [sic] modules, whatever is available. It's not that I don't learn in a classroom environment. . .but now we're moving at such a fast pace. Technology is. . .you want to be somewhere else and you want to be able to enhance on whatever is happening in the other part of the world, and computer programs make that happen. I'm thinking of the nurses sitting in some Far Eastern country and wanting to benefit from a bioterrorism program that we're implementing in the U.S., and that's only going to be possible if you have a computer program up and alive at all times. (UCLA)

> Having the option of computer is convenient because a lot of nurses work at night. They can't wake themselves up to come to an in-service [sic]. It may fall at a time when it's on their vacation. The convenience of having it there, and of course, refreshing the information. (UCLA)

Online Training Suggestions

The focus group participants provided suggestions on creating suitable, more user-friendly online teaching methodologies and content that would be suitable to nurses. All were in agreement that, for the online teaching materials to be more compelling, the question of ''target audience'' needs to be taken into account, both in terms of content and methodology. The training materials need to be tailored to the different professional contexts, learning styles, personalities, and educational levels that exist within the designated target group—in this case, nurses. These online materials should also include built-in options to enable nurses to select and switch between appropriate training levels and their preferred learning styles. These sentiments are displayed in the following passages.

> A technology gap exists between seasoned nurses who are getting left out of computer-based training because they are not as ready to commit hours to sitting at the

computer or learning the technology. There's a resistance to overcome and to bridge this e-gap between them and the new graduates who are used to the technologies and are ready to dedicate the necessary time. (NMCSD)

The thought of keeping it simple, the content, is good because you know we're all in different stages of interest in learning. But I like the idea of a link too, so that if, as advanced practice nurses, you want to learn on the medical level, you have that option. But if you want to learn the very basics and you don't want a lot of words, just hear the basics... (UCLA)

Cultural Sensitivity Issues

Once again, the question of ''target audience'' became a central consideration in the responses and suggestions of both focus groups for making the training materials more culturally sensitive to a target audience of nurses. In addition, there was a concern that nurses themselves needed a ''health literacy'' component on how to interact with patients from different cultural backgrounds. Suggestions from those who believed cultural sensitivity to be an issue included producing different language versions of the teaching materials; being careful not to single out a religious or ethnic population as ''terrorist''; and diversifying the cast that would appear in the training program.

A number of participants thought that cultural sensitivity was not a concern. One suggested that different types of learners are far more important than ''cultural sensitivity,'' which poses a potential dilemma when juxtaposed against the reality that part of the target audience for the training may be a population that is neither literate in the Western sense nor has access to similar resources. Following are the range of responses on this question:

If you want to make it culturally palatable, then nurses need to be trained to present the material to the patients in a way that they can understand it, and there should be a ''health literacy'' component to it. (NMCSD)

The different types of learners are far more important than cultural sensitivity and being aware that there are visual learners, auditory learners. So when you try to develop training, try to incorporate more than one method. How people learn is more important. (NMCSD)

I know this program is going to be for the nurses, but the element of quality would be very important because the groups that we will address as far as infectious diseases might be targeted to areas that are poor...so that aspect of sensibility should be in there. The plans that we do put in should be realistic that poor people will be able to follow the directions, follow the interventions that we are trying to implement in those areas. (UCLA)

Part of the training would be how to educate a population that may be illiterate...preparing nurses on how to issue, like how to be creative in implementing this sort of intervention. (UCLA)

DISCUSSION

Focus groups were used to discuss areas of emphasis that nurses might find particularly informative; to consider the pros and cons of bioterrorism delivery formats, including computerized versus didactic-type delivery styles; and to consider culturally sensitive delivery aspects.

Both groups provided suggestions on creating user-friendly online teaching methodologies and content that would be more suitable to nurses. They agreed on the need to make nurses the target audience, basing the training on their day-to-day realities; the need to motivate nurses to retain the information; the need to cater to different learning styles by using a variety of delivery formats, building in options to switch between styles; and the need for user-friendly reference materials such as algorithm cards. This is indeed critical because nurses require ongoing training and practice to maintain a high state of readiness and be able to respond rapidly and appropriately to biologic threats. Such readiness includes early recognition, reporting, decontamination, self-protection, prophylaxis, and treatment (Rowney & Barton, 2005; Weiner, Irwin, Trangenstein, & Gordon, 2005).

The need for guidelines on procedure during each moment after the patient comes in was also called for through focus group consensus. Added to this was the call for an emergency communication command system that nurses, as an important part of the communication chain, could be trained to access and follow as required during an event. Indeed, nurses have played active roles in their state and local emergency preparedness teams, focusing on community assessment and disease surveillance (Mondy, Cardenas, & Avila, 2003).

Findings also revealed that both groups were split down the middle on the question of cultural sensitivity. When contemplating the use of online training, the major concerns differed for each group: For NMCSD participants, it was their ability to get feedback. As for UCLA participants, scheduling was an overall concern because there was no dedicated online time, unlike the prescheduled didactic training built into their day-to-day lives.

Future development of computer-based modules should involve consideration of the workplace environment of nurses—providing guidelines on the steps that they would have to follow in making their decisions, as well as visuals to supplement their reference

materials and aid in recognizing and diagnosing the signs and symptoms that are presented; interacting with physicians and other colleagues in determining courses of treatment, care, and safety measures; and playing their role in the communication chain. This could also include familiarization with an emergency room setting and the types of procedures and practices followed in the event of an emergency incident, if not a mock bioterrorism incident, enabling nurses with readiness and aptitude to apply professional nursing skills to a wide range of emergency situations (Akins, Williams, Silenas, & Edwards, 2005). Mimicking the workplace setting and the flow of events during and after a bioterrorism incident would likely contribute to greater satisfaction of nurses who believed that detailed, scientific explanations were little help to their job and difficult to retain.

Because the chances of nurses ever having to respond to such incidents are slim, nurses were concerned that they would forget vital information from their training. It may therefore be helpful to build bioterrorism preparedness training into an overall emergency response model so that all nurses are trained in the same basic protocol regardless of their particular station. Therefore, it would be important to provide a program online and/or in manual form that nurses can quickly consult to follow the procedures that they would additionally be required to follow in, for instance, a bioterrorism event. Such a program should correspond to national emergency preparedness and communication programs so that nurses understand their role in the communications chain of command.

Equally important, however, is that officials in organizations such as the Centers for Disease Control and Prevention (CDC), which specializes in emerging infectious diseases, bioterrorism, and emergency communication, understand that they have an important stake in having a well-prepared nursing workforce. For instance, the CDC CD-ROM guide to effective emergency risk communication planning excludes nurses as part of the communication chain to train in crisis communication. During a crisis, effective communication is a necessary ''resource multiplier,'' and factoring nurses into the preevent planning by such organizations may be well worth considering.

The long-term goal of this overall study is to design and develop a complete CBET that can be customized to meet the training needs of military and civilian nurses who are engaged in general or advanced practice in various healthcare settings. This application offers one of the first evaluations of bioterrorism training and promises to provide new information on how nurses solve clinical problems.

REFERENCES

Akins, R. B., Williams, J. R., Silenas, R., & Edwards, J. C. (2005). The role of public health nurses in bioterrorism preparedness. *Disaster Management Response*, *3*(4), 98–105.

Annas, G. J. (2002). Bioterrorism, public health, and civil liberties. *New England Journal of Medicine*, *346*(17), 1337–1342.

Blendon, R. J., DesRoches, C. M., Benson, J. M., Herrmann, M. A., Taylor-Clark, K., & Weldon, K. (2003). The public and the smallpox threat. *New England Journal of Medicine*, *348*(5), 426–432.

Franz, D. R., Jahrling, P. B., Friedlander, A. M., McCain, D. J., Hoover, D. L., Bryne, W. R., et al. (1997). Clinical recognition and management of patients exposed to biological warfare agents. *JAMA*, *6*(278), 399–411.

Glaser, K. (1978). The treatment of depressed and suicidal adolescents. *American Journal of Psychotherapy*, *32*(2), 252–269.

Gordon, S. M. (1999). The threat of bioterrorism: A reason to lean more about anthrax and smallpox. *Cleveland Clinic Journal of Medicine, 66*(10), 592–595, 599–600.

Langan, J. C., & James, D. C. (2005). *Preparing nurses for disaster management*. Upper Saddle River, NJ: Prentice Hall.

Ligon, B. L. (2001). Smallpox: Its history and reemergence as a weapon of biological warfare. *Seminars in Pediatric Infectious Disease*, *12*(1), 71–81.

Lincoln, Y., & Guba, E. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage Publications.

Mondy, C., Cardenas, D., & Avila, M. (2003). The role of an advanced practice public health nurse in bioterrorism preparedness. *Public Health Nursing*, *20*(6), 422–431.

Rotz, L. D., Khan, A. S., Lillibridge, S. R., Ostroff, S. M., & Hughes, J. M. (2002). Public health assessment of potential biological terrorism agents. *Emerging Infectious Diseases*, *8*(2), 224–230.

Rowney, R., & Barton, G. (2005). The role of public health nursing in emergency preparedness and response. *Nursing Clinics of North America*, *40*(3), 499–509, ix.

Veenema, T. G. (2000). Diagnosis, management, and containment of smallpox infections. *Disaster Management and Response*, *2*(1), 8–13.

Weiner, E., Irwin, M., Trangenstein, P., & Gordon, J. (2005). Emergency preparedness curriculum in nursing schools in the United States. *Nursing Education Perspectives*, *26*(6), 334–339.

Young, C. F., & Persell, J. J. (2004). Biological, chemical, and nuclear terrorism readiness: Major concerns and preparedness for future nurses. *Disaster Management and Response*, *2*(4), 109–114.

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