# Developing Objectives, Content, and Competencies for the Training of Emergency Medical Technicians, Emergency Physicians, and Emergency Nurses to Care for Casualties Resulting From Nuclear, Biological, or Chemical (NBC) Incidents

# FINAL REPORT

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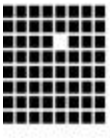
U.S Department of Health & Human Services, Office of Emergency Preparedness
American College of Emergency Physicians
American Board of Emergency Medicine
American College of Medical Toxicology
American Hospital Association
American Nurses Association
Association for Professionals in Infection Control and Epidemiology, Inc.
Emergency Nurses Association
International Association of Fire Chiefs
National Association of Emergency Medical Services Physicians
National Association of Emergency Medical Technicians
National Registry of Emergency Medical Technicians
National Association of State Emergency Medical Services Directors
Society for Academic Emergency Medicine


Office of Emergency Preparedness



American College of Emergency Physicians®

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# Executive Summary

## Introduction

Weapons of mass destruction (WMD) are those nuclear, biological, chemical, incendiary, or conventional explosive agents that pose a potential threat to health, safety, food supply, property or the environment. The terrorist use of WMD is believed to be a significant threat to our society.[1-5] For any observer of current events, the reality of the US terrorist threat is demonstrated by reports of failed attempts,[3] numerous anthrax hoaxes,[6-7,] and actual attacks, such as the inoculation of Salmonella into Oregon salad bars in 1984,[8] the New York Trade Center bombing in 1993,[9] the release of sarin in Japan in 1994[10] and again in 1995,[11] the Oklahoma City bombing in 1996,[12,13] and the US Embassy bombings in Kenya and Tanzania in 1998.[14]

Congress has recognized the threat by passing legislation to fund training for the enhancement of domestic preparedness (Defense Against Weapons of Mass Destruction Act of 1996, and the more commonly known Nunn-Lugar-Domenici amendment of 1997).[15] In addition, a number of presidential decision directives (PDDs) have addressed the threat. For example, in 1995, PDD 39—*US Policy on Counter-Terrorism* specified the roles of specific government agencies in both the crisis and consequence management phases of a terrorist incident.[16] In 1998, PDD 62—*Combating Terrorism (Protection Against Unconventional Threats to the Homeland and Americans Overseas)* and PDD 63—*Critical Infrastructure Protection*, called for improving national response capabilities through such efforts as local, regional, and national planning; procurement of specialized equipment and pharmaceuticals; and enhanced surveillance, research and development.[17,18] President Clinton's February 1999 announcement of a $10 billion budget initiative directed at defending against terrorism involving WMD and cyber attacks further underscores the emphasis being placed on preparedness.[19]

Although the potential for a successful chemical or biological terrorist attack may be remote when compared to other known health crises, the catastrophic nature of such an event demands that the local community be prepared. The best defense in reducing casualties will be the ability of community leaders to mount an appropriate response.[20-23] To that end, the local community will have to be prepared and relatively self-sufficient for hours to days.

Local civilian medical systems, both out-of-hospital and hospital, comprise a critical human infrastructure that will be integral in providing the early event recognition and early response necessary for minimizing the devastation of a WMD incident.[24, 25] Unless such an attack is announced, the local health care system, especially hospital emergency departments, will be the first and most critical line of defense for detection, notification, rapid diagnosis, and treatment. This is particularly true for a potential biological event where a small amount of a bacteria or toxin can produce a disproportionate number of victims, and where disease can spread from person to person causing increasing numbers of casualties as the attack remains undetected for days or weeks.[26-29] Whereas Emergency Medical Services (EMS) providers will be among the first responders to a chemical incident, emergency department personnel will become the "first responders" to a covert biological attack.[24, 30]

Integrative efforts targeted at providing seamless patient care from the out-of-hospital to the hospital setting must involve many key individuals such as hospital administrators, local and state emergency planners, law enforcement personnel, poison centers staff, laboratory agencies staff, industry personnel, public health officials, safety officers, and medical specialists.[23, 31-33] To date, the health and medical community, specifically Emergency Medical Service (EMS) providers, emergency nurses, and emergency physicians, have not been the targets of most Federal resources allocated for WMD education, training, equipment or research. As a result, adequate training or educational experiences that sufficiently address the full range of knowledge and skills required by these health care professionals is not yet available.

An overall plan must be developed for providing, sustaining, and monitoring appropriate WMD-related educational experiences for Emergency Medical Technicians, emergency nurses, and emergency physicians. To address this need, the Department of Health and Human Services Office of Emergency Preparedness (DHHS, OEP) contracted with the American College of Emergency Physicians (ACEP) to identify the strategies required to prepare these target audiences to respond to WMD incidents.

The NBC Training Contract (282-98-0037) between DHHS and ACEP consisted of two contract phases. Phase I focused on the: (1) identification of the needs, demands, and feasibility for NBC-related training, (2) determination of the barriers and challenges related to delivering NBC training, and (3) development of high-level educational goals and strategies to attain the identified goals. Phase II focused on the: (1) review of educational curricula for each of the target audiences and of six existing courses, (2) definition of levels of proficiency and development of associated behavioral objectives, (3) identification of recommendations for integrating WMD content into initial and continuing education, (4) identification of recommendations for sustainment of WMD knowledge and skills, and (5) specification of techniques to ensure continuing proficiencies.

**Methodology**

To accomplish the goals of the contract, a task force of individuals from key professional organizations that represent both potential audience and advocacy groups was convened. This task force employed a consensus development approach to ensure that the representatives of each of the target audiences were fully included in the process. The task force applied an instructional design methodology that provides a set of guidelines for information gathering and decision making, and encompasses several interrelated stages—analysis, design, development, implementation, and evaluation.[34-37] The process is iterative, emphasizing continuous formative evaluation through the review and use of information gathered or decisions made in previous steps. Based on the requirements of this contract, the work of the task force focused on the analysis stage.

The analysis accomplished in this contract most closely followed the elements of a training needs analysis. An effective training needs analysis is built around a set of techniques and tools for examining and understanding performance problems or requirements, as well as any new methodology or content in which people must be trained.[38-40] The needs analysis technique provides an organized method for gathering opinions and ideas from a variety of sources on performance requirements. This type of analysis is a crucial part of the process used to design effective training because the information gathered forms the basis for the design and development stages.

As such, the analysis stage focused on defining the problem or concern thoroughly and understanding it sufficiently in order to recommend appropriate solutions. During the analysis the task force focused on a thorough explanation of the problem that would result in appropriate recommendations. To that end the task force produced a description of the target audience/learners, an outline of the content that learners should be taught with specific objectives that indicate what learners must know and be able to do, clarification of the barriers related to solving the problem, and a review of existing educational materials.

Audience

To adequately describe the targeted audience—Emergency Medical Technicians (EMT Basic, Intermediate, Paramedic), emergency physicians, and emergency nurses—specific methods were used to gather detailed information about these professional groups. Methods for determining descriptions of each group in the targeted audience primarily included group interactions, interviews, review of material, and agreement by the task force. Information was gathered in stages, answering questions and incorporating new information as the process progressed. The task force considered relevant

distinctions and similarities among the groups to determine numbers, geographic distribution, job responsibilities (shared and unique), current levels of education, types of certification, training opportunities, and motivation and attitudes toward WMD/NBC-related training.

Content and Objectives

Based on the information gathered about the target audiences, a subject matter analysis was accomplished through interviews with task force members and others recommended by the task force about various topics identified as necessary for WMD/NBC-related training. Additional levels of detail were gathered from articles and existing materials and from subject matter experts on the task force. The analysis of the subject matter resulted in a detailed content outline that listed all of the major content categories and their related sub-topics.

During the process of writing the objectives, the task force organized the content into proficiency categories.[42, 43] Each category was defined by the level of performance or proficiency expected after mastery of the objectives. Three categories—awareness, performance, and planning—encompassed all of the content identified by the taskforce as required to respond effectively to a WMD event.

The awareness level of proficiency provides an overview of the issues and challenges related to preparing for and responding to WMD incidents. The key goal of this level is to introduce terms, issues, and basic domain knowledge so that this information is understood and remembered. The performance component provides in-depth, performance-based or application-oriented training designed to ensure that each audience group gains the skills and knowledge required to perform effectively during WMD-related incidents. The planning component provides a list of issues and topics to be considered by planning and management personnel who need to understand and be involved in devising cooperative plans for responding to WMD incidents. Objectives were not developed for the planning level, since planning level issues were not included in this contract.

With an in-depth understanding of the audience groups the task force used the content outline to write specific objectives for each level of proficiency—awareness and performance. Since the awareness level seeks to provide an overview of and introduction to the issues and challenges related to preparing for and responding to WMD incidents, remembering information is the key goal of learners at this level. However, at the performance level objectives were written to specify observable behaviors learners are to exhibit before they are considered competent. Performance objectives are meant to correspond closely to real-world performance or work requirements and specify the actions learners should be able to perform after training.

Barriers

The task force then identified barriers and challenges that must be addressed if training is to be successful. For each audience group, the situations, concerns, perceptions, and constraints were identified that if not addressed would undermine the acceptance and delivery of effective WMD-related training. These barriers were organized into three major groups for each audience with associated discussion provided for each barrier. The barrier groupings were: (1) barriers that would either prevent or make difficult the integration of WMD-specific content into primary education; (2) barriers that would prevent or significantly hinder the development and maintenance of effective WMD training materials; and (3) barriers that would prevent the acquisition of WMD skills/knowledge by those currently in practice, or limit the ability to sustain WMD skills/knowledge through continuing education, practice, and drills or exercises.

Curricula and Course Review

Continuing the needs analysis process, current curricula, educational programs and practical experiences, especially as they applied to training related to WMD incidents, were reviewed. Analysis

or review of existing data, such as curricula and course materials, provided information on the actual knowledge, skills, and attitudes that are characteristic of the education of targeted groups.

The formal curricula for initial and certification training that was examined covered the following educational experiences: the US DOT/NHSTA national standard curricula for EMT-B, EMT-I, and EMT-P training, medical school, emergency medicine residency training, nursing school, and emergency nursing. The focus of each review was to assess the current educational efforts regarding WMD specific content and to determine how to best integrate that content into the educational programs designed for each audience. The task force specifically considered: curriculum oversight and accreditation, content topics covered, practical experience included in the program, evaluation, certification, areas where integration might occur, and potential barriers to integration.

Another part of this extant data analysis involved the review of six prominent courses that were nationally available to some cross-section of the target audiences. They were:

1. Medical Response to Biological Warfare and Terrorism
2. Medical Response to Chemical Warfare and Terrorism
3. Medical Planning and Care in Radiation Accidents
4. Domestic Preparedness for Hospital Providers
5. Domestic Preparedness for EMS Technicians
6. Emergency Response to Terrorism: Basic Concepts

Each course was examined to determine the intent of the course, course sponsors, topics and objectives covered, types of practical experiences included, instructional and evaluation techniques used, and delivery methods employed. This review allowed the task force to better understand the types of WMD training currently offered. This review also served to cross check the content outline developed by the task force. With this information the task force could then determine how best to integrate WMD-specific content into educational programs specifically designed for each audience.

Recommended Strategies

By applying the systematic instructional design methodology the task force concluded its work with recommendations that were directed by the particular contract goals. These goals were: (1) identification of recommendations for integrating WMD content into initial and continuing education, (2) identification of recommendations for sustaining WMD knowledge and skills, and (3) specification of techniques to ensure continuing proficiencies. The following question was used to develop recommendations for each audience group: How do we go about building training that ensures that the levels of proficiency desired can be met within the accepted training models currently being used to educate the target audience groups?

The goals of integrating, sustaining and ensuring proficiencies in the knowledge and skills required to effectively respond to WMD events relate to three specific areas—initial acquisition, transfer, and retention. These three areas represent a process that results in effective changes of behavior that can be maintained over time despite the lack of daily application. However, the concept of transfer of learning from the instructional environment to the job context is complex.[44] To begin the process of transfer, a learner must first acquire the knowledge and skills required to produce the expected performance outcomes. Successful acquisition of knowledge and skills requires that sound instruction be provided for the learners. Thus, an effective instructional design process is a necessity. As such, instructional strategies that increase acquisition and transfer were incorporated into the recommendations of the task force.[45-47]

Another integral component of an effective instructional design process that is related to the acquisition and transfer of new knowledge and skills is evaluation. The task force considered evaluation not only to determine if learners have achieved the stated performance objectives but also

to decide whether the course or program was effective. This is technically referred to as formative and summative evaluation.[35]

The task force recognized that learner motivation and support are also variables that significantly affect the acquisition and transfer of knowledge and skills.[49] The task force, therefore, addressed the apparent lack of motivation concerning WMD education among learning audience groups in the recommended strategies. Concurrent with motivational issues, lack of support in terms of both administrative encouragement and assistance in the absence of proper equipment has been recognized as a barrier to the acquisition and transfer of WMD-specific content. Support issues were also addressed.

The task force recognized that the transfer of knowledge and skills to specific tasks should produce competent performance. Moreover, the performance must be retained not only immediately after the training, but also after a period of no practice. The task force agreed on three basic generalizations regarding retention: the level of retention is positively related to the level of learning at the end of the instructional event; retention decreases as the interval or layoff period increases; rehearsal of the competencies moderates skill loss during a layoff.[46] The task force incorporated these principles into its recommended strategies regarding sustainment of the levels of proficiency.

## Results

Audience

For each audience group, information was compiled into several common categories—numbers and location, basic level of training, certification requirements, continuing education, and selected major organizations, agencies, and boards. Overall, it is clear from these descriptions that although emergency health care personnel possess a strong foundation of knowledge and skills for taking WMD response training, little or no WMD-based expertise currently exists among the three audiences targeted by this contract.

### *Emergency Medical Technicians*

Emergency Medical Technicians comprise a large group (approximately 700,000) that is widely dispersed, located primarily around urban areas. Of the total number of Emergency Medical Technicians, a significant number are volunteers. Of the paid Emergency Medical Technicians, about one-half are employed by private companies and one-half work for local fire departments or other government agencies.

Background education for Emergency Medical Technicians ranges from GED to an associate's or bachelor's degree. Although there can be some variance from state to state, the EMS group is composed of three main levels (basic, intermediate, paramedic) beginning with EMT-Basic. For all three levels, EMT certification is awarded at the state level.

The National Highway Traffic Safety Administration (NHTSA), under the Department of Transportation (DOT), publishes the U.S. DOT National Standard Curricula, which specifies national guidelines for each level of EMT training. Certification is achieved by passing a written and practical examination either at the state level or the National Registry of EMTs. Continuing education requirements vary on a state-by-state basis. Emergency Medical Technicians are represented by a variety of professional groups as they lack one organization that represents the diverse nature of the profession. Instead, provider groups have developed their own associations and organizations.

WMD content is not a part of the educational process for the emergency medical technicians audience. However, Emergency Medical Technicians possess a framework of knowledge and skills into which additional WMD content could be inserted particularly at the paramedic level. This

framework is developed by virtue of widely accepted certification standards as specified in the US DOT National Standard Curricula, as well as other special certifications required in different regions. In addition, all Emergency Medical Technicians operate under the direct authority of a physician in the role of the system medical director. The medical director is responsible to provide protocols for all EMT levels and has the prerogative in most states to create "standards" by teaching and authorizing a different level of care.

***Emergency Physicians***

In hospitals across the US, there are approximately 5,000 emergency departments in which approximately 32,000 emergency physicians work. Of the physicians working in emergency departments, approximately 60% are trained and/or certified in emergency medicine and these physicians are primarily working in urban settings (with the largest percentage working in academic medical centers). Of the physicians not trained and/or certified in emergency medicine, approximately 75% are trained and/certified in another specialty – primarily family practice (32%) and internal medicine (28%).[50]

Although there is no set curriculum among medical schools, the Liaison Committee on Graduate Medical Education provides a list of essentials for accreditation that accounts for the similarity among medical school programs. However, at residency level, education is more uniform since the Residency Review Committee (RRC) in Emergency Medicine, whose members represent the AMA, ACEP, and ABEM, set the standards for and approves all residency programs in emergency medicine. Continuing education requirements are determined at the state level. The American College of Emergency Physicians and the Society of Academic Emergency Medicine primarily represent emergency physicians with other organizations representing smaller groups or interest groups.

For emergency physicians, WMD-related training is not part of the core content of medical school and only a small component of emergency medicine residency programs. However, an excellent foundation for training and management of WMD incidents is provided for emergency physicians through current emergency medicine residency programs. Non-residency trained emergency physicians also have a knowledge base that would lend itself to supplemental training in WMD incidents.

***Emergency Nurses***

There are approximately 90,000 emergency nurses practicing in the U.S. These nurses have completed basic nursing education that ranges from a nursing diploma to graduate-level degrees. Emergency nurse certification is voluntary and available through the Board of Certification for Emergency Nursing. Emergency nurses are represented by one main organization, the Emergency Nurse Association (ENA); however, the American Nurses Association (ANA) is considered to be the broad umbrella organization that focuses on professional and practice issues regardless of the clinical setting.

From initial nurse education through the educational path selected to reach the emergency nursing specialty, emergency nurses are provided no course work specific to WMD incidents. However, emergency nurses possess basic knowledge and skills that would allow them to add WMD training to their expertise.

<u>Content and Learning Objectives</u>

Based on levels of proficiency established by this task force, the following awareness and performance objectives were created. These were developed from the extensive list of WMD-related content areas that were delineated earlier in the process.

This group of objectives is meant to provide a framework into which new WMD-related issues and answers can be inserted. The order of presentation of these objectives is not intended as a recommendation for instructional presentation. The sections merely served as organizational units for creating a comprehensive list of objectives.

Because most training should be targeted toward the performance or application level that requires the learner to use the information the way it will be used on the job, the bulk of the WMD content is presented at the performance level. The awareness level is used to provide introductory information, domain familiarization, and motivation.

***Awareness Objectives***

The following is a condensed version of the awareness objectives from the final report:

*Terrorism*
- Definition
- Terminology
- Current threat potential
- Current level of preparedness

*Event Types*
- Threat agents
- Possible scenarios for each agent

*Index of Suspicion and Event Recognition*
- General indications of a terrorist attack
- Comparison of biologic attack with endemic disease
- Epidemiology and surveillance issues
- Incident identification and reporting
- Information sharing
- Activation of response

*Response Systems and Communications*
- Integration of health care professionals
- Roles of federal, state, and local agencies
- Integration of federal, state, and local agencies
- Incident command system
- Communication issues

*Key Elements of a WMD Response*
- Special preparedness and response needs of a WMD incident
- Mass casualty care issues
- Personal and scene safety issues
- Contamination, containment and security issues
- Decontamination indications and issues
- Psychological impact of an incident
- Issues and challenges of mass patient care
- Issues and challenges of fatality management
- Maintenance of regular health care services
- Characterize principles of effective response to a biologic, chemical, or radiological incident

*Personal Protection and Safety*
- Personal protection issues

- Secondary threats
- Personal protective equipment
- Personal behaviors and procedures

Note: Supporting materials would include a glossary and job aids, including one that provides general descriptions of each type of agent—nuclear, biological, and chemical.

***Performance Objectives***

The list of performance objectives is included. This list does not include the detailed discussion of each objective available in the final report.

*1.0 Event Recognition*
- Use surveillance systems.
- Recognize a possible terrorist attack.
- Report WMD-related information to the appropriate person(s).

*2.0 Unified Incident Command/Management Structure*
- Use a unified system of command

*3.0 Response Support*
- Provide the necessary logistical support for victim care, responders, and the response as a whole.

*4.0 Safety and Protection*
- Select and work effectively in personal protective equipment.
- Demonstrate behaviors that help ensure personal safety.

*5.0 Decontamination*
- Decontaminate victims at an incident site, medical facility, or other areas as needed.

*6.0 Isolation and Containment*
- Appropriately isolate and contain victims of each type of WMD event.

*7.0 Evidence Preservation*
- Use appropriate techniques for preserving possible evidence at an incident site or medical facility

*8.0 Psychological Effects*
- Prepare for, recognize, and treat the psychological impact of a WMD event on victims and health care professionals.

*9.0 Communication and Agency Interaction*
- Maintain and help facilitate effective communication during a WMD incident response.
- Interact effectively with appropriate agencies and organizations involved in responding to an incident.

*10.0 Triage*
- Perform effective triage of victims of specific types of WMD incidents involving a variety of agents.

*11.0 Treatment*
- Perform effective assessment, stabilization, diagnosis, and treatment of victims of specific types of WMD incidents involving a variety of agents.

*12.0 Transportation*
- Transport victims as required, considering potential contamination risks, resource shortages, and communication needs.

*13.0 Recovery Operations*
- Complete recovery operations, including reports and debriefings.

*14.0 Fatality Management*
- Appropriately handle human remains, addressing safety, psycho social, and forensic needs.

Barriers

The perception of the barriers to WMD training is largely shared among the three audiences; however, some differences exist. Although a number of barriers are included, it was generally agreed among the task force members that for all target audiences funding and time constraints are primary barriers to developing and implementing WMD response training. The order in which the barriers are presented does not indicate emphasis.

***Emergency Medical Technicians***

*Barriers that would either prevent or make difficult the integration of WMD-specific content into primary EMT education:*
- No single source of authority to require that WMD knowledge and skills become a part of EMT training
- Excessive time required to complete the process of revising US DOT National Standard curricula
- EMT curricula would have to expand to include new content, which increases training costs
- No "approved" body of content or curriculum exists on which to base course development

*Barriers that would prevent or significantly hinder the development and maintenance of effective WMD training materials for Emergency Medical Technicians:*
- Lack of funding for the development of comprehensive WMD content for EMT training programs or for continuing education courses, which includes research, writing, material development, procurement of equipment/supplies, faculty development, and pilot testing
- Lack of sponsoring organization to develop, deliver, and maintain WMD training

*Barriers that would: (1) prevent the acquisition of WMD skills/knowledge by those currently in practice, or (2) limit the ability to sustain WMD skills/knowledge for Emergency Medical Technicians through continuing education, practice, and drills or exercises:*
- Failure of those currently practicing to recognize this type of training as a priority for continuing education
- Failure of employers to recognize this type of training as a priority, which results in lack of employer support
- High turnover among Emergency Medical Technicians
- Inadequate funding to cover attendance costs (e.g., time off, tuition, travel)

***Emergency Physicians***

*Barriers that would either prevent or make difficult the integration of WMD-specific content into medical school curricula or into emergency medicine residency programs:*
- Existing medical school and emergency medicine residency program curricula are full and time is limited

- No "approved" body of content or curriculum exists on which to base WMD course or content development
- The need for training in knowledge and skills related to WMD response has not been broadly articulated and emphasized by national organizations
- No advocates have currently been identified (and equipped) to lobby for or influence the acceptance of WMD content as a priority for integration into existing medical school curriculum

*Barriers that would prevent or significantly hinder the development and maintenance of effective curriculum materials for integration into initial medical school/emergency residency education or continuing education:*

- Lack of funding for the development of comprehensive WMD content for medical school/emergency residency programs or for continuing medical education courses, which includes research, writing, material development, procurement of equipment/supplies, faculty development, and pilot testing
- Lack of a national clearing house or repository for the collection of related knowledge/skills to ensure consistency and quality, and minimize redundancy of effort
- Lack of established standard content literature, which increases the time required to develop curricula and course materials
- Difficulty of procuring adequate expertise to work on the development of curricula and course materials and to oversee content development, management, and revision
- Lack of an oversight group designated to assist in the development, management, and revision of curricula and course materials

*Barriers that would: (1) prevent the acquisition of WMD skills and knowledge by those emergency physicians currently in practice, or (2) limit the ability to sustain WMD skills and knowledge for emergency physicians through continuing medical education, practice, and drills or exercises:*

- Inadequate funding to cover attendance costs (e.g., time off, tuition, travel)
- Failure of hospital administrators to recognize this type of training as a top priority, which results in lack of broad hospital support
- Personnel shortages that make it impossible to cover positions open while people are being trained (issue of back-fill requires adequate personnel)
- Failure of emergency physicians to recognize a need for WMD education, particularly that this type of training is a top priority

***Emergency Nurses***

*Barriers that would either prevent or make difficult the integration of WMD-specific content into nursing school curricula or into emergency nursing education, including certification requirements:*

- Existing nursing school curriculum is full and time is limited
- No "approved" body of content or curriculum exists on which to base an emergency nursing course or content development
- No formal acceptance exists at the national level of the need to integrate WMD response training information into standard nursing curriculum or to develop a standardized continuing education course

*Barriers that would prevent or significantly hinder the development and maintenance of effective curriculum materials for integration into initial nursing education or continuing education:*

- Lack of funding for the development of comprehensive WMD content for nursing school or for continuing education materials/courses, which includes research, writing, material development, faculty development, and pilot testing

- Lack of a national clearing house or repository for collection of related knowledge and skills currently being developed to ensure consistency and quality, and minimize redundancy of effort
- Lack of established standard content literature, which increases the time required to develop curricula and course materials specific to the nursing role
- Difficulty of procuring adequate expertise to work on the development of curricula and course materials and to oversee content development, management, and revision
- Lack of oversight group designated to assist in the development, management, and revision of curricula and course materials

*Barriers that would: (1) prevent the acquisition of WMD skills/knowledge by those emergency nurses currently in practice, or (2) limit the ability to sustain WMD skills/knowledge for emergency nurses through continuing medical education, practice, and drills or exercises:*

- Inadequate funding to cover attendance costs (e.g., time off, tuition, travel, at continuing education conferences or workshops, etc.)
- Lack of perception by hospital administrators that this type of training is a top priority, which results in lack of broad hospital support
- Personnel shortages that make it impossible to provide coverage for positions while people are being trained (issue of back-fill that requires adequate personnel
- Lack of perception by nurses that there is a need for WMD education, particularly that this type of training is a top priority

Curricula and Course Reviews

***Curricula Reviews***

The task force investigated the existing curricula for training each of the target audiences at various levels (e.g., medical school and residency training). The final report addresses in detail the areas of curriculum review specifically considered for each audience. This summary presents only areas where WMD content might be integrated into the existing educational experiences for each audience group, as this information is most pertinent to the development of the recommended strategies.

*Emergency Medical Technicians*

WMD content seems to fit into several areas of the curriculum for each EMT level. For example, integration of content might occur in the following areas:

- Well-being of the EMT, including critical incident stress debriefing (CISD), scene safety and personal protection, proactive safety precautions (immunizations)
- Scene size-up, evaluation of a scene for potential hazards, number of patients, mechanism of injury or nature of illness
- Ambulance operations
- Communications
- Patient assessment
- Pharmacology
- Poisoning emergencies
- Overview of hazardous materials, incident management systems, mass casualty situations, and basic triage
- Medical and legal issues, preservation of crime scenes and evidence

All of the above topics are included in the EMT-B curriculum and then addressed in more detail and at higher levels of competency in the EMT-P curriculum. Additionally, toxicology, infection and communicable diseases, and psychiatric disorders, as well as rescue awareness and operations, hazardous materials operations, and crime scene awareness are included in the EMT-P

curriculum. The EMT-I curriculum does not appear to cover any type of disaster situations, scene safety, or personal safety.

*Emergency Physicians*

*Undergraduate Medical School Curriculum*

In the undergraduate medical school curriculum, integration of content might occur in the several areas within the typical medical school curriculum. For example, content related to the use of biological weapons could be integrated into infectious disease, epidemiology, and microbiology courses. Content related to chemical weapons could be incorporated into pharmacology, basic neurophysiology (nerve agents), and toxicology courses. Information about nuclear weapons might be included in immunology or toxicology courses. Clinical applications related to the WMD content could be incorporated into internal medicine, family medicine, surgery, and emergency medicine clerkships.

*Emergency Medicine Residency Curriculum*

WMD objectives seem to fit into several areas of the core content in emergency medicine, including the following: content related to the management of multiple casualties from WMD could be integrated into disaster medicine, content related to chemical weapons could be incorporated into clinical pharmacology and toxicology, and information about the effects of biologic weapons could be included into toxicologic disorders, systemic infectious disorders, and thoracic respiratory disorders.

WMD material could also be further emphasized in the residency training program during EMS activities such as didactic lectures as well as prehospital experiences.

Finally, opportunities for bedside clinical teaching occur on a daily basis whenever patients exposed to hazardous materials or other chemicals present to the ED or when such events as the annual influenza epidemic occur. These situations provide an opportunity to expand the educational discussions that occur in the emergency department to include specific WMD topics and content which in many ways are related.

*Emergency Nurses*

*Nursing School Curriculum*

There are several content areas that are amendable to specific WMD content. Most schools of nursing include Responding to Mass Casualty Situations as a lecture topic. This is the most logical integration point because the content is under control of the nursing school. Students also receive related content in courses such as microbiology and epidemiology; however, programs outside of the nursing school usually teach these courses. It would be more difficult to integrate material into these types of courses.

*Emergency Nurse Curriculum*

Based on the content outline for the certified emergency nurse examination, WMD content identified by the task force appears to fit into several emergency nursing content topics. Relationships could be made in clinical pathophysiology, patient care management, especially in the disaster subsection, environment and toxicology, and shock and multi system trauma.

WMD content, at an awareness level, also could be woven into the course content of Trauma Nurse Core Curriculum, Course in Advanced Trauma Nursing and Emergency Nurse Pediatric Course. Primarily the Trauma Nurse Core Curriculum would be the most natural fit for WMD content integration.

Importantly, the new edition of the Emergency Nursing Core Curriculum, published by ENA, includes a section on weapons of mass destruction—nuclear, biological, and chemical—within the chapter on disaster preparedness and disaster management. The new section includes the following topics: overview of biochemical hazardous material contamination, radiation contamination, chemical contamination, biological contamination, viral contamination, and toxins. The disaster chapter also contains a section on testing or exercising disaster preparedness.

***Course Review***

The review of the six courses revealed a range of delivery methods and WMD content emphases. In general, it was observed that: no one course encompassed of all the objectives developed by this task force; some of the courses target only a specific area of content; some provide information at the awareness level only; and no one course addresses the learning needs of all three audiences but rather they focus on a specific audience.

The course reviews also served to validate the content outline developed by the task force.

***Recommended Strategies***

The task force recommends the following strategies for integrating WMD-specific content into both the didactic and experience-based training and credentialling programs of each of the three audiences, emergency physicians, emergency nurses, and Emergency Medical Technicians, as well as for sustaining appropriate levels of proficiency in WMD knowledge and skills. Each strategy is based on the results of the needs analysis and review of existing courses and curricula related to the targeted audiences. In the final report, recommendations are supplemented with a discussion of advantages and disadvantages of the recommended strategies, as well as suggestions for implementation. The importance of advocates for the recommended strategies and possible timeframes are also discussed.

Each audience group needs a specific approach to achieve the appropriate levels of proficiency. Although there is some overlap among the solutions offered, the recommendations are based on each audience group's specific characteristics, professional needs, and training environments. By recommending solutions or approaches tailored for each of the target audiences, training is more likely to result in the acquisition and sustainment of the knowledge and skills needed to respond effectively to WMD events.

*Recommendations for Emergency Medical Technicians*

*WMD Training for initial EMT Training—Basic, Intermediate, and Paramedic*

1. Develop course materials covering the WMD awareness and performance objectives.
2. Work with professional organizations to promote WMD awareness and performance-level courses.
3. Work with professional organizations to promote direct integration of the WMD content into the standard curricula for all Emergency Medical Technicians.

*Sustainment of WMD Education for All EMTs*

WMD training cannot be effectively and efficiently provided to all levels of EMTs—both in training and practicing—until a WMD stand-alone course developed for use in initial training can also be used for practicing EMTs who have completed initial training and certification.

4. Offer WMD training to all Emergency Medical Technician students as continuing education.
5. Develop a regularly updated refresher course, using both self-study and instructor-led formats.

*Recommendations for Emergency Physicians*

*WMD Training for Medical Students*

1. Develop a technology-based, self-study program covering the awareness objectives.
2. Work with professional organizations to promote direct integration of the WMD awareness objectives into medical school curricula.

The intent of introducing WMD-specific training materials into the curricula of the nation's medical schools is to provide an introduction and overview of the topics to all medical students regardless of the specialty they ultimate choose for residency training and practice.

*WMD Training for Emergency Medicine Residents*

3. Develop a set of teaching and learning materials for all emergency medicine residency programs.
4. Work with professional organizations to promote direct integration of the WMD performance objectives into the emergency medicine core content.

The most appropriate approach for WMD training within emergency medicine residency programs is to provide residents with instruction at the performance level of proficiency.

*Sustainment of WMD Education for Practicing Emergency Physicians*

5. Develop a self-study program that includes both the awareness and performance objectives for emergency physicians who are currently in practice.
6. Develop regularly updated self-study programs for continuing medical education credit.
7. Develop instructor-led materials for continuing medical education credit.

Two issues are related to suggestions for maintaining current skills and knowledge in this content area. First, emergency physicians currently in practice need to have opportunities to gain skills and knowledge to effectively respond to WMD events. Second, because integration of WMD-related knowledge and skills will take several years and the level of integration will vary throughout the country, supplementary experiences and courses may be needed until medical students and residents complete their training programs with the desired levels of proficiency.

*Recommendations for Emergency Nurses*

*WMD Training for Undergraduate Nursing Education*

1. Develop a technology-based, interactive, self-study program for all nursing schools.
2. Work with professional nursing education organizations to promote direct integration of the WMD awareness objectives into nursing education curricula.

An overview of WMD content at the awareness level of proficiency should be provided to all nursing students no matter what type of specialty nursing they might choose for further training.

*WMD Training for Emergency Nurses*

3. Develop a continuing education course covering the WMD performance-level objectives for all emergency nurses.

Emergency nurses need not only a basic knowledge of the nature of WMD events, but also knowledge and skills relating to the care and treatment of WMD casualties. Thus, it is important that

WMD knowledge and skills are provided to emergency nurses at the performance level of proficiency.

*Sustainment of WMD Education for Emergency Nurses*

4. Develop self-study and instructor-led continuing education programs.
5. Work with professional organizations to promote integration of the WMD content into established hospital training programs.

*Time Frames for Implementation of WMD Content into Existing Curricula*

Given the time required to design and develop a sophisticated, interactive technology-based program to provide WMD-specific content to EMT, medical, and nursing students and their faculty, the time frame for implementation of the program would be approximately 12 to 24 months.

A time frame to accomplish formal integration of WMD content into EMT, medical, and nursing school curricula is difficult to estimate. However, it would most likely take many years for formal integration to become a reality.

**Discussion**

Based on the front-line role required of emergency medical personnel in the event of a terrorist attack, the task force believes that WMD training for out-of-hospital and hospital-based health care providers should be made integral to their basic or formative education. Due to the rapidly expanding information in this area and the issues of skill retention WMD training must also be integrated into their continuing education experiences. To that end, this task force sought to develop guidelines against which previously developed courses and also future training efforts can be measured and developed.

One of the most critical elements of this process is to identify and analyze specific learner needs for WMD training in order to produce a list of performance-based learning objectives that is both comprehensive and relevant to particular job demands. Examining specific learner requirements and using these to produce objectives that are directly related to expected performance ensures that the training based upon these objectives will prepare learners to perform the identified tasks successfully. [38-41] Each audience group should be trained relative to their particular job responsibilities and anticipated levels of involvement. This would result from employing a methodology that produces comprehensive and relevant performance-based learning objectives appropriate for each training audience.

An important characteristic of the instructional design methodology is the integrated and interdependent process that is used to ensure that instructional objectives and strategies meet the identified training need. Thus, the high-level design strategies discussed in the recommendations were formed after an involved examination of the objectives as well as the other results of the analysis, including audience descriptions, barriers, existing curricula and training formats.

It is suggested that recommended strategies be implemented by a multidisciplinary oversight panel of content experts, educational specialists, and representatives of major professional organizations representing each of the three audience groups. The oversight panel would be tasked with the responsibility for the consistency, quality, and updating of the products developed. Additionally, the oversight group would work to establish partnerships with organizations and institutions to assist with the implementation of the recommendations discussed in this report. To support the work of the oversight group, a national clearinghouse or repository should be established to collect relevant information, including articles, books, reports, research, instructional materials, and other media. The multi disciplinary oversight group is discussed as an integral part of each development recommendation for each of the target audiences.

As an integral part of the process of designing and developing WMD training materials, a formal plan for evaluating each product should be established and managed by the oversight panel. The formative evaluation process will consist of regular reviews of content materials and methods by subject matter experts, educational specialists, and representatives of the target audience groups to make certain that each course or program meets the identified objectives, content requirements, audience needs, and methodology. Pilot tests should be held and revisions made based on the findings. Before final implementation of each product, a summative evaluation process should be planned. This would provide a means for assessing the courses, programs, and other recommendations after specific periods of time or after specific goals have been met. The summative evaluation would collect and analyze participant and faculty feedback as well as scores from assessments and other pertinent data. Evaluation would be based on documented training outcomes as well as subjective assessments. This process would be an important part of determining the effectiveness and success of each effort with the emphasis on providing practical and high-quality training to all members of the target audiences.

An important overarching strategy to support the proposed recommendations is to work with national organizations and associated groups to increase all health care professionals' understanding of the necessity of WMD education. It is necessary for national, state, and local organizations or institutions to incorporate WMD topics as part of their research, publications, and conference agendas. Only by communicating through multiple channels the message that WMD education is necessary will this topic gain the level of importance needed to ensure that all health care professionals are well prepared.

To ensure that all emergency health care providers are prepared to effectively respond to WMD events, WMD content should be incorporated into all levels of training, including initial or undergraduate education and credentialling or certification. Training opportunities should encompass both awareness and performance levels of proficiency. Because WMD knowledge is rapidly changing, additional opportunities or activities need to be provided so that health care providers can maintain their levels of proficiency. Refresher courses coupled with participation in regular drills or exercises should help keep the target audiences prepared to respond effectively to a WMD event.

It is imperative that WMD training is formally incorporated into the educational curricula.[21, 22,24,29,30] Augmenting the knowledge and skills of emergency health care professionals accomplishes several goals. Integrating new information into professionals' existing knowledge bases and everyday practices will serve to facilitate the process by which new information is learned and retained.[51-54] The practice of situating or anchoring new knowledge and skills within a context related to the desired performance moves learning from "know what" to "know how."[41] By integrating WMD planning and preparation into current disaster response plans and public health capabilities, the potential problem of creating a rarely used divergent system that is ineffective at best and harmful at worst can be avoided. In addition, expanding and improving current response, surveillance, and diagnostic systems will also serve to increase the medical community's ability to respond to other public health crises, such as those involving hazardous material accidents and infectious disease outbreaks.[32, 33,52]

Potential barriers to the successful implementation of training are an important consideration when proposing educational strategies. Equally as important, the involvement and oversight of key medical experts and professional groups must be an integral part of WMD training design, development, and delivery. Allocating adequate health care expertise to WMD training content development helps ensure the content is accurate, thorough, and up to date. Support from key professional organizations that represent each audience group lends credibility to the value of training. That type of professional peer support also facilitates opportunities for training and provides a voice of advocacy for integrating new WMD content into existing educational experiences.

There are numerous limitations to consider during the process of completing this contract. It was the opinion of the task force educational consultants that the application of the instructional design methodology as the technique for accomplishing this contract's objectives was considered the most effective technique for obtaining the outcomes required. However, there may be other methodologies that might be of some benefit. Inherent in the application of the instructional design methodology was the consensus process utilized by the task force. Task force representatives were nominated by their parent organizations based on their expertise and interest in the area of WMD training. These representatives provided base line information for their groups as well as opinions and ideas during the entire process. If the representatives were in fact not experts in the WMD training arena or were not knowledgeable regarding their groups' interest and endeavors in WMD training then there exists a potential flaw.

The instructional design process is iterative emphasizing continuous formative evaluation through the review and use of information gathered or decisions made in previous steps. This methodology can therefore be limited by incorrect information obtained during each step of the process as that information is an integral part of the next step of the process. For example, if the audience is not adequately described or analysis of the subject matter curriculum currently available is not adequate, then the next steps in the process culminating in the recommendations are flawed. Careful attention was paid to each step of the process because of the understanding of this potential limitation. Another potential limitation is the fact that only six prominent courses were selected to review. Other courses may be available or have recently become available which may cause the task force to rethink their opinions on the current educational efforts regarding WMD training offered. The question used to develop the recommendations for each audience group centered on building training that ensures the level of proficiency within the accepted training models currently being used to educate the target audience groups. The task force felt that the recommendations would be most acceptable to the audiences if they were integrated within the educational process currently used. It is conceivable, however, that new training strategies may need to be devised to most effectively educate the target audience groups.

The task force also acknowledges that the objectives do not apply equally to all emergency physicians, emergency nurses, and Emergency Medical Technicians. Subsequent course development will require a thorough front-end analysis that will delineate the appropriate content and level for the targeted audience group. At that point, content related to each objective will be tailored appropriately to meet specified learning needs. In addition, even though these objectives were purposely written in generic terms, the overarching intent and recommendation of this task force is that the objectives be customized to the local setting where needs, resources and procedures will vary.

A broad, long-term view of WMD training must be taken to avoid a quick fix approach that may foster a false sense of security. In the opinion of this taskforce, effective WMD training must be a long-term effort because the need for training is ongoing. For example, knowledge and skills must be reviewed, practiced, and kept up to date as information and practices change. Training, therefore, should be designed to integrate WMD medical response content into existing education, provide learning opportunities for those already in practice, and ensure the availability of current materials and refresher learning experiences for all.

In conclusion, to be successful WMD response training must meet the needs of a large, diverse audience, providing them not only awareness-level knowledge, but also skills that can be practiced, demonstrated, and maintained. By focusing on performance requirements in developing objectives for various audience groups, this task force sought to produce a guide that would accurately represent the content essential for effective health care response training. When integrated into standardized educational experiences, this content can be adaptable for meeting local training

needs. It is the hope of the taskforce, as documented and summarized in this report, that WMD response content will become an integral part of the education and subsequent knowledge base of emergency health care professionals.

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# List of Acronyms

| | |
|---|---|
| AACN | American Association for Colleges of Nursing |
| AAMC | Association of American Medical Colleges |
| ABEM | American Board of Emergency Medicine |
| ABMS | American Board of Medical Specialties |
| ACEP | American College of Emergency Physicians |
| ACGME | Accreditation Council for Graduate Medical Education |
| ACLS | Advanced Cardiac Life Support |
| ACMT | American College of Medical Toxicology |
| ACOEP | American College of Osteopathic Emergency Physicians |
| ACS | American College of Surgeons |
| AEP | Association of Emergency Physicians |
| AFL-CIO | American Federation of Labor and Congressional Industrial Organization |
| AMA | American Medical Association |
| ANA | American Nurses Association |
| AOBEM | American Osteopathic Board of Emergency Medicine |
| AORN | Association of Operating Room Nurses |
| APLS | Advanced Pediatric Life Support |
| ATLS | Advanced Trauma Life Support |
| BCEN | Board of Certification for Emergency Nursing |
| BJA | Bureau of Justice Assistance |
| BLS | Basic Life Support |
| BTLS | Basic Trauma Life Support |
| CAAHEP | Commission on Accreditation of Allied Health Education Programs |
| CATN | Course in Advanced Trauma Nursing |
| CCNE | Commission on Collegiate Nursing Education |
| CCRN | Critical Care Registered Nurses |
| CDC | Centers for Disease Control and Prevention |
| CE | Continuing Education |
| CEN | Certified Emergency Nurse |
| CGME | Council for Graduate Medical Education |
| CISD | Critical Incident Stress Debriefing |
| CISM | Critical Incident Stress Management |
| CME | Continuing Medical Education |
| CPR | Cardiopulmonary Resuscitation |
| CRA | Community Research Associates |
| DHHS | Department of Health and Human Services |
| DOD | Department of Defense |
| DOE | Department of Energy |
| DOT | Department of Transportation |
| ECG | Electrocardiogram |
| ED | Emergency Department |
| EMD | Emergency Medical Dispatchers |
| EMT | Emergency Medical Technicians |
| EMT-B | Emergency Medical Technician Basic |
| EMT-I | Emergency Medical Technician Intermediate |
| EMT-P | Emergency Medical Technician Paramedic |
| EMS | Emergency Medical Services |
| ENA | Emergency Nurses Association |
| ENPC | Emergency Nurse Pediatric Course |

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|---|---|
| EPA | Environmental Protection Agency |
| FBI | Federal Bureau of Investigation |
| FDA | Food and Drug Administration |
| FEMA | Federal Emergency Management Agency |
| FLEX | Federal Licensing Examination |
| GED | General Equivalency Diploma |
| HAZMAT | Hazardous Materials |
| HHS | Department of Health and Human Services |
| IAFC | International Association of Fire Chiefs |
| IAFF | International Association of Fire Fighters |
| ICS | Incident Command System |
| IDSA | Infectious Disease Society of America |
| IV | Intravenous |
| JCAHO | Joint Commission on Accreditation of Health Care Organizations |
| JRCEMT-P | Joint Review Commission on Educational Programs for the EMT-Paramedic |
| LCME | Liaison Committee of Medical Education |
| MD | Medical Doctor |
| MMST | Metropolitan Medical Strike Team |
| NAEMSP | National Association of EMS Physicians |
| NAEMT | National Association of Emergency Medical Technicians |
| NALS | Neonatal Advanced Life Support |
| NASEMSD | National Association of State EMS Directors |
| NBC | Nuclear, Biological, Chemical |
| NBME | National Board of Medical Examiners |
| NCLEX | National Council Licensure Examination |
| NDMS | National Disaster Medical System |
| NDPO | National Disaster Preparedness Organization |
| NFA | National Fire Academy |
| NFPA | National Fire Protection Association |
| NHTSA | National Highway Transportation Safety Administration |
| NLNAC | National League for Nursing Accrediting Commission |
| NOLF | Nursing Organizations Liaison Forum |
| NREMT | National Registry of Emergency Medical Technicians |
| NTIS | National Technical Information Service |
| OEP | Office of Emergency Preparedness |
| ORISE | Oak Ridge Institute for Science and Education |
| PHTLS | Pre-Hospital Trauma Life Support |
| PHTN | Public Health Training Network |
| OSHA | Occupational Safety and Health Administration |
| PALS | Pediatric Advanced Life Support |
| PDD | Presidential Decision Directives |
| PGY | Post Graduate Year |
| PPE | Personal Protective Equipment |
| RDS | Role Delineation Study |
| REAC/TS | Radiation Emergency Assistance Center/Training Site |
| RN | Registered Nurse |
| RRC | Residency Review Committee |
| SAEM | Society of Academic Emergency Medicine |
| TNCC | Trauma Nurse Core Curriculum |
| TNS | Trauma Nurse Specialist |
| U.S. DOT | United States Department of Transportation |
| USMLE | United States Medical Licensing Examination |

| | |
|---|---|
| USAMRICD | United States Army Medical Research Institute of Chemical Diseases |
| USAMRID | United States Army Medical Research Institute of Infectious Diseases |
| WMC | Weapons of Mass Casualty |
| WMD | Weapons of Mass Destruction |
| WME | Weapons of Mass Effect |

# Introduction

**Rationale**

Weapons of mass effect (WME) are those nuclear, biological, chemical, incendiary, or conventional explosive agents that pose a potential threat to health, safety, food supply, property, or the environment if employed. The terrorist use of WME is widely believed to be a significant threat to our society.[1-8] Other terminology is used to describe such agents, such as "weapons of mass destruction" (WMD), "weapons of mass casualties" (WMC), or "nuclear, biological, and chemical weapons" (NBC). It is the opinion of this task force that WME is a more appropriate descriptor, because not all agents, particularly the biologicals, would result in the type of "mass destruction" commonly associated with battlefields, yet they could create physical, psychological, and economic devastation. However, in this report, the term WMD will be used instead of WME because of its current wide acceptance.

**Congress has recognized the threat by passing legislation to fund training for the enhancement of domestic preparedness (Defense Against Weapons of Mass Destruction Act of 1996, and the more commonly known Nunn-Lugar-Domenici amendment of 1997).[9] In addition, a number of presidential decision directives (PDDs) have addressed the potential threat. For example, in 1995, PDD 39–US Policy on Counter-Terrorism specified the roles of specific government agencies in both the crisis and consequence management phases of a terrorist incident.[10] In 1998, PDD 62–Combating Terrorism (Protection Against Unconventional Threats to the Homeland and Americans Oversees) and PDD 63—Critical Infrastructure Protection, called for improving national response capabilities through such efforts as local, regional, and national planning; procurement of specialized equipment and pharmaceuticals; and enhanced surveillance, research, and development.[6,11,12] President Clinton's February 1999 announcement of a $10 billion budget initiative directed at defending against terrorism involving WMD and cyber attacks further underscores the emphasis being placed on preparedness.[13]**

For any observer of current events, the reality of the US terrorist threat is accentuated by reports of failed attempts, numerous anthrax hoaxes,[3,7,8] and actual attacks, such as the inoculation of Salmonella into Oregon salad bars in 1984,[14] the New York Trade Center bombing in 1993,[15] the release of Sarin in Japan in 1994[16] and again in 1995,[17] the Oklahoma City bombing in 1996,[18,19] and the US Embassy bombings in Kenya and Tanzania in 1998.[20] Although the potential for a successful chemical or biological terrorist attack may be remote when compared to other known health crises, the catastrophic nature of such an event demands that the medical community be prepared. This is particularly true for a potential biological event where deadly agents (e.g., anthrax) are relatively accessible, where a small amount of a bacteria or toxin can produce a disproportionate number of victims, and where disease can spread from person to person (as in smallpox) and cause increasing numbers of casualties as the attack remains undetected for days or weeks.[21-25] Unless such an attack is announced, the local health care system, especially hospital EDs, will be the first and most critical line of defense for detection, notification, rapid diagnosis, and treatment. Whereas emergency medical services (EMS) providers will be among the first responders to a chemical incident, ED personnel will become the "first responders" to a covert biological attack.[21,26,27]

Local civilian medical systems, both out-of-hospital and in hospital, comprise the critical human infrastructure that will provide the early event recognition and early response mobilization necessary for minimizing the devastation of a WMD incident.[3,27,28] Federal support will be essential in the event of an attack, providing advanced laboratory diagnostics, trained medical response teams, and other specialized resources. However, the local medical and public health system will have to be relatively self-sufficient for hours to even several days. The best defense in reducing casualties will be the ability of medical and public health personnel to recognize symptoms and to provide rapid clinical and epidemiologic diagnosis of an event.[29,30] Integrating the potential for a terrorist attack into

routine patient assessment requires that health care providers (1) be well informed regarding potential biological, chemical, and nuclear agents, (2) possess a heightened index of suspicion, (3) have the ability to identify possibly unusual disease patterns or clinical findings, and (4) know how to practice appropriate surveillance and reporting.[29]

Another critical response element is the ability of medical personnel to protect themselves, which, in turn, protects the nation's medical facilities and resources. On-scene EMS providers will be at risk for secondary contamination following a terrorist attack. Further, they may unknowingly transport contaminated victims to the hospital. Moreover, since it is likely that hospitals will receive "walk-in" patients who have bypassed field decontamination,[31] practiced skills in the use of personal protective equipment and safety protocols related to a biological, chemical, or radiologic event will be critical. Mass patient decontamination and triage both out-of-hospital and at the hospital (where appropriate) also present new learning challenges.[32,33]

In response to a WMD incident, health care personnel will be called upon to manage unprecedented numbers of casualties in an environment of panic and fear that accompanies terrorism. Part of this process includes the identification of and response to psychological stresses and effects within the patient population, as well as within the medical responder community.[34]

Another element essential to an effective WMD response involves the successful integration of hospital and out-of-hospital communities with state and federal agencies. Communication, coordination, and command are as critical in a potential WMD event as in other disaster incidents.[35] Training can be instrumental in raising awareness about the need for coordination among systems, providing opportunities to practice vital communication functions through drills or scenarios, and building cooperation between patient care priorities and forensic investigation needs.[36] Essential to communication and successful interaction is a common command and control structure, such as the Incident Command System (ICS),[33,37] which is commonly used among EMS personnel but is less known in the hospital setting.

Although the task force recognizes that integrative efforts targeted at providing seamless patient care from the prehospital to the hospital setting must involve key individuals such as hospital administrators, local and state emergency planners, law enforcement, poison center personnel, laboratory workers, industry, public health officials, safety officers, and other medical specialists, the training needs of such individuals are not further addressed here.[38-40]

This task force believes that an effective domestic response system to WMD terrorism must be built on a foundation of knowledgeable, trained, and practiced health care professionals at the local level. Yet the health and medical community, specifically nurses and physicians, have not been the target of most federal resources allocated for WMD education, training, equipment, or research. As a result, we also believe that adequate training or educational experiences that sufficiently address the full range of knowledge and skills required, attend to specific audience needs, and thus allow most civilian emergency medical professionals to become appropriately prepared are not yet available.

**Contract Process**

As part of an initiative to develop an overall plan for providing, sustaining, and monitoring appropriate WMD-related educational experiences, the Department of Health and Human Services Office of Emergency Preparedness contracted with the American College of Emergency Physicians (ACEP) to develop the strategies required to prepare emergency medical personnel—specifically EMS providers, emergency physicians, and emergency nurses—to respond to WMD incidents. This process relied on a task force of individuals from key professional organizations that represent both potential audience and advocacy groups. (A complete list of task force members is located at the beginning of this document.)

The contract process was an iterative one, composed of two phases. The first phase began with information gathering regarding the need for training and the audience characteristics, which facilitated the delineation of potential barriers and challenges, as well as the development of high-level educational strategies. The second phase built on these findings and focused on the following elements: review of existing educational curricula and specified courses, development of educational goals and objectives, and recommendations for integrating WMD content into the educational processes of EMS providers, emergency physicians, and emergency nurses. Along with recommending strategies for incorporating WMD content into existing programs, the task force proposed techniques for sustaining the proficiencies of WMD-related knowledge and skills for the specified audience groups.

To accomplish these tasks effectively, the task force applied a systematic instructional design process, combined with a consensus development approach. A consensus approach was selected to give each audience group represented full participation in the process. The instructional design methodology or process provided a set of guidelines for information gathering and decision making.[41-44] As part of the instructional design process, a needs analysis was employed to identify and clearly define the training need, which, in turn, helped formulate solutions. (For further discussion of the methodology used in this contract process, see Appendix—Methodology.)

**Critical Assumptions of the Task Force**

**Based on the front-line role required of the emergency medical personnel in the event of a terrorist attack, the task force believes that WMD training for out-of-hospital and hospital-based health care providers should be made integral to their basic or formative education and remain a part of their CE experiences. To that end, this task force sought to develop guidelines against which previously developed courses and future training efforts can be measured and developed.**

One of the most critical elements of this process is to recognize and analyze specific learner needs for WMD training and to produce a list of performance-based learning objectives that is both comprehensive and relevant to particular job demands. Examining specific learner requirements and using these to produce objectives that are directly related to expected performance ensures that the training based on these objectives will prepare learners to perform the identified tasks successfully.[45-47] Each audience group should be trained relative to anticipated levels of involvement and particular job responsibilities. This would result from employing a performance-oriented methodology that produces comprehensive and relevant performance-based learning objectives appropriate for each training audience.

Not only will effective WMD medical response require new knowledge and skills, but it is imperative that WMD training be formally included in the current emergency health care infrastructure.[6,30] Augmenting existing response systems and extending the current knowledge and skills among emergency health care professionals accomplishes several goals. Integrating new information into professionals' existing knowledge bases and everyday practices will serve to facilitate the process by which new information is learned and retained.[48-52] The practice of situating or anchoring new knowledge and skills within a context related to the desired performance moves learning from "know what" to "know how."[48,52] Expanding and improving current response, surveillance, and diagnostic systems will also serve to increase the medical community's ability to respond to other public health crises, such as those involving hazardous material accidents and infectious disease outbreaks. In addition, by integrating WMD planning and preparation into current disaster response plans and public health capabilities, the potential problem of creating a rarely used divergent system that is ineffective at best and harmful at worst can be avoided.

Potential barriers to the successful implementation of training are an important consideration when proposing strategies to effectively implement training. Equally as important, the involvement and oversight of key medical experts and professional groups must be an integral part of WMD training design, development, and delivery. Allocating adequate health care expertise to WMD training content development helps ensure the content is accurate, thorough, and up to date. Support from key professional organizations that represent each audience group lends credibility to the value of training. That type of professional peer support also facilitates opportunities for training and provides a voice of advocacy for integrating new WMD content into existing educational experiences.

A broad, long-term view of WMD training must be taken to avoid a quick fix approach that may foster a false sense of security. In the opinion of this taskforce, effective WMD training must be a long-term effort because the need for training is ongoing. For example, knowledge and skills must be reviewed, practiced, and kept up to date as information and practices change. Training, therefore, should be designed to integrate WMD medical response content into existing education, provide learning opportunities for those already in practice, and ensure the availability of current materials and refresher learning experiences for all.

To be successful, WMD response training must meet the needs of a large, diverse audience, providing them not only awareness-level knowledge, but also skills that can be practiced, demonstrated, and maintained. By focusing on performance requirements in developing objectives for various audience groups, this task force sought to produce a guide that would accurately represent the content essential for effective health care response training. When integrated into standardized educational experiences, this content can be adaptable for meeting local training needs. It is the hope of the task force, as documented and summarized in this report, that WMD response content will become an integral part of the education and subsequent knowledge base of emergency health care professionals.

# Needs Analysis

The needs analysis is the first phase of the instructional design methodology. The purpose of this phase is to thoroughly define the problem so that recommendations can be made for a solution. An effective training needs analysis is built around a set of techniques and tools for examining and understanding performance problems or requirements, as well as any new methodology or content in which people must be trained. It is a crucial part of the training design effort because the information gathered during this process forms the basis for the design and development phases.

The outcomes of this training needs analysis include a description of the target audience, the clarification of barriers related to solving the problem, and a review of existing educational material, including curricula and available courses.

## AUDIENCE DESCRIPTIONS

Describing the characteristics of each of the audiences identified by this contract—EMS providers, emergency physicians, and emergency nurses—was an important part of understanding and determining training needs. For each audience group, information was compiled into several common categories—numbers and location, basic level of training, certification requirements, CE, and selected major organizations, agencies, and boards. A follow-up discussion is included that summarizes each audience group's current level of preparedness for a WMD response.

Overall, it is clear from these descriptions that although emergency health care personnel possess a strong foundation of knowledge and skills for taking WMD response training, little or no WMD-based expertise exists among the three audiences targeted by this contract.

### EMS Providers

Numbers and Location

There are approximately 711,472 EMS providers in the United States, primarily clustered around urban areas. This number does not include emergency medical dispatchers (EMDs) and other EMS first responder licensed personnel, like emergency responders (American Red Cross) and first responders (Department of Transportation (DOT)). Following is a description of the three emergency medical technician levels as specified in the 1994 revision of the US DOT National Standard Curriculum, along with an approximate breakdown by percentage for each (Emergency Medical Services: The Journal of Emergency Care, Rescue and Transportation, December 1998.27:12):

76% EMT-Basic (EMT-B, formerly EMT-A [ambulance])

8% EMT-Intermediate (EMT-I) The EMT-I is a level of training between basic and paramedic and generally has more training in assessment than the EMT-B. Most are trained to use IV and, advanced airway therapy and administer a limited number of medications.

16% EMT-Paramedic (EMT-P) The EMT-P is the most advanced out-of-hospital level EMS provider and has advanced assessment skills, is trained in many advanced invasive intervention, and can use many medications, IV solutions, and other advanced treatments.

In addition to these three levels, some states have specified additional levels between EMT-B and EMT-P.

Among EMS providers there is a wide variety among employment settings. Most employment types fall into one of the following five major categories: (1) fire-based services—where EMS providers are part of the local fire service; (2) private companies—where EMS providers operate under commercial contract with local governments; (3) third services—where EMS providers

form a third service discrete from fire or police; (4) volunteer-based services—where EMS providers provide emergency medical services without compensation, and 5) hospital-based services—where EMS providers operate under a local or regional hospital.

Of the total number of EMS providers, a significant number of them are volunteers. Of all paid EMS providers, about one half are employed by private companies and one half work for local fire departments or other government agencies.

Primary Levels of Education and Certification

Background education for EMS providers range from GED to an associate's or bachelor's degree. Although there can be some variance from state to state, the EMS group is composed of three main levels (basic, intermediate, paramedic) beginning with EMT-Basic. For all three levels, EMT certification is awarded at the state level.

The National Highway Traffic Safety Administration (NHTSA), under the DOT, publishes the US DOT National Standard Curricula, which specifies national guidelines for various levels of EMT training.

***EMT-Basic (EMT-B)***

To become certified at the basic level, one must complete a 110-hour didactic course and a minimum of 10 practice hours.

In the past, EMT-Bs were not allowed to provide any invasive treatment. However, the new EMT-B curriculum developed by NHTSA, distributed in 1994 and since adopted by each of the states and territories, allows for the administration of several medications, including subcutaneous epinephrine, nebulized albuterol, and sublingual nitroglycerin; defibrillation using an automated external defibrillator; use of advanced airway techniques or procedures; and in some states, use of the technique of endotracheal intubation.

The EMT-B curriculum includes lectures, participation in practical skill sessions, and independent study. Clinical experience is also required and may be accomplished by riding on EMS units, observing EDs, observing physician offices, and interacting with a least five patients as part of the training program.

Certification usually requires a written examination and demonstration of skill competency. The certification process varies by state. Approximately 40 states utilize the NREMT as a part of their certification or licensure process. Most states require some form of recertification and the NREMT requires reregistration every two years. For EMT and paramedic recertification, CE may be required for the personnel to ensure they still possess the knowledge and skills necessary to function safely and effectively.

***EMT-B Core Curriculum***

The EMT-B curriculum covers major content topics such as introduction to emergency medical care, the health care system, the EMS system, roles and responsibilities, infection control, well-being of the EMT-B, medical, legal, and ethical issues, the human body, baseline vital signs and sample history, lifting and moving patients, airway management and ventilation, scene size-up and strategies, initial assessment, communication, the physician in EMS, quality, documentation, general pharmacology, and a variety of specific emergencies including respiratory, cardiovascular, poisoning, environmental, geriatric, and trauma, bleeding, and shock. There is a separate section on disaster and HAZMAT response that covers definitions and classifications, planning, incident command system, triage, roles, and responsibilities (from 1994 DOT EMT-Basic National Standard Curriculum).

***EMT-Intermediate (EMT-I)***

The intermediate level was developed primarily to provide a higher level of training compared to the basic level without incurring the time, money and resources, and depth of training required to reach the level of paramedic. This category of providers particularly serves rural communities and others for whom the paramedic training would be prohibitive, due to cost and time constraints.

*EMT-I Core Curriculum*

Training to become certified at the intermediate level does not involve a unique set of material but is instead a subset of the paramedic training course. Examples of increased levels of care from the basic level include intravenous or endotracheally administered medications (epinephrine, lidocaine, and atropine), as well as endotracheal intubation, ECG monitoring, and manual defibrillation.

***EMT-Paramedic (EMT-P)***

EMT-P is the most advanced level of formalized out-of-hospital training. The length of training ranges from 850 to 1,500 hours of practical and didactic training, with many college-based programs awarding associate's degrees.

Additional skills include other forms of parenteral access (intramuscular, intravenous, intraosseous, subcutaneous), use of a more extensive pharmacological complement, needle chest decompression, cricothyroidotomy, and other knowledge and skills derived from training, observation, and practice.

*EMT-P Core Curriculum*

In 1999, the US DOT National Standard Curriculum for EMT-P was also revised to identify the minimum body of knowledge and skills for competent performance. NHSTA recognized that the integration of the knowledge and skills necessary for an EMT-P is an individualized process that cannot be completely defined in a curriculum.

Although there is a general body of knowledge and skills that is assumed for all EMTs, the group is very heterogeneous and actual practice and training vary widely. This results from a number of factors.

Among EMS providers there are a variety of employment settings. Different employment settings include (1) fire-based services—where EMTs are part of the local fire service; (2) private companies—where EMTs operate under commercial contract with local governments; (3) third city services—where EMTs form a government-based service discrete from fire or police; and (4) volunteer-based services—where EMTs provide EMS voluntarily.

**In addition, all EMS providers operate under the direct authority of a physician in the role of medical director. The medical director is responsible to provide protocols for all EMT levels and has the prerogative to create his or her own "standard" by teaching and authorizing a different level of care in most states. Given the variety of EMS situations concerning employer, population served, and role of medical director, there are also significant differences among EMS providers concerning educational opportunities, requirements, and motivation.**

Continuing Education for EMS Providers

CE requirements vary from state to state. CE may be established and mandated at the state, regional, or local level, and training formats and delivery methods vary from individualized learning via home study or Web-based/online materials to traditional classroom instruction. Some state requirements for CE can only be met by attending a variety of courses that have been approved by the

state's EMS director, usually through the state Department of Health or EMS office. These may be provided through local, regional, state, or national conferences or through Web- or CD-ROM-based individualized instruction.

The National Registry of Emergency Medical Technicians (NREMT) was established in 1970 in response to a recommendation from President Lyndon Johnson's Committee on Highway Safety that a national certification agency be established for EMS. Fully understanding its role as a registration agency that issues certificates of competency, the National Registry provides a mechanism to help ensure the protection of the public. NREMT verifies achievement of minimal competencies of all levels of EMTs through the establishment and implementation of uniform requirements of EMS provider training, examination, and CE. For its recertification process, the NREMT currently only accepts 10 hours of distance-based education; however, this policy may change in the future.

Selected Major Organizations/Agencies/Boards

National Association of Emergency Medical Technicians (NAEMT)

Receives and represents the views and opinions of prehospital care personnel and to further the advancement of EMS as an allied health profession

National Registry of Emergency Medical Technicians (NREMT)

Operates as a not-for-profit, nongovernmental, freestanding agency that registers EMS providers across the nation. The NREMT registration services are part of the licensure process for EMTs and paramedics in approximately 40 states. The most visible function of the NREMT is examination development and administration. Its primary mission is to protect the public by identifying EMS providers who can safely and effectively practice.

National Association of State EMS Directors (NASEMSD)

Provides leadership and support in developing effective EMS systems throughout the nation and in formulating national EMS policy and fosters communication and sharing among state EMS directors.

International Association of Fire Fighters (IAFF)

An AFL-CIO-affiliated labor union that represents more than 225,000 professional fire fighters and emergency medical personnel in the United States and Canada.

International Association of Fire Chiefs (IAFC)

Seeks to provide leadership to career and volunteer chiefs, fire chiefs, and managers of emergency services organizations throughout the international community through vision, information, education, services, and representation.

National Association of EMS Physicians (NAEMSP)

Represents physicians responsible for the medical oversight of EMS programs as well as nonphysicians dedicated to out-of-hospital emergency medical care. Most of the physician members in the association are medically/legally responsible for the provision of out-of-hospital emergency care.

American College of Emergency Physicians (ACEP)

The American College of Emergency Physicians (ACEP) represents more than 20,000 emergency physicians. As the oldest and largest representative body for emergency physicians, ACEP has played a key role in the recognition and development of emergency medicine as a medical specialty. Through its efforts in CE, public education, research, and

policy development and through international activities, ACEP's goal is helping to ensure continued improvements in the quality of emergency care worldwide.

American Ambulance Association (AAA)

Represents the views and opinions of the owners and managers of private EMS services across the nation and to further the advancement of management skills for EMS providers.

EMS lacks one individual organization that represents the diverse nature of the profession. Instead, subgroups have developed their own associations and organizations for this purpose. The combined representation of the AAA, NAEMT, IAFC and the IAFF would represent a substantial number of EMS providers.

All the above named organizations can support the WMD training process by stressing the importance of WMD knowledge and skills in their educational meetings and publications. In particular, WMD-related objectives can be integrated into the National Standard Curriculum for all EMS personnel by NHTSA and, in turn, considered by the National Registry and the individual state EMS departments for inclusion on the certification examination. In addition, the other organizations can support initial efforts in this area by offering freestanding CE courses.

## Emergency Physicians

Numbers and Location

In hospitals across the United States, there are approximately 5,000 EDs in which approximately 32,000 emergency physicians work. Of the physicians working in EDs, approximately 60% are trained and/or certified in emergency medicine, and these physicians are primarily working in urban settings (with the largest percentage working in academic medical centers). Of the physicians not trained and/or certified in emergency medicine, approximately 75% are trained and/certified in another specialty—primarily family practice (32%) and internal medicine (28%). [53]

Primary Levels of Education and Certification

***Medical School***

Medical school programs are typically 4 years in length. However, there are a few schools that enroll students for 6 years, incorporating part of their undergraduate college work into medical school. Medical schools are accredited by the Liaison Committee of Medical Education (LCME), which is composed of representatives from the American Medical Association (AMA), the Association of American Medical Colleges (AAMC), the Department of Health and Human Services, and others. Although the LCME provides a list of essentials for accreditation, oversight of medical school curricula in the form of specific content requirements does not exist at the national level. Curricula are determined at the individual medical school level and are therefore affected by a variety of influences.

Approximately 20% of medical schools require a rotation through emergency medicine, but most do not include any exposure to emergency medicine. However, many students choose to take an elective in emergency medicine, and most residency programs include a month rotation in the ED as part of their educational curriculum.

*Medical School Core Curriculum*

The curricula of the 125 US medical schools vary from school to school. However, each is designed to prepare students for their graduate medical education experience. The typical 4-year medical school education is divided into a preclinical phase and a clinical phase. The preclinical phase occurs during the first 2 years of medical school; the clinical phase takes place during the last 2 years. Basic science courses make up the content of the preclinical curriculum, including anatomy, biochemistry, physiology, microbiology, pharmacology, and pathology. A course that introduces students to physical diagnosis and clinical medicine is often included in the preclinical phase.

The clinical phase of most medical school curricula is usually composed of 6- to 12- week clinical experiences called clerkships. During their clerkship experiences, students work directly with patients to obtain medical histories and develop diagnostic and therapeutic plans in consultation with their trained physicians. Clerkships include limited lectures and seminars to augment “bedside” teaching. Elective courses in the basic, behavioral, and clinical sciences during the fourth year permit students to explore career options and expand their undergraduate program. Clinical electives include clerkships in the primary specialties and in their many subspecialties. Elective opportunities vary from preceptorships with practicing physicians to research work.

Medical schools are accredited by the LCME. This is a cooperative effort with the AMA that includes representation from the AAMC. The LCME provides broad standards for reviewing education programs that lead to the MD degree. Within this general framework, individual schools are free to develop their own academic programs.

*Medical Licensing Process*

The United States Medical Licensing Examination (USMLE) is sponsored by the Federation of State Medical Boards of the United States, Inc., and the National Board of Medical Examiners

(NBME). The USMLE is a single examination composed of three separate parts, referred to as Steps 1, 2, and 3. The examination was designed to assess the application of knowledge, concepts, and principles related to health and disease that are essential to effective patient care.

The timing, order, and number of attempts to take the examination are determined by the medical licensing authority where one seeks licensure. Where eligibility permits, Steps 1 and 2 may be taken in any order. However, Step 3 may be taken only after the successful completion of the first two steps. (Note: Prior to the year 2000, some variations in requirements are accepted.)

One common scenario would be that at the end of a student's second year in medical school, the licensure process begins by taking the USMLE Step 1. At the end of the third year, the student would take the USMLE Step 2. Most residency programs require that Step 2 be passed before the program is begun. In graduate medical education, usually after the first year of residency, students take USMLE Step 3, the passing of which results in a medical license to practice issued at the state level.

Licensing requirements are set at the state level. For example, in Texas the licensing agency is the Texas State Board of Medical Examiners. However, in other states, that agency may be a physician group or another professional group in charge of licensing a number of professions.

***Residency Training and Emergency Medicine Certification***

**The specialty of Emergency Medicine was formally recognized by the American Medical Association and the American Board of Medical Specialties (ABMS) in 1979. As of June 1998, 121 emergency medicine residency programs in the United States were approved by the Accreditation Council for Graduate Medical Education (ACGME). Their programs graduate more that 950 residents each year. In addition, 24 osteopathic emergency medicine residency programs graduate more that 100 residents each year.**

The ACGME is responsible for the standards or special requirements and approval process for all 23 medical specialties. Within the ACGME, the Residency Review Committee – RRC in Emergency Medicine (whose members are appointed by the AMA, ACEP, and American Board of Emergency Medicine [ABEM] sets the standards for and approves all residency programs in emergency medicine (Graduate Medical Education Directory 1998-1999).

ABEM and the ABMS are responsible for the board examination and the process of initially certifying and recertifying emergency medicine physicians every 10 years. The specialty board examination is given after residency and sometimes after 1 year or more of practice.

Even though the specific curricula for all the emergency medicine residency programs in the United States vary in specifics, overall program requirements and medical content are specified by the ACGME. As part of the ACGME, the RRC in Emergency Medicine, whose members represent the AMA, ACEP, and ABEM, sets the standards for and approves all residency programs in emergency medicine.

*Emergency Medicine Core Content*

Each emergency medicine residency program must teach the skills and knowledge that comprise the fundamentals of the practice of emergency medicine. Additionally, residency programs must provide increasing responsibility for and experience in the application of these principles to the management of clinical problems. Each residency program is to be designed so that residents have the opportunity with appropriate guidance and supervision to attain a satisfactory level of clinical maturity, judgment, and technical skill. In general, after completing a residency program, residents

should be capable of practicing emergency medicine and incorporating new skills and knowledge during their careers.

Emergency medicine residency programs are required to offer 36 months of curriculum work under the control of an emergency medical program director. Many residency programs are affiliated with medical schools and are based at a primary hospital or clinical site.

Each program must offer an average of at least 5 hours per week of planned educational experiences developed by the emergency medicine residency program. Residency programs use problem-based learning, laboratories, and technology-based instruction, as well as interdisciplinary conferences.

Continuing Medical Education

Continuing medical education (CME) requirements are state legislated and therefore can vary widely from one state to another. For example, Texas requires a certain number of hours, of which a set number must be in risk management, but does not mandate topics for the remaining hours. However, some states do not require any CME as part of the relicensure process.

All specialty boards and professional organizations have their own CME requirements. Members of ACEP are required to complete at least 150 hours of CME every 3 years. Programs sponsored by ACEP and individual ACEP chapters serve to keep emergency physicians informed as well as to help educate physicians from other specialties regarding key emergency medicine issues.

Selected Major Organizations/Agencies/Boards

American Board of Emergency Medicine (ABEM)

Seeks to establish and maintain high standards of excellence in the specialty of emergency medicine and bears responsibility for the emergency medicine ABMS board examination and for granting certification and recertification in emergency medicine.

American Board of Medical Specialties (ABMS)

Assists member boards in their efforts to develop and use professional and educational standards for the evaluation and certification of physician specialists.

American College of Emergency Physicians (ACEP)

ACEP represents more than 20,000 emergency physicians. As the oldest and largest representative body for emergency physicians, ACEP has played a key role in the recognition and development of emergency medicine as a medical specialty. Through its efforts in CE, public education, research, and policy development and through international activities, ACEP's goal is helping to ensure continued improvements in the quality of emergency care worldwide.

American College of Osteopathic Emergency Physicians (ACOEP)

Exists to support quality emergency medical care, promote interests of osteopathic emergency physicians, support development and implementation of osteopathic emergency medical education, and advance the philosophy and practice of osteopathic medicine through a system of quality and cost-effective health care in a distinct, unified profession. In 1998, ACEP recognized the American Osteopathic Board of Emergency Medicine (AOBEM) as a certifying body in emergency medicine. Many of their members are also members of ACEP.

American Medical Association (AMA)

Works to promote the art and science of medicine and the betterment of public health. The AMA is the most widely recognized medical organization in the United States.

American Osteopathic Board of Emergency Medicine (AOBEM)
: Conducts the certification process for osteopathic emergency physicians for the American Osteopathic Association.

Association of American Medical Colleges (AAMC)
: Represents medical schools, academic health science centers, academic societies, and medical research organizations in the establishment of a national agenda for medical education, biomedical research, and health care. It is the umbrella organization for several groups and societies, including the Council of Medical School Deans, The Council of Teaching Hospitals, The Council of Academic Societies, and Council of Academic Chairs.

National Association of EMS Physicians (NAEMSP)
: Provides leadership and fosters excellence in out-of-hospital EMS. NAEMSP is made up primarily of emergency physicians who are interested in and involved with EMS (out-of-hospital) care.

Society of Academic Emergency Medicine (SAEM)
: Works to foster emergency medicine's academic environment in research, education, and health policy through forums, publications, interorganizational collaboration, policy development, and consultation services.

Both ACEP and SAEM focus on the practicing emergency physician, but from slightly different perspectives. ACEP represents all emergency physicians and therefore focuses on broader issues facing emergency medicine, such as interacting with other professional societies, billing and reimbursement issues, practice management, and educational concerns. Membership is open to all practicing emergency physicians; although in the year 2000 membership will be limited to board-certified emergency physicians. SAEM is dedicated to the issues and concerns of the academic emergency physician. As such, they place a heavy emphasis on research, teaching, and academic program development. ACEP and SAEM both have representatives on the ABEM board.

All these organizations can support the WMD training process by stressing the importance of WMD knowledge and skills in their educational meetings and publications. In particular, WMD-related objectives can be integrated into the Core Content of emergency medicine and, in turn, considered by ABEM for inclusion on the certification examination. In addition, the other organizations can support ACEP's initial efforts in this area by looking at education of other provider populations. For instance, the Infectious Disease Society of America (IDSA) could assume an active role in getting infectious disease specialists involved in preparedness and training in their local communities.

## Emergency Nurses

Numbers and Location

**Within the United States, there are approximately 90,000 emergency nurses. (Currently this information is not officially tracked; therefore this number was estimated based on the number of EDs and hospitals.) Approximately 25,000 are members of the Emergency Nurses Association (ENA) and approximately 26,000 have their certification in emergency nursing (CEN).**

As described in a 1999 brochure published by ENA, emergency nurses fulfill a variety of roles, including clinical, education, and management. In addition, they function in a multitude of specialty areas, including trauma nursing and flight nursing (fixed wing and rotor).

Primary Levels of Education and Certification

***Nursing Education***

All nurses have completed at minimum one of the following paths of education:

- Nursing diploma – 2-3 year hospital-based nursing program
- Associate's degree in nursing (community college)
- Bachelor's degree in nursing
- Masters or PhD in nursing or other related field

For many years nurse training was conducted by hospitals and graduates earned a nursing diploma. Current options also include both associate's and bachelor's degrees.

Nursing education programs are accredited by the Commission on Collegiate Nursing Education (CCNE) and the National League for Nursing Accrediting Commission (NLNAC). The CCNE and the NLNAC have established standards by which they accredit schools of nursing. The standards differ for the two agencies and based on the type of nursing program—baccalaureate, graduate, associate, or hospital diploma program.

Baccalaureate nursing programs require at least 120 semester credits, with about half concentrated in the nursing major. Nursing classes focus on the promotion, maintenance and restoration of the health of individuals, families, groups, and communities. Programs encompass both theory and clinical learning experiences. Courses include basics and advanced concepts of nursing, adult health, pediatrics, mental health nursing, women's health, maternal/child and health, pharmacology, beginning research methods, social and professional issues and trends, and nursing leadership. A baccalaureate nursing education prepares the new graduate as a generalist to work in the widest range of health care settings, including staff positions in hospitals, public health and visiting nurse agencies, and other organized nursing services.

Associate degree nursing programs require at least 72 to 76 semester credit hours as the maximum number for the degree. The focus of this curriculum has been on preparation for technical nursing practice. New graduates are expected to practice primarily in staff-level positions, providing individual client care in structured environments such as hospitals or nursing homes.

The hospital diploma programs are generally 3 years in length; however, a majority of these programs have been closed or absorbed into university settings.[51]

*Emergency Nursing Curriculum*

The Board of Certification for Emergency Nursing - BCEN - recommends that review materials/programs focus on the CEN content outline included nursing process. There are references from both ENA and other sources. References available include ENA Emergency Core Curriculum, ENA CEN Review Software, and ENA Review Manual.

***Nursing Licensure***

To practice nursing, registered nurses must pass the National Council Licensure Examination (NCLEX), a national examination administered by each state board of nursing.

NCLEX is the basic licensing examination that all nurses seeking to practice within the United States must successfully pass. NCLEX tests whether the nurse candidate possesses the knowledge, skills, and abilities necessary to practice safely and effectively as an entry-level nurse. "Entry – level" has been defined as practice within the first 6 months following graduation from the basic nursing education program.

The current framework or test plan is two dimensional. The first dimension encompasses the nursing process. The five phases of the nursing process—(1) assessment, (2) analysis, (3) planning, (4) implementation, and (5) evaluation—are represented by approximately equal numbers of questions on each examination. The second dimension encompasses client needs. The categories of client needs are represented on the examination according to the results of a job analysis. Approximately 28% of the questions reflect providing a safe, effective care environment; 12% reflect providing for patients' physiological integrity; 12 percent reflect providing for patients' psychosocial integrity; and 15% reflect providing health promotion and maintenance.[52]

***Emergency Nurse Certification***

The certification examination for emergency nursing has been available since 1980. Originally the certification was established in the United States by the ENA; however, the examination is now administered by and is the sole responsibility of the BCEN. Today, more than 26,000 US, Canadian, Australian, and New Zealand emergency nurses maintain the CEN credential.

To be eligible for board certification, one must have a current unrestricted license or nursing certificate that is equivalent to a registered nurse in the United States.

It is recommended that candidates for CEN possess 2 years' experience in emergency nursing practice and membership in the ENA (or, for international candidates, the professional emergency nursing society of that country).

Although some hospitals do not require special education or certification for emergency nurses, in many EDs nurses have to show proof of advanced certifications or verifications to the Joint Commission on Accreditation of Healthcare Organizations (JCAHO). Additionally, many hospitals require specific certifications/verifications for nurses who work in the ED. Specific certifications or verifications include Basic Life Support (BLS), Advanced Cardiac Life Support (ACLS), and Pediatric Advanced Life Support (PALS). Course in Advanced Trauma Nursing (CATN), Emergency Nurse Pediatric Course (ENPC), or Trauma Nurse Core Course (TNCC) may be required for trauma designations.

Generally, emergency nurse certification is voluntary in that any nurse may choose to become certified through the BCEN, a separate corporation within the ENA. However, many EDs require their nurses to have a certification in emergency nursing to work in the ED. Support for nurses obtaining a CEN varies greatly. Hospitals may pay for the certification examination, pay for the examination and CE, or give incentives in the form of an increased hourly rate.

BCEN works to educate hospitals about the benefit of having a certified emergency nursing staff. In addition, BCEN has oversight of the examination and protects the confidentiality and quality of the examination. The certification process involves contacting BCEN and receiving an application and a blueprint or high-level topical outline of general test areas.

As part of the process of creating the examination, BCEN defines the role of most ED nurses using a Role Delineation Study (RDS). The RDS process involves use of surveys and interviews to collect and rate by frequency tasks most often performed by emergency nurses. From selected RDS results, test items are prepared for the certification examination. In addition to the RDS, which is currently being revised to include new areas, new questions are continually added from ongoing research into actual emergency nursing practice.

The CEN must be renewed every 4 years. To maintain a certification, nurses can elect to retake the examination using a computer-adaptive test or complete CE hours as specified by the CEN Board. However, every other renewal (or every 8 years), the examination must be retaken. Currently, the CME requirement for recertification is 100 hours in accredited topics of choice.

*Emergency Nursing Core Curriculum*

The Emergency Nursing Core Curriculum is published by the ENA. This study reference is designed to assist practicing emergency nurses by providing the relevant and essential information requisite to quality emergency patient care. The focus is on nursing care process. Major content topics that are covered include clinical practice (e.g., nursing process, abdominal; cardiovascular; dental, ear, nose, and throat; environmental; facial; and general medical emergencies), research, education, professionalism, and emergency department management. WMD topics are being integrated into the new edition of the curriculum.

Continuing Education in Nursing

Currently, 19 states require CE for maintaining a nursing license. Most states (11 of 19) require 30 hours of CE over a 2-year period. Very few states have specific topical CE requirements.[53]

The original intent of establishing CE requirements was to ensure that nurses maintained some level of continued competency to practice in the absence of continual retesting. However, nursing and education researchers have been unable to establish a firm link between CE and continued competency. Thus, the move by state boards of nursing to set CE requirements has slowed as the nursing profession examines other models for measuring continued competency.

In addition, mandating any additional training may be controversial because it must be paid for by the individual, not by the hospital where he/she is practicing.

Selected Major Organizations/Agencies/Boards

Emergency Nurses Association (ENA)

Professional nursing organization that provides education and communication among emergency nurses (both members and nonmembers) and has approximately 25,000 members. The ENA publishes a number of text and reference books that can be purchased and used as an educational resource within an ED.

Board of Certification for Emergency Nurses (BCEN)

Carries out responsibilities related to the board examination and certification in emergency nursing.

American Nurses Association (ANA)

The ANA is considered to be the broad umbrella organization that focuses on professional and practice issues regardless of the clinical setting, and as such, emergency nurses may also belong to ANA. ENA is a specialty organization that focuses on the care provided by emergency nurses. Formally, ENA and ANA collaborate through an organization called the

Nursing Organizations Liaison Forum (NOLF). This was created by ANA to provide a mechanism for direct feedback and collaboration of all nursing organizations.

American Association of Colleges of Nursing (AACN)

AACN represents more than 530 university and 4-year college education programs in nursing at public and private institutions nationwide. The organization has established quality standards for bachelors and graduate-degree nursing education programs.

Essentially, ENA is the professional association for emergency nurses and plays an active role in emergency nurse education. For example, ENA provides the Trauma Nurse Core Course (TNCC), which is taught throughout the nation as well as in Canada, Sweden, Australia, New Zealand, and additional international affiliates. Other nursing specialties have their own organizations, such as the Association of Operating Room Nurses (AORN).

## Audience Description Discussion

Over the last few years awareness of the need for WMD event preparedness has been raised throughout the health care community via media coverage of terrorism threats, multiple hoaxes, professional meetings and publications, and a variety of training efforts.

Although individuals from all three of the audiences specified by this contract may have had a chance to participate in various training or informational presentations through professional organizations or in participation with local and regional preparedness efforts, there has been no widespread/comprehensive, fully integrated initiative. For example, even though the Nunn-Lugar-Domenici Domestic Preparedness Program was provided to many of the nation's largest cities, it did not successfully reach the majority of health care providers.

Consequently, though a few have gained some specific knowledge and skills and a somewhat larger number have raised their awareness of the need, the vast majority is totally unprepared to deal effectively with the occurrence of a terrorist WMD event, particularly a biological incident.

**For emergency physicians, WMD-related training is not part of the core content of either medical school or emergency medicine residency programs. However, proposed WMD training would build on the existing knowledge and skills already a part of the emergency physician knowledge base. An excellent foundation for training and management of WMD incidents is provided for emergency physicians through current emergency medicine residency programs. These foundations include principles of resuscitation, understanding of toxicologic incidents, and infectious disease recognition and treatment.**

**From initial nurse education through whatever process is selected to reach the emergency nursing specialty, emergency nurses are provided no course work specific to WMD incidents. In the practice of their routine tasks, however, emergency nurses provide essential support in rapid assessment and treatment, particularly during the initial phase of acute illness and trauma. WMD training would build on this existing knowledge and these skills, as well as areas such as personal protective equipment (PPE) (as related to OSHA requirements) and general patient care.**

In addition, it is likely that the emergency nurse will be the primary organizer of patient care and flow during a WMD response. Therefore, adequate knowledge and skills are critical to ensure an effective response and to create, at a minimum, an environment of controlled chaos in the ED.

Hospital-based emergency physicians and nurses may take part in annual disaster drills. Although all hospitals have disaster drills, the focus of those drills may vary and usually deal with typical disasters, such as multiple car crashes, airplane crashes, or explosions. Some hospitals provide specialized training based on their locations and potential for a particular type of incident. For example, for a hospital located near a nuclear facility, the disaster drill might include treatment for radiation exposure.

**As with the physician and nurse audience groups, WMD content is not a part of the educational process for the EMS audience. Particularly at the paramedic level, however, EMS providers possess a framework of knowledge and skills into which additional WMD content could be inserted. This framework is developed by virtue of widely accepted certification standards as specified in the US DOT National Standard Curriculum, as well as other special certifications required in different regions. Specific areas of knowledge and practice related to WMD response content for the EMT-P population include scene assessment/safety, PPE, triage, life support, communication, decontamination, and transportation.**

All three audience groups are specialized practitioners who have the educational foundation into which WMD skills could effectively be integrated. It is important to note, however, that none of these groups have received the full training they need to protect themselves or to mitigate the affects of a terrorist event, whether biological, chemical, or radiological.

## BARRIERS TO WMD TRAINING

For each audience group, the situations, concerns, perceptions, and constraints were identified that—if not addressed—would undermine the acceptance and delivery of effective WMD-related training. Although a number of barriers are included, it was generally agreed among the task force members that funding and time are primary barriers to developing and implementing WMD response training. The barriers have been organized into three major groups for each audience. Associated discussion is provided for each barrier. As can be seen, the perception of these barriers are largely shared among the three audience groups; however, some differences exist. (The order in which the barriers are presented does not indicate emphasis.)

### EMS Providers

Barrier Group 1

*The first group of barriers are those that would either prevent or make difficult the integration of WMD-specific content into primary EMT education.*

- **No single source of authority to require that WMD knowledge and skills become a part of EMT training**

Each state has complete discretion in determining EMT certification requirements. In some states there is a decision-making body, such as the state department of health, that specifies the curriculum to be used. This may include and even exceed the US DOT standards for EMT training, adding components such as ACLS or CPR. Other states take a less hands-on approach and delegate that authority to local bodies, such as individual medical directors or training programs, allowing them to decide what will be taught.

This is a particularly important barrier because no single source of authority among the states will always be an issue, and the various decision-makers within each state will constantly change. Therefore, support for WMD response training would have to be solicited on a state-by-state basis to ensure its use.

- **Excessive time required to complete the process of revising US DOT National Standard Curriculum**

To integrate WMD content into primary EMS training requires the US DOT National Standard Curriculum be revised to include that content. However, a significant barrier to that revision is the time it takes to introduce new educational content into the National Standard.

For example, the most recent update of the EMT-B curriculum was in 1994, and it was not until 1999 that all states actually adopted the 1994 revision. Following many years in the revision process, the 1994 curriculum was replacing a curriculum from 1984. Although the National Highway Traffic Safety Administration (NHTSA) has discussed plans for shortening the revision process, no specific timetables have yet been released.

In addition, at the EMS Education Agenda for the Future meeting in April 1999, representatives addressed the need to develop a newer and faster mechanism for introducing new content into the body of knowledge required for training out-of-hospital providers. This mechanism is vital to ensure that the educational process keeps pace with rapidly changing medical practice.

Even though some variance will always exist concerning the speed at which individual states and programs adopt new content, revising the National Standard Curriculum is an essential step.

- **EMT curricula would have to expand to include new content, which increases training costs**

The basic course as recommended by the US DOT consists of 110 hours, and nothing can be removed from the content without degrading the knowledge base or skill set. In fact, EMT certification requirements in various locations routinely exceed this standard by many hours, adding courses such as CPR and ACLS. Given EMT curricula that must already exceed requirements to fully train personnel, the addition of WMD content will be of concern to both those providing training and participants/students.

Depending on how EMS providers are structured in a community, the training and its associated costs will be the responsibility of one of several groups, including the fire service, a third service, a private company, a local or regional hospital, or volunteer EMS providers. For some of these groups, the additional costs of faculty and facilities, as well as lost work time, may be a significant hindrance to WMD training.

The additional hours of training will be a financial burden to individuals who pay for their own training.

- **No "approved" body of content or curriculum on which to base course development**

Although this barrier would be critical if not addressed, the task force does not consider it a long-term problem. Initial efforts are under way. Funds continue to be allocated at the federal level to address the health care community's need to be adequately prepared. In addition, the objectives identified by this task force could become a foundation for a future curriculum and course.

However, this effort requires the dedication of a specialized multidisciplined task force or writing group that can research, compile, and organize the content needed for effective training.

Barrier Group 2

*The second group of barriers includes those that would prevent or significantly hinder the development and maintenance of effective WMD training materials for EMS providers. This material includes curriculum materials for integration into primary training of courses and materials for CE (both original training for EMS providers currently practicing and retraining for skill maintenance).*

- **Funding for the development of comprehensive WMD content for EMT training programs or for CE courses, which includes research, writing, material development, procurement of equipment/supplies, faculty development, and pilot testing**

Lack of adequate funding is a major barrier involving a number of factors. Additional effort would be required for revising the US DOT National Standard Curriculum as well as the cost of developing a CE course and refresher courses. Basic costs to be funded include research, writing, and material development. Depending on the delivery method and the level of proficiency desired—awareness or performance—costs would also include faculty development, high-level scenario-based simulations, necessary equipment and supplies, and material duplication and distribution.

- **Lack of sponsoring organization to develop, deliver, and maintain WMD training**

To ensure the development of effective WMD response training for EMS providers, there must be a group that both oversees the initial course development and incorporates revisions as

necessary. This group should be composed of representatives from a variety of EMT-related professional organizations and experts in the areas of WMD content and education.

Barrier Group 3

*A third group of barriers for EMS providers involves those that will (1) prevent the acquisition of WMD skills/knowledge by those currently in practice or (2) limit the ability to sustain WMD skills/knowledge for EMS providers through CE, practice, and drills or exercises.*

- **Failure of those currently practicing to recognize this type of training as a priority for CE**

For EMS providers currently in practice, resistance to initial WMD training could result from a variety of reasons, including denial or a lack of awareness. An attitude of denial could be based on the belief that a WMD incident would never occur in their community. Also, without the awareness of the potential danger involved in a WMD incident, EMS providers may not make WMD training a priority over other educational options.

Regarding sustainment of skills or refresher training, EMS providers, in general, are more open to acquiring new knowledge and skills than to completing required updates to their existing knowledge base.

Like physicians and nurses, EMS providers must first be convinced that MWE content is both relevant to their jobs and essential for their personal safety.

- **Failure of employers to recognize this type of training as a priority, which results in lack of employer support**

In EMS providers, there is a lack of uniformity among employment settings. Most employment situations fall into one of the following five major categories: (1) fire-based services—where EMTs are part of the local fire service; (2) private companies—where EMTs operate under commercial contract with local governments; (3) third services—where EMTs form a third service discrete from fire or police; (4) volunteer-based services—where EMTs provide EMS services without a career path or compensation, and (5) hospital-based services—where EMTs operate under a local or regional hospital.

Depending on many factors among employment situations, such as location, population, or training budget, a variety of opinions and values will determine the training requirements of a particular EMS provider. For example, an employer may be under pressure to remain economically viable, which would affect the decision for or against additional training.

- **High turnover among EMS providers**

The high turnover among EMS providers can undermine the motivation of the person or entity responsible for funding the training.

An individual responsible for his or her education may be unwilling to seek additional training if a long-term commitment to practice is not felt. The entity, whether a fire service, third service, or private company, may also be unmotivated to provide training that is perceived as unnecessary for people who may not remain in their employment. However, this is only a barrier to the extent that the acquisition of WMD knowledge and skills is considered unessential or optional.

- **Inadequate funding to cover attendance costs (e.g., time off, tuition, travel)**

Similar to cost concerns related to adding to initial training requirements, there are funding issues related to CE. Because of the lack of uniformity among the ways that EMT training is funded, where payment may be made by individuals or employers, this barrier may exist in varying degrees among the EMS population.

## Emergency Physicians

Barrier Group 1

*The first group of barriers are those that would either prevent or make difficult the integration of WMD-specific content into medical school curricula or into emergency medicine residency programs.*

Barriers to the integration of WMD content into curricula for both medical schools and emergency medicine residency programs are very similar.

- **Existing medical school and emergency medicine residency program curricula are full and time is limited.**

The most important barrier to integrating WMD content into medical school curricula is that existing curricula are full. Therefore, the challenge of adding new material and opportunities to practice skills will be very difficult. Because existing curricula are full, the integration of new material may require that other important topics be eliminated.

No standard curriculum exists for all medical schools, and emergency medicine programs are still trying to establish a foothold in the curricula of many medical school programs. In fact, only approximately 25 of 126 US medical schools have a required clerkship in emergency medicine, and only about 70 medical schools have integrated emergency medical skills into some part of the curriculum.[54]

Although medical school curricula are very similar across the country, there is no oversight of their development at the national level. Most schools make decisions about incorporating new content via a curriculum committee. Although new information is eventually incorporated, there is both a significant lag time and a long waiting list. There may be a delay of 5 years or more in getting a new course, clerkship, or rotation added. Examples of topics recently integrated into some medical schools after several years' work include domestic violence prevention and occupational/environmental medicine.

Program requirements for emergency medicine residency programs are specified by the Accreditation Council for Graduate Medical Education (ACGME). Although emergency residency curricula are also full, there is more flexibility at the residency level than with medical school curricula.

- **No "approved" body of content or curriculum exists on which to base WMD course or content development**

Although courses and seminars focusing on various WMD response elements have been developed at state, local, and national levels, no comprehensive objectives and content have yet been created.

The lack of an approved body of content or curriculum is not viewed as a long-term problem because the objectives identified by this task force could become a foundation for future curricula and courses. However, further development effort would require the dedication of a specialized multidisciplined task force or writing group that could research, compile, and organize the content needed for development of medical school/emergency medicine residency education.

- **The need for training in knowledge and skills related to WMD response has not been broadly articulated and emphasized by national organizations**

Based on the organizations represented on this task force, this effort demonstrates a growing commitment among professional groups representing emergency medicine, namely ACEP, SAEM, and NAEMSP. An example that the situation may be changing is also seen by the recent AMA seminar on this issue at their House of Delegates meeting. That body passed resolutions that indicate that more active AMA involvement may occur in the near future.

However, no medical organization has taken up the banner calling for national preparation regarding WMD response. Instead, small "pockets" of interest have emerged within these national organizations. While emergency medicine has made significant strides in recognizing the need for training, it would be a significant error to simply identify response preparation with this discipline alone. To be successful, interest must be widespread throughout the entire medical community.

- **No advocates have currently been identified (and equipped) to lobby for or influence the acceptance of WMD content as a priority for integration into existing medical school curriculum.**

Strong advocates are essential to overcoming the barrier of limited time and full curricula among medical schools. Although numbers are limited, strong departments of emergency medicine can become influential advocates. Other professional groups including those represented on this task force can become strong advocates for the necessity of providing training in WMD response skills.

For revising medical school curriculum, the AAMC would play a key role and would have to be supported by such organizations as the ACGME, the AMA, and the American Council of Medical School Deans.

Regarding advocates for emergency medicine residency education, relationships with influential national organizations have been forged in the process of this contract. These include ACEP, ABEM, SAEM, NAEMSP, and ACMT.

Pertinent professional organizations outside the field of emergency medicine need to be identified and persuaded to promote the integration of WMD content. Although some level of willingness and interest exists, other potentially influential professional groups have yet to be involved.

Barrier Group 2

*The second group of barriers include those that would prevent or significantly hinder the development and maintenance of effective curriculum materials for integration into initial medical school/emergency residency education or CE.*

- **Lack of funding for the development of comprehensive WMD content for medical school/emergency residency programs or for continuing medical education courses, which includes research, writing, material development, procurement of equipment/supplies, faculty development, and pilot testing**

Lack of adequate funding is a major barrier involving a number of factors. New costs would be incurred for development of medical school or emergency medicine instructional materials as well as the cost for developing a CE course or refresher training. Basic costs include research, writing, and material development. Depending on the delivery method and the level of proficiency desired—awareness or performance—costs would also include faculty development, high-level scenario-based simulations, necessary equipment and supplies, material duplication and distribution, etc. The recent predicament of dwindling physician faculty release time (i.e., time devoted to scholarly activities and service to the community rather than direct patient care) as a direct result of decreased federal

hospital reimbursement will negatively affect the ability to successfully develop and deliver these educational materials.

- **Lack of a national clearing house or repository for the collection of related knowledge/skills to ensure consistency and quality and to minimize the redundancy of effort**
- **Lack of established standard content literature, which increases the time required to develop curricula and course materials**
- **Difficulty of procuring persons with adequate expertise to work on the development of curricula and course materials and to oversee content development, management, and revision**
- **Lack of an oversight group designated to assist in the development, management, and revision of curricula and course materials**

These barriers speak to several critical issues surrounding the development, ongoing management and successful implementation of WMD-related education for emergency physicians. Currently there is a lack of defined and published literature and peer-reviewed research documenting medical knowledge and skills required for an effective WMD response. As discussed throughout this report, there are various courses and beginning efforts toward WMD education, but due to the relative newness of the threat and the lack of actual experience responding to a WMD terrorist event, no definitive body of knowledge and practice has been developed. It follows, then, that unlike other content areas where experience is widely held and documented, few individuals possess the WMD-related expertise required to develop curricula or course material or to oversee content development.

Due to the dynamic nature of the proposed content, updates and additions will be required to ensure a course remains current at all times. This creates the following needs: first, that there be a centralized source for obtaining and sharing the most up-to-date information and practices, a source that is centralized for both efficiency and consistency; and, second, that there be a group with the task of revising and distributing new or updated training material as needed.

A model for the oversight group might be a task force such as this one that represents a multidisciplinary group of content experts, educational specialists, and representatives of major professional organizations from each of the three audience groups.

Barrier Group 3

*A third group of barriers for emergency physicians involves those barriers that will (1) prevent the acquisition of WMD skills and knowledge by those emergency physicians currently in practice or (2) limit the ability to sustain WMD skills and knowledge for emergency physicians through continuing medical education, practice, and drills or exercises.*

- **Inadequate funding to cover attendance costs (e.g., time off, tuition, travel)**
- **Failure of hospital administrators to recognize this type of training as a top priority, which results in lack of broad hospital support**

In the medical community milieu as it now exists, there are significant funding limitations. Financial constraints come from decreased federal reimbursements, managed care, variety of payors, and new equipment demands resulting from technological advances.

As hospitals face funding shortages, programs and services viewed by administrators as "nonessential" may be cut or eliminated, and increasingly less money is available for staff development and educational programs. Training may be reduced to include only what is required by law.

Hospitals must become allies and supporters of WMD training initiatives for maximum effectiveness. Even without the benefit of additional funding, hospital administrators can exert critical/positive influence for incorporating WMD content into existing training initiatives. An example of an existing initiative associated with JCAHO requirements is the blood-borne pathogen training mandated by OSHA.

Without understanding potential WMD incident risks and preparedness solutions, hospital administrators may be resistant to focusing on WMD training concerns.

- **Personnel shortages that make it impossible to cover positions open while people are being trained (issue of back-fill requires adequate personnel)**

The issue of staffing positions left unfilled when emergency physicians attend training, referred to as back-fill, may reflect both an actual shortage of emergency physicians and a lack of funding to pay for the additional staff.

- **Failure of emergency physicians to recognize a need for WMD education, particularly that this type of training is a top priority**

Among emergency physicians the perception that training is not needed may originate from several factors, such as denial, false confidence, and lack of awareness. Denial may result from the belief that a WMD terrorist event would never occur in a particular locale. False confidence may reflect the belief that adequate preparation has been made, as in the case of misunderstanding the unique and critical differences between the required response for a biological event versus a chemical event. Along with denial and false confidence, lack of awareness of the potential effects of a WMD event and the need to be prepared also influences the perception of what training is a priority.

For emergency physicians, the energy for and openness to an important new training area can be overshadowed by the feeling that there is currently more to learn and do than can possibly be managed, which may result in resentment of extra demands. In that case, existing demands, both work related and educational, will tend to remain higher priorities.

In addition to the cost and availability of educational opportunities, emergency physicians must be informed of the critical need for this type of training. There is an enormous amount of information required to remain up-to-date in emergency medicine. To invest in WMD CE courses, emergency physicians must first be convinced that WMD knowledge and skills are critical to their professional knowledge base. In particular, relevance to physicians and what they do every day is very important. Where choices are limited due to training costs and time constraints, many might choose other topics that relate to demands they experience every day.

## Emergency Nurses

Barrier Group 1

*The first group of barriers are those that would either prevent or make difficult the integration of WMD-specific content into nursing school curricula or into emergency nursing education, including certification requirements.*

- **Existing nursing school curriculum is full and time is limited.**

The amount of information that must be covered is vast, particularly as new technology is introduced and nurses are expected to know how to operate state-of-the-art equipment.

Nursing school curricula are full and programs are already challenged to cover current core content at the desired depth. Therefore, it is not an uncommon expectation that some in-depth or more specialized levels of knowledge and skill will be learned on the job rather than the entry-level nursing education program.

- **No "approved" body of content or curriculum exists on which to base an emergency nursing course or content development.**

Courses and seminars focusing on various WMD response elements have been developed at state, local, and national levels; however, no comprehensive set of content or objectives has been broadly accepted, particularly for the emergency nurse population. Without some agreed on standard, it may be difficult to determine which course to take or when an individual has received the appropriate training.

Although this barrier would be critical if not addressed, the task force does not consider it a long-term problem. Initial efforts are under way. Funds continue to be allocated at the federal level to address the health care community's need to be adequately prepared. In addition, the objectives identified by this task force could become a foundation for a future curriculum and course. The ENA recently included WMD-related topics in their core content document. Unless these efforts are continued, this barrier will become a critical factor that interferes with the goal of providing WMD response training.

- **No formal acceptance exists at the national level of the need to integrate WMD response training information into standard nursing curriculum or to develop a standardized CE course.**

The general academic staff development organizations have not yet been involved in adding mass casualty incident/WMD into nursing curriculum and continuing nursing education. However, the task force acknowledges that some level of willingness and interest exists, as evidenced by the ANA's 1999 House of Delegates resolution entitled "Nursing's Response to the Use of Weapons of Mass Destruction."

This resolution, passed by ANA's primary policy-making body, instructs the ANA to work with the relevant nursing organizations toward the inclusion of such material in the basic nursing curriculum and the development of CE materials. Developing consensus within the relevant nursing leadership for the need to include this material is essential to eliminate this particular barrier.

Barrier Group 2

*The second group of barriers includes those that would prevent or significantly hinder the development and maintenance of effective curriculum materials for integration into initial nursing education or CE.*

- **Lack of funding for the development of comprehensive WMD content for nursing school or for CE materials/courses, which includes research, writing, material development, faculty development, and pilot testing**

Lack of adequate funding is a major barrier involving a number of factors. New costs would be incurred for the development of nursing school curricula as well as the cost for developing a CE course or updates. Basic costs include research, writing, and material development. Depending on the delivery method and the level of proficiency desired—awareness or performance—costs would also include faculty development, high-level scenario-based simulations, necessary equipment and supplies, and material duplication and distribution.

- **Lack of a national clearing house or repository for collection of related knowledge and skills currently being developed to ensure consistency and quality and to minimize redundancy of effort**
- **Lack of established standard content literature, which increases the time required to develop curricula and course materials specific to the nursing role**
- **Difficulty of procuring persons with adequate expertise to work on the development of curricula and course materials and to oversee content development, management, and revision**
- **Lack of oversight group designated to assist in the development, management, and revision of curriculum and course materials**

These barriers speak to several critical issues surrounding the development and ongoing management and success of WMD-related education for emergency nurses. Currently, there is a lack of defined and published literature documenting nursing knowledge and skills required for an effective WMD response. As discussed throughout this report, there are various courses and early efforts, but due to the relative newness of the threat and lack of actual experience responding to a WMD terrorist event, no definitive body of knowledge and practice has been developed. It follows, then, that unlike other content areas where experience is widely held and documented, few individuals possess the WMD-related expertise required to develop curricula or course material or to oversee content development.

Because of the dynamic nature of the proposed content, updates and additions will be required, which creates the following needs: first, that there be a centralized source for obtaining and sharing the most up-to-date information and practices, a source that is centralized for both efficiency and consistency; and, second, that there be a group with the task of revising and distributing new or updated training material as needed.

Barrier Group 3

*A third group of barriers for emergency nurses involves those barriers that will (1) prevent the acquisition of WMD skills/knowledge by those emergency nurses currently in practice or (2) limit the ability to sustain WMD skills/knowledge for emergency nurses through continuing medical education, practice, and drills or exercises.*

- **Inadequate funding to cover attendance costs (e.g., time off, tuition, travel), at CE conferences or workshops, etc.**
- **Lack of perception by hospital administrators that this type of training is a top priority, which results in lack of broad hospital support**

In general, inadequate funding is one of the most significant barriers to emergency nurses attending CE courses, whether the courses are related to initial education for nurses currently

practicing or related to refresher training. Hospitals historically have been the major source of CE for nurses. However, with funding becoming more and more limited due in part to factors such as reduced federal reimbursements and pressures of managed care, hospitals in general are offering fewer and fewer educational opportunities for nurses. Many hospitals are experiencing reduced revenues as well as a shortage of nurses to provide both inpatient and outpatient services. It is difficult for facilities to pay for nurse CE when operating in the red and difficult to permit time away from work given the shortage of nurses working in the hospital setting.

Preparing and maintaining training is costly, particularly if individual institutions have to bear the total cost. Since there are already many training requirements that must be met, it may be cost prohibitive for a hospital to add requirements without increasing funding availability.

As hospitals face funding shortages, programs and services viewed by administrators as "nonessential" may be cut or eliminated, and increasingly less money is available for staff development. Training may be reduced to include only what is required by law.

Hospitals must become allies and supporters of WMD training initiatives for maximum effectiveness. Even without the benefit of additional funding hospital administrators can exert positive influence for incorporating WMD content into existing training initiatives. An example of an existing initiative associated with JCAHO requirements is the blood-borne pathogen training mandated by OSHA.

- **Personnel shortages that make it impossible to provide coverage for positions while people are being trained (issue of back-fill that requires adequate personnel**

The issue of staffing positions left unfilled when nurses attend training, referred to as back-fill, may reflect both an actual shortage of nurses and a lack of funding to pay for the additional staff. Shortages of both nurses and funding currently present a significant barrier to emergency nurses gaining adequate knowledge and skills for responding to a WMD incident.

- **Lack of perception by nurses that there is a need for WMD education, particularly that this type of training is a top priority**

In addition to the cost and availability of educational opportunities, nurses must be informed of the critical need for this type of training. There is an enormous amount of information required to remain up to date in emergency nursing. Given choices of CE courses, emergency nurses must first be convinced that WMD knowledge and skills are critical to a professional knowledge base.

Although advocates have begun to be identified in the form of the 1999 ANA House of Delegates proposal and ENA's inclusion of WMD and WME content into the core content document, awareness of the need and efforts to address it are currently limited to a small number of individuals within these organizations.

For example, although ENA's board president advocates WMD education, general awareness of the need for training is limited among ENA members as a whole. In part, because a specific route of education and certification is not required to practice emergency nursing, those in practice do not necessarily acknowledge one type of training over another. If choices are limited due to training costs and time constraints, many might choose other topics that relate to demands they experience every day.

## CURRICULA REVIEWS

As part of the needs analysis process, current educational programs and practice experiences as well as existing training materials were reviewed. The formal curricula for initial and certification training were examined. The curricula reviews covered the following educational experiences: the US DOT/NHSTA National Standard Curriculum for EMT-B, EMT-I, and EMT-P training, medical school, emergency medicine residency training, nursing school, and emergency nursing.

**The focus of each review was to gather information that would provide background data for the task force as they determined how best to integrate WMD-specific content into the educational programs designed for each audience. Common areas that were investigated include curriculum oversight and accreditation, content topics covered, practical experience included in the program, evaluation, certification, areas where integration might occur, and potential barriers to integration. The results of each curricula review are summarized below.**

### EMS Providers

The NHTSA assumed responsibility for developing training courses that meet the standards established by the Highway Safety Act of 1966. The EMS Systems Act of 1973 identified standardized training for out-of-hospital personnel to provide national guidelines with the intent of ensuring that EMS training was current and of high quality. Thus, the content of most of the EMS training programs across the United States is based on the national standard curriculum funded and developed with periodic updates by NHTSA.

**Standard curricula have been developed for each of the three EMT levels—EMT-B, EMT-I, and EMT-P. The curricula are composed of objectives and detailed content outlines. Most EMS programs adhere to the standard curriculum as guidelines for their programs. However, there is variation among programs in length and quality of instruction.**

The levels of training for emergency medical technicians as specified in the 1994 revision of the standard curriculum include:

- EMT-Basic (EMT-B, formerly EMT-A [ambulance])
- EMT-Intermediate (EMT-I) The EMT-I is a level of training between basic and paramedic and generally has more training in assessment than the EMT-B. Most EMT-I candidates are trained to use IV therapy and advanced airway therapy and to administer a limited number of medications.
- EMT-Paramedic (EMT-P) The EMT-P is the most advanced level of EMS provider and has advanced assessment skills and training in many advanced, invasive interventions and can use many medications, IV solutions, and other advanced treatments.

The revised 1994 EMT-Basic curriculum requires a minimum of 110 hours of instruction, including lectures, participation in practical skill sessions, and commitment to independent study. Clinical experience is also required. It is recognized that additional specific education will be required of EMT-B who operate in the field; for example, ambulance driver training, heavy and light rescue, and basic extrication. Since this and other information may vary based on location, each training program should identify and provide special training in areas related to the local situation.

The revised EMT-I curriculum requires approximately 300 to 400 hours of instruction, including 175 to 225 hours of classroom and practical laboratory experiences, 50 to 75 hours of clinical experiences, and 75 to 100 hours of field internship. These estimates are based on pilot and field testing of the curriculum.

Requirements for EMT-P were also revised in 1994 to identify the minimum body of knowledge and skills for competent performance. Based on the pilot and field testing, the average program will require approximately 1,000 to 2,000 hours of instruction, including 500 to 600 hours of classroom and practical laboratory, 250 to 300 hours of clinical experience, and 250 to 300 hours of field internship.

Curriculum Oversight and Accreditation

Most of the EMS programs are based on the national standard curricula that are funded, developed, and revised under the auspices of NHTSA. National standard curricula have been developed for all nationally recognized levels of EMS education. The curricula consist of prescriptive objectives and detailed content outlines. Currently, national accreditation of EMS programs is voluntary and available only at the paramedic level. In 1998, there were approximately 100 accredited paramedic programs. Even though no national accreditation is available for other levels of EMS education, most states have a process for approving all levels of EMS programs.

Nationally recognized accreditation is available only through the Commission on Accreditation of Allied Health Education Programs (CAAHEP) Joint Review Committee on Accreditation of Educational Programs for the EMT-Paramedic (JRCEMT-P).

In addition to NHTSA and CAAHEP, several associations are involved with EMS education. The National Registry of Emergency Medical Technicians (NREMT) was formed to provide uniform registration for all EMT levels. The National Association of EMS Directors (NAEMSD) advocates national EMS policy. The National Association of EMS Physicians (NAEMSP), ACEP and American College of Surgeons (ACS) routinely develop position statements, offer educational programs, and distribute materials to EMS agencies.

Practical Experiences Included in the Curriculum

The EMS curricula consist of four components of instruction—didactic instruction, skills laboratory, clinical education, and field internship. The clinical education experience and the field internship are the components of the curricula where students obtain practice experience. During clinical education, the students synthesize the knowledge and skills obtained during didactic instruction and skills laboratories. Most often, clinical education occurs in both hospital and field environments. The hospital environment allows students to see more patients and to see an adequate distribution of patient situations. Field environments allow students to apply knowledge and skills progressing from observer to team member or leader, based on the level of training and the situation. The field internship provides situations where students must integrate all of the didactic, psychomotor skills, and clinical instruction to perform their jobs. The field internship occurs near the end of the program, with sufficient instruction coming after the internship to ensure the students can perform at the expected EMT level.

Certification/Licensure/Registration

Before granting licensure, most states require tests that include both practical and written components. The certification process varies by state. However, there is a wide variation in the quality and difficulty of the tests, and this has caused problems with reciprocity among the states. A national certification process by the NREMT is used by some states. Currently, 40 states use some form of the NREMT examinations. A single-level NREMT examination or the use of examinations for all levels may be used. The NREMT examinations are based on an analysis of current practice and on the National EMS Education and Practice Blueprint. The examinations are authored by a multidisciplinary group with input from various EMS organizations.

Recertification is required by most states, and the NREMT re-registration requires applicants to demonstrate they still possess the knowledge and skills necessary to function at a specific EMT level; completion and verification of CE are required.

Areas Where Integration of WMD Content Might Occur

The content covered by the objectives developed by the task force seem to fit into several areas of the curriculum for each EMT level. Relationships could be made in the following areas:

- Well-being of the EMT, including critical incident stress debriefing (CISD), scene safety and personal protection, proactive safety precautions (immunizations)
- Scene size-up, evaluation of a scene for potential hazards, number of patients, mechanism of injury or nature of illness
- Ambulance operations
- Communications
- Patient assessment
- Pharmacology
- Poisoning emergencies
- Overview of hazardous materials, incident management systems, mass casualty situations, and basic triage
- Medical and legal issues, preservation of crime scenes and evidence

All of the above topics are included in the EMT-B curriculum and then addressed in more detail and at higher levels of competency in the EMT-P curriculum. Additionally, toxicology, infectious and communicable diseases, and psychiatric disorders, as well as rescue awareness and operations, hazardous materials operations, and crime scene awareness, are included in the EMT-P curriculum. The EMT-I curriculum does not appear to cover any types of disaster situations, scene safety, or personal safety.

Potential Barriers to Integration of WMD Content

Each of the standardized curricula for EMTs covers an extensive amount of information, and students must learn to perform competently in a reasonable time period. Adding additional knowledge and skill requirements to each of the curricula means that training programs may need to expand to encompass more teaching time. This increases the cost of training to the student and to institutions or programs. Most often, instead of adding content to the curricula, subject matter experts must review existing objectives and determine what can be omitted or, at the very least, covered in less time. Complicating the issue of integrating content about WMD is the concern that a terrorist event is not a high probability event for most EMS providers. In addition, revision cycles for the EMT curricula occur infrequently, thus slowing the formal integration of timely knowledge and skills related to issues such as responding to incidents involving WMD.

Responding to terrorist events that involve WMD is a developing content area; thus, there are a limited number of experts available for developing sound instructional materials. Additionally, some faculty members may not feel they are competent to teach in this content area.

Lack of equipment to use for training (i.e., PPE) is a barrier for many programs, since many do not have specialized equipment for responding to a biological event and most cannot afford to add the cost of expensive equipment to their training budgets.

## Emergency Physicians

**Undergraduate Medical School Curriculum**

**The curricula of the 125 US medical schools vary from school to school. However, each is designed to prepare students for their 3-year graduate medical education experience. The typical 4-year medical school education is divided into a preclinical phase and a clinical phase. The preclinical phase occurs during the first 2 years of medical school; the clinical phase takes place during the last 2 years. Basic science courses make up the content of the preclinical curriculum, including anatomy, biochemistry, physiology, microbiology, pharmacology, and pathology. A course that introduces students to physical diagnosis and clinical medicine is often included in the preclinical phase. Lecture continues to be the primary method of instruction, although at many medical schools, lectures compose less than 50% of scheduled contact time. Small-group discussions, self-instruction, and laboratory experiences are incorporated into the remainder of the scheduled time.**

The clinical phase of most medical school curricula is usually composed of 4- to 12-week clinical experiences called clerkships. During clerkship experiences, students work directly with patients to obtain medical histories and develop diagnostic and therapeutic plans in consultation with their trained physicians. Clerkships include limited lectures and seminars to augment "bedside" teaching. Elective courses in the basic, behavioral, and clinical sciences during the fourth year permit students to explore career options and expand their undergraduate program. Clinical electives include clerkships in the primary specialties and in their many subspecialties.

Curriculum Oversight and Accreditation

Medical schools are accredited by the LCME. This is a cooperative effort with the AMA that includes representation from the AAMC. The LCME provides broad standards for reviewing education programs that lead to the MD degree. Within this general framework, individual schools are free to develop their own academic programs.

Practical Experiences/Clinical Content Included in the Curriculum

Many medical schools introduce practical experiences in either the first or second year with an Introduction to Clinical Medicine course that is case based and offers students opportunities to work with a few real (or simulated) patients. However, the most significant practical experiences begin in the third year of training, when clinical clerkships are the main focus of the curriculum. Clerkships are required by most medical schools. During the clerkship experience, students work with real patients and are supervised by residents, nurses, and staff physicians. The clerkship usually is composed of lectures, required readings, and clinical work. It is during the clerkship experience that students learn the practical details of being a physician.

Evaluation and Licensure

The faculty of each medical school is responsible for establishing the criteria for evaluating student performance, promotion, and graduation. Some schools have written learning objectives for their programs, as well as for individual courses. Both written and/or oral evaluations, and direct observations are used. However, the frequency and types of evaluations vary from school to school. Many schools are beginning to use a final comprehensive examination. The NBME "Part" Examinations and the Federation Licensing Examination (FLEX) developed by the Federation of State Medical Boards were phased out in 1994. The United States Medical Licensing Examination (USMLE) is the sole examination pathway to licensure, and all students who wish to be licensed are required to pass Steps 1, 2, and 3.

Areas Where Integration of WMD Content Might Occur

Objectives and content topics related to learning about responding to WMD events could be integrated into several areas within the typical medical school curriculum. For example, content

related to the use of biological weapons could be integrated into infectious disease, epidemiology, and microbiology courses. Content related to chemical weapons could be incorporated into pharmacology, basic neurophysiology (nerve agents), and toxicology courses. Information about nuclear weapons might be included in immunology or toxicology courses. Clinical applications related to the WMD content could be incorporated into internal medicine, family medicine, surgery, and emergency medicine clerkships.

Potential Barriers to the Integration of WMD Content

One of the most significant barriers to integrating WMD content into the medical school curriculum is that the existing curriculum is overloaded. There are many areas competing for time in the curriculum. Because there is an overwhelming amount of medical information and skills to be taught in the 4 years, adding new content is a slow and difficult process in most schools. To have something inserted into a medical school curriculum, an organized group of persons who are strong advocates of the content topic must support the addition. Currently, there is no active advocacy group for adopting WMD content as part of the required curriculum or, in most cases, even the recognition of a need among medical school faculty.

The lack of content knowledge and experience among medical school faculty and curriculum planners is another barrier. Even if time were acquired, there would have to be expert faculty who could develop materials and teach students. Currently, most medical school faculty do not have the specific expertise required.

**Emergency Medicine Residency Curriculum**

**Emergency medicine residency programs are required to include 36 months of curriculum work under the control of an emergency medical program director. The RRC recognized three formats: post graduate year (PGY) 1-3, PGY 2-4, and PGY 1-4. A resident must complete all years of education for which a program is accredited. Many residency programs are affiliated with medical schools and are based at a primary hospital and clinical site.**

Each program must offer an average of at least 5 hours per week of planned educational experiences developed specifically for the residency program, including presentations based on the defined curriculum, morbidity and mortality conferences, journal review, and research methods. Residency programs use problem-based learning, laboratories, technology-based instruction, and interdisciplinary conferences.

Curriculum Oversight and Accreditation

Even though the specific curricula for the approximately 120 emergency medicine residency programs in the United States vary in specifics, overall program requirements and medical content are specified by the ACGME. As part of the ACGME, the RRC in Emergency Medicine, whose members represent the AMA, ACEP, and ABEM, sets the standards for and approves all residency programs in emergency medicine.

As of June 1998, 121 emergency medicine residency programs in the United States were approved by the ACGME. These programs graduate more than 950 residents each year. In addition, 24 osteopathic emergency medicine residency programs graduate more than 100 residents each year.

Practical Experiences Included in the Curriculum

The RRC requires that 50% of residency training beyond the first year take place in the ED. Participation may cover out-of-hospital care, including participation in paramedic base station communications, emergency transportation and care in the field, and, if possible, air ambulance units, teaching out-of-hospital personnel, disaster planning drills, and quality assurance audits.

Most residents spend the majority of their time in the ED working with patients under the medical supervision of the staff physicians. Each resident has significant opportunities to perform invasive procedures, monitor unstable patients, and direct major resuscitations of all types on all age groups. Residents actively participate in quality improvement programs, research and other scholarly activity, and physician wellness programs. Additionally, the curriculum includes at least 2 months of inpatient critical care rotations, during which the residents have decision-making experience that allows them to develop the skills and judgment necessary to manage critically ill and injured patients.

Resident Evaluation

All residency programs must have effective, ongoing evaluation of all components. The evaluation process must be related to the educational objectives of the program and provide a mechanism to effect change. A written, final evaluation must be provided for each resident who completes the program. The evaluation must include a review of the resident's performance during the final period of training and should verify that the resident has demonstrated sufficient professional ability to practice competently and independently.

**The core content of emergency medicine is the basis of ABEMs written examinations. The ABEM in-training examination is administered to allow residents to determine how prepared they are to take the written certification examination. There is no pass/fail criterion for this examination. The examination is instead designed to allow the resident and program director to compare individual performance with those of the other residents taking the examination**.

Certification

Eligibility to sit for the certification examination in emergency medicine offered by ABEM requires residency training in emergency medicine and a valid unrestricted medical license.

Certification in emergency medicine is valid for a period of 10 years, at which time recertification must occur. This may be accomplished by the diplomat taking and passing one of three board examinations—the written certification examination, the oral certification examination, or the written recertification examination.

Areas Where Integration of WMD Content Might Occur

WMD objectives seem to fit into several areas of the core content, including disaster medicine, clinical pharmacology, toxicological disorders, systemic infectious disorders, and thoracic respiratory disorders.

Potential Barriers to the Integration of WMD Content

- Lack of advocates to lobby for or influence the acceptance of WMD content into the core curriculum
- Extensive amount of information that core curriculum must now cover in relationship to the time (3 to 4 years) that residents are in training
- Lack of personnel in expertise in each residency program to develop and teach WMD content
- No approved body of content or curriculum on which to base course development
- Lack of equipment such as decontamination facilities or PPE for training residents

## Emergency Nurses

### Nursing School Curriculum

There are three educational tracks that prepare registered nurses for basic practice: diploma programs, associate degree programs, and bachelor degree programs. Diploma programs are generally three-year hospital-based nursing programs that prepare graduates primarily for staff positions within hospitals. Most of these programs have been phased out or incorporated into associate and baccalaureate programs. Associate degree programs are 2- year programs primarily affiliated with junior and community colleges. Associate degree course work includes both liberal arts and nursing courses. Graduates are primarily prepared to practice in structured health care settings such as hospitals and nursing homes. Presently, associate degree programs prepare the largest number of graduating nurses. Finally, the baccalaureate programs are affiliated with universities and senior colleges. The course of study is typically 4 years, with a nursing major in the last 2 years. Graduates of baccalaureate programs are employed in a variety of patient care settings, including hospitals, community agencies, schools, and clinics.

**There is no standard or prescribed nursing curriculum. Every program contains a component of basic science, anatomy, pathophysiology, pharmacology, and microbiology. The nursing component focuses on the nursing process, clinical nursing interventions, and prevention and wellness. Baccalaureate programs tend to focus more on skills and role development related to critical thinking and assessment skills, management, nursing research, and analysis of health systems structure and development. Nursing faculty use all manner of course structure, including lecture, small-group discussion, self-instruction, clinical experiences, and laboratory time, for knowledge and skills development.**

In addition to the traditional classroom or didactic component, all nursing schools include clinical instruction. This involves direct patient care experiences within a variety of settings, acute care, community, long-term care, and home health. Students' clinical experiences are generally monitored by a preceptor from the health care facility or a member of the nursing faculty.

Curriculum Oversight and Accreditation

The process of program accreditation or approval is complex within nursing. All nursing programs must be approved by the State Board of Nurses for all graduates to take the licensure examination (NCLEX). Therefore, each school of nursing must be recognized by either the State Board of Nursing in which the school resides, or if the State Board of Nursing has delegated this process, the program can be accredited by the State Department of Education.

In addition, there are two accreditation programs that are voluntary in nature. However, accreditation by at least one of these programs is often necessary for the registered nurse to pursue a graduate degree within nursing or to procure scholarship funding. The National League for Nursing Accrediting Commission (NLNAC) presently accredits all levels of nursing education schools and programs, both post-secondary and higher degree. NLNAC has established accreditation standards and criteria along with interpretive guidelines that govern the nursing curriculum. According to these standards, the nursing curriculum is developed by the nursing faculty and provides for a variety of learning experiences consistent with the nursing unit's mission/philosophy and attainment of outcomes. The NLNAC is recognized by the US Department of Education as a national accrediting agency.

The Commission on Collegiate Nursing Education (CCNE), an autonomous arm of the American Association of Colleges of Nursing (AACN), accredits baccalaureate and graduate nursing education programs. The CCNE also has established standards and procedures related to curriculum development, nursing faculty, and the overall student experience. The CCNE is presently seeking recognition as a national accrediting agency from the US Department of Education.

*The Essentials of Baccalaureate Education for Professional Nursing Practice*, published by the AACN in 1998, provides a framework for baccalaureate nursing educators to develop, define, and revise nursing curricula. The first *Essentials* document was published in 1986 and provided such a framework for more than 10 years. The core competencies, core knowledge, and areas of role development that every graduate of a baccalaureate nursing program should possess are outlined in this document.

Practical Experiences Included in the Curriculum

Schools of nursing use didactic, practical or clinical, and independent study methods for teaching. Methods of evaluation include examinations, return demonstration, self-assessment, observed clinical interaction, and basic course work. Nursing students' clinical experiences include all settings—hospital, outpatient clinic, home, and community health.

Licensure

To practice, registered nurses must pass the NCLEX, the basic licensing examination administered by each state board of nursing.

NCLEX is the basic licensing examination that all nurses seeking to practice within the United States must successfully pass. NCLEX tests whether the nurse candidate possesses the knowledge, skills, and abilities necessary to practice safely and effectively as an entry-level nurse. "Entry level" has been defined as practice within the first 6 months following graduation from the basic nursing education program.

The current framework or test plan is two-dimensional. The first dimension encompasses the nursing process. The five phases of the nursing process (1) assessment, (2) analysis, (3) planning, (4) implementation, and (5) evaluation are represented by approximately equal numbers of questions on each examination. The second dimension encompasses client needs. The categories of client needs are represented on the examination according to the results of a job analysis. Approximately 28% of the questions reflect providing a safe, effective care environment; 12% reflect providing for patients' physiological integrity; 12% reflect providing for patients' psychosocial integrity; and 15% reflect providing health promotion and maintenance.[52]

Areas Where Integration of WMD Content Might Occur

There are several content areas that are amendable to specific WMD content. First, most schools of nursing include Responding to Mass Casualty Situations as a lecture topic. This is the most logical integration point because the content is under control of the nursing school. Students also receive related content in courses such as microbiology and epidemiology; however, these courses are usually taught by programs outside of the nursing school. It would be more difficult to integrate material into these types of courses.

Potential Barriers to the Integration of WMD Content

The greatest barrier to integrating WMD content into the entry-level nursing school curriculum is the overwhelming amount of content that must already be covered over the specified period of time. An additional barrier could be the lack of specific WMD knowledge by nursing faculty.

**Emergency Nursing Curriculum**

**Emergency nursing is considered a critical care specialty field. Many courses are offered locally and are designed to acclimate an inexperienced nurse to emergency nursing. However, courses are not standardized or required as a condition for working in an ED. The burden of the basic education necessary for transition from an inexperienced to an experienced,**

**knowledgeable emergency nurse rests primarily on the nursing management of the individual hospital or ED.**

The ENA, the international professional organization for emergency nurses, provides many of the courses taken by emergency nurses to expand their practice standards and knowledge base in emergency nursing. Courses such as TNCC (Trauma Nurse Core Curriculum), ENPC (Emergency Nurse Pediatric Course), and CATN (Course in Advanced Trauma Nursing) are internationally subscribed to as demonstrating the concepts necessary for functioning successfully as an emergency nurse.

Additional courses are TNS (Trauma Nurse Specialist), ACLS (Advanced Cardiac Life Support), BLS (Basic Life Support), PALS (Pediatric Advanced Life Support), and NRP or NALS (Neonatal Advanced Life Support). Many emergency nurse managers use these courses to maintain a basic clinical standard for their emergency staff nurses. Beyond these standardized courses, there are numerous research-based nursing journals that offer continued clinical knowledge developments, as well as the many states and local chapters of official nursing organizations that consistently offer educational opportunities.

National clinical standards exist, such as the ENA Core Curriculum, which serve to maintain a national standard of emergency nursing care, but ultimately, practice varies from state to state, institution to institution. Although practice variance is not great, it occurs in certain technical procedures followed at each institution. The basic clinical practice standards are established nationally by the ENA, in accordance with the Nurse Practice Act.

Curriculum Oversight

The ENA, as the international professional organization for emergency nurses, publishes the Core Curriculum, which is a consensus of clinical knowledge and practice standards written by leaders in the field of emergency nursing. The ENA courses TNCC, ENPC and CATN are developed by task forces consisting of educators and clinical experts organized by the ENA. Course content, validity, distribution, and continued development is administered by the ENA. Other courses attended with consistency by emergency nurses, such as ACLS, BLS, PALS, and NALS, are administered by international organizations such as the American Heart Association, in accordance with their international guidelines.

The BCEN recommends that review materials and programs focus on the CEN content outline including nursing process. There are references from both ENA and other sources. For example, references available from ENA include Emergency Core Curriculum; CEN Review Software, and CEN Review Manual.

BCEN neither sponsors nor endorses any preparatory courses or texts for the CEN examination. However, the BCEN works to educate hospitals about the benefit of having a certified emergency nursing staff.

Practical Experiences

Two years of experience in emergency nursing practice is recommended, but not required, for eligibility to take the CEN examination.

There are scenario-based experiences built into most of the aforementioned courses that require the performance of multiple technical skills and demonstration of critical thinking, as well as mastery of course content. Practical experience at the bedside occurs primarily with an experienced preceptor assigned to precept and orient the new emergency nurse at the place of employment. JCAHO mandates maintaining evidence of achieving an initial competency in performed skills, as

well as annual competence in performing technical procedures, CE in such topics as age-specific competencies, annual BLS review, and maintaining mandatory certifications required by the institution, such as TNCC, ACLS, and infection control and safety issues.

Other certifying bodies, such as the American College of Surgeons, may also have nursing education requirements to be maintained by the institution. These requirements all serve to place CE demands on nursing management. Many of these requirements have a practical, as well as didactic, component.

Certification

In general, emergency nurse certification is voluntary. Some hospitals do not require special certification for emergency nurses, but many ED nurses must show proof of advanced certification or verification to JCAHO. Many hospitals require specific certifications/verifications for nurses who work as emergency nurses in the ED. Specific certifications or verifications include BLS, ACLS, and PALS. ENPC, TNCC, CATN, NALS, and TNS are also commonly required or suggested standardized courses

**The Certification Examination for Emergency Nurses has been offered since 1980. It was initially established by the ENA but is now administered by the BCEN. The BCEN certifies nurses who provide emergency services across the health care continuum. To be eligible for board certification, a nurse must have a current unrestricted license or nursing certificate equivalent to an RN in the United States. The BCEN recommends a minimum of 2 years of current emergency nursing experience to successfully sit for the boards.**

BCEN has oversight of the examination and protects its confidentiality and quality. The certification process involves contacting BCEN and receiving an application and a blueprint or high-level topical outline of general test areas. As part of the process of creating the examination, BCEN defines the role of most emergency department nurses using a Role Delineation Study (RDS). The RDS process involves use of surveys and interviews to collect and rate by frequency tasks most often performed by emergency nurses. From selected RDS results, test items are prepared for the certification examination. In addition to the RDS, which is currently being revised to include new areas, new questions are continually added from ongoing research into actual emergency nursing practice.

CEN must be renewed every 4 years. To maintain certification, nurses can elect to retake the examination using a computer-adaptive test or complete CE hours as specified by the CEN board. However, every other renewal (or every 8 years), the examination must be retaken. Currently, the CE requirement for recertification is 100 hours in accredited topics of choice. The 100 hours of topics are specified by the BCEN.

A current unrestricted license or nursing certificate that is equivalent to an RN in the United States or its territories is required. Recommendations for eligibility include 2 years of experience in emergency nursing practice and membership in the ENA.

Areas Where Integration of WMD Content Might Occur

Based on the content outline for the CEN examination, WMD content identified by the task force appears to fit into several emergency nursing content topics. Relationships could be made in clinical pathophysiology; patient care management, especially in the disaster subsection; environment and toxicology; and shock and multisystem trauma.

WMD content, at an awareness level, also could be woven into the course content of TNCC, CATN, and ENPC. Primarily, the TNCC curriculum would be the most natural fit for WMD content

integration. Certainly highlighting various aspects of WMD issues in the professional nursing journals would also serve to elevate the WMD awareness level.

Importantly, the new edition of the *Emergency Nursing Core Curriculum*, published by ENA, includes a section on WMD—nuclear, biological, and chemical—within the chapter on disaster preparedness and disaster management. The new section includes the following topics: overview of biochemical hazardous material contamination, radiation contamination, chemical contamination, biological contamination, viral contamination, and toxins. The disaster chapter also contains a section on testing or exercising disaster preparedness. The next logical step is to include WMD content questions on the CEN board examination.

Potential Barriers to the Integration of WMD Content

Barriers for WMD content integration into preexisting standardized courses include:

- Convincing the educators and clinical experts who regularly review and update course content that WMD is an important topic and applicable to include in the course
- Lack of recognized topic experts who are also knowledgeable in the preexisting standardized courses to assist with WMD content integration
- Budgetary restraints for the increased time and research necessary to develop pertinent WMD content for the standardized courses
- A full existing course content for which the addition of more information may exceed the time constraints of the course

Barriers for inclusion of WMD content questions on the CEN include:

- Lack of recognized topic experts who are also familiar with the CEN to formulate pertinent test questions
- Convincing the BCEN that WMD content is sufficiently important and pertinent to all emergency nurses that it should be included in the CEN examination
- Lack of available, CE WMD refresher courses to enable emergency nurses to renew their CEN via CE classes

## COURSE REVIEWS

The following six courses represent selected WMD-related courses that are nationally available:

1. Medical Response to Biological Warfare and Terrorism
2. Medical Response to Chemical Warfare and Terrorism
3. Medical Planning and Care in Radiation Accidents
4. Domestic Preparedness for Hospital Providers
5. Domestic Preparedness for EMS Technicians
6. Emergency Response to Terrorism: Basic Concepts

A brief review and overview are provided for each course that focus on how the content of each course compares with the objectives identified by the task force and how the course might be used to meet training needs of the contract audience groups.

**Course #1**
***Medical Response to Biological Warfare and Terrorism***

Sponsoring Organization

The US Army Medical Research Institute of Infectious Diseases (USAMRIID), the Centers for Disease Control and Prevention (CDC), the Food and Drug Administration (FDA), and the Public Health Training Network (PHTN)

The videotape set can be ordered and purchased from the National Technical Information Service (NTIS).

Target Audience

The course is intended primarily for the following audience groups:

- Military and civilian medical care providers
- Public health professionals such as epidemiologists and laboratorians, who are involved in disease surveillance and prevention
- Clinical laboratory staff
- First responders and others who would assist in recognizing and managing casualties from a biological agent attack

Proficiency Level and Evaluation Techniques

The proficiency level expected is that the participants will know and remember information presented. Some of the knowledge is applied in the use of case studies. Participants are evaluated via an approximately 25-item multiple choice test at the end of the course. A course evaluation is also provided.

Format and Material

The course is presented in a series of six videotapes, each two hours long. Along with the video tapes, a set of course material is provided for each participant that contains the course schedule (time allocation for each tape), case studies/exercises, reference materials (see list below), and evaluations. (The satellite course is structured into three four-hour days of instruction.)

This course provides an interesting mix of presentation settings and styles, including a news talk show format, question and answer sessions, brief lectures by subject matter specialists, panel discussions with selected experts, and video segments. Paper-based support materials include:

- Short, text-based case studies and scenarios followed by discussion questions
- *Medical Management of Biological Casualties Handbook*, 3rd ed. Frederick, MD: US Army Medical Research Institute of Infectious Diseases, Fort Detrick; 1998

- *Defense Against Toxin Weapons*. David R. Franz, DVM, PhD, US Army, Revised 1997 (49-page booklet)
- *Packaging and Shipping Infectious Materials*
- *NATO Handbook on the Medical Aspects of NBC Defensive Operations AmedP-6 (B), Part II – Biological*, Depts of the Army, the Navy and the Air Force, February 1996
- MMWR – *Case Definitions for Infectious Conditions Under Public Health Surveillance* US Dept of Health and Human Services: CDC; 1997: 46

Case studies present scenarios and related questions to practice dealing with various types of biological incidents—bacteria, viruses, infection control, and toxins.

Content Description

This course presents a thorough view of the threat of biological warfare/terrorism; an introduction to biological agents that includes epidemiology, pathogenesis, clinical features, and medical management; the medical response to a military-based biological weapons attack; and various issues surrounding, roles of public health services and primary caregivers. Overall, this course is the most comprehensive one available in the area of medical management of biological attacks or incidents.

In general, the context of the course is military rather than civilian, a context that influences the scenario settings, the equipment discussed, and the concerns addressed. However, the 1999 version will devote one of the 3 days (4 hours) to civilian response issues. This segment will be moderated by instructors from the CDC.

In addition, the focus of this course is on biological agents, effects, and response, as opposed to all WMD, which would include chemical, radiological, or mixed.

A portion of the content is similar to that content represented by the task force objectives. Similar areas include treatment, event recognition, safety and equipment (although differences exist due to military setting), decontamination principles, triage principles, principles of containment and isolation, and psychological effects.

Although military in context, the course included civilian concerns by discussing federal level response and public health service roles on both a national and local basis.

Potential Use for Contract Audience Groups

The content of this course is appropriate for the audiences targeted in this contract, although more applicable to physicians and nurses because of the in-depth coverage of agents and treatment options. Because of the thoroughness of this course and level of expertise represented, this course or some portion of it might also be used as a train-the-trainer tool. However, because of audience differences, some modifications would be required to maximize the content's effectiveness. Although this course contains definitive knowledge on biological agents, their effects, and appropriate treatment, new case scenarios that present biological terrorist events in civilian settings will have to be developed, as is planned for the 1999 version. To meet the training delivery needs of the contract audience groups, the content might also be repurposed into segments or modules. These could be organized onto a CD-ROM or in a Web format, which would allow participants to access and revisit selected portions easily and when convenient rather than being limited to an extended 8- or 10-hour session.

The use of CD-ROM and/or the Web could extend the application of the content, making it available to additional audiences. This type of delivery would also help facilitate the distribution and the maintenance of the program.

However, both of the delivery methods offered by this course—satellite and videotape series—accommodate a wide range of audiences. A satellite audience can be small or large, depending on the facilities. The videotape can also serve various audience sizes and has even more flexibility for structuring the learning into convenient blocks of time. The two formats are also beneficial in that the satellite version allows a consistent, high quality course to be made available—live, in real time with an interactive format—to a large audience with minimal travel costs, while the video option allows for self-study where individuals require unique pacing.

The satellite-delivered course in particular provides a potential model for training large numbers of people at once. For example, the anticipated number of participants for the September 1999 satellite course is 40,000. This presentation method could be considered to solve train-the-trainer needs in future WMD education efforts.

**Course #2**
***Medical Response to Chemical Warfare and Terrorism***

Sponsoring Organization

The Chemical Casualty Care Division of the USAMRICD

The videotape set can be ordered and purchased from the NTIS.

Target Audience

The course is intended primarily for the following audience groups:

- Military and civilian medical care providers
- Public health professionals, such as laboratorians
- First responders and others who would assist in recognizing and managing casualties from a chemical agent attack

Proficiency Level and Evaluation Techniques

The proficiency level expected is that the participants will know and remember information presented. Participants are evaluated via an approximately 25-item multiple choice test at the end of the course. A course evaluation is also provided.

Format and Material

This course is structured into six, 2-hour videotapes. The course is also offered via satellite. Along with the videotapes, participants receive a student book entitled *Medical Management of Chemical Casualties Handbook*, six local participant activities, one course examination, and Scantron forms.

The tape series provides an interesting mix of presentation settings and styles, including group discussions, laboratory demonstrations, video segments, a variety of lectures, panel discussion, and question and answer sessions with a group of experts.

Case studies present scenarios and related questions to practice dealing with various types of chemical incidents—pulmonary agents, cyanide, vesicants, nerve agents, incapacitating agents, and mass casualty.

Content Description

This course presents information for health care providers that includes information about the characteristics of different classes of chemical warfare agents, the likely presentation of casualties, and the proper diagnosis and treatment for victims of chemical agent exposures**.**

The context of the course is military rather than civilian. Although one scenario did involve an industrial accident, the issue of civilian-based terrorism was not covered. In addition, the exclusive focus of the course is on chemical events rather than including all types of WMD incidents.

Some of the course content is similar to the chemical incident content represented by the task force objectives. Similar content areas include treatment, identification of agents, safety and use of equipment (although equipment used by military is not used by civilians), decontamination principles, triage principles, and principles of containment and geographical isolation.

The activities provided for use throughout the course help participants apply facts and concepts.

Potential Use for Contract Audience Groups

Although this course contains definitive knowledge on chemical agents, along with effects and appropriate treatment, new case scenarios would have to be developed that present chemical terrorist events in civilian settings. To meet the training delivery needs of the contract audience groups, the content would also have to be repurposed into segments or modules. These could be organized onto a CD-ROM, which would allow participants to access and revisit selected segments easily and when convenient, rather than being limited to an extended 8- or 10-hour session. Portions of this course are already available via the Web.

Additional Web and/or CD-ROM versions could extend the application of the content, making it available to additional audiences. This type of delivery would also help facilitate the distribution and the maintenance of the program.

However, both of the delivery methods offered by this course—satellite and videotape series—accommodate a wide range of audiences. A satellite audience can be small or large, depending on the facilities. The videotape can also serve various audience sizes and has even more flexibility for structuring the learning time.

The satellite-delivered course provides a potential model for training large numbers of people at once. This instructional method could be considered for a train-the-trainer situation with future WMD education efforts.

**Course #3**

***Medical Planning and Care in Radiation Accidents***

Sponsoring Organization

The course is prepared and presented at the Radiation Emergency Assistance Center/Training Site (REAC/TS), which is located at the Oak Ridge Institute for Science and Education. REAC/TS is sponsored by the US Department of Energy at the Oak Ridge Institute for Science and Education (ORISE).

The REAC/TS faculty also prepares and presents the nuclear portion of Domestic Preparedness training entitled *Managing Nuclear Incidents.*

To participate in the course, individuals must register ahead of time and space is limited.

Target Audience

This course is designed primarily for physicians and physician assistants. Others taking the course include paramedics, registered nurses, nuclear health physicists, toxicologists, and military personnel.

It is recommended that participants have a basic understanding of radiation sciences prior to attending this course.

Proficiency Level and Evaluation Techniques

The proficiency level expected is that of knowing and remembering and is assessed by performance on the quiz and case studies. No procedural or planning performance assessment is made. Participants are provided with a 25-item multiple choice quiz at the end of the course, along with a course critique form.

Format and Material

The course is structured into 4.5 days of instructor-led classroom instruction for groups of 24. The lectures are presented by various subject matter experts from REAC/TS.

A participant notebook is provided for the course that contains the course schedule (time allocation for each section over a 4.5 day period), lecture notes for the 24 sections, bibliographies and reference articles, and medical problems or case studies.

One video is used that emphasizes decontamination. Also included is a live demonstration of victim decontamination and a visit to the cytogenetics laboratory and whole body counter.

Content Description

This course presents an advanced level of information on the diagnosis and treatment of acute local and total body radiation exposure, internal and external contamination, combined injuries, and multicasualty incidents involving ionizing radiation. Overall, it is the most comprehensive medical management course available in the area of medical management of complications from radiation accidents.

One major distinction is that this course focuses on radiological agent, effects and response, not on all of the WMD, which include chemical, radiological, or mixed. However, a portion of the content is similar to the radiological content represented by the task force objectives. Similar content areas include treatment, event recognition, safety and equipment, elements of response support, decontamination principles, triage principles, principles of containment and isolation, and psychological effects.

The issue of terrorism is touched on (e.g., missing brachytherapy sources and the black market); however, the case studies do not involve terrorist events. Issues are emphasized surrounding mass casualty management relating to nuclear incidents.

Five medical problems are presented. These are not related to terrorism but are accidents at work sites, laboratories, or hospitals. There is a demonstration of patient decontamination (both live and video) and an extensive look at several real-life accidents involving mass casualties during the formal lecture portion of the course.

Potential Use for Contract Audience Groups

This course is very technical and comprehensive. It emphasizes the medical management of complications from radiation accidents and therefore is considered too in-depth for the audiences targeted by this contract.

An alternative and perhaps more appropriate course for the specified audience might be the *Handling of Radiation Accidents by Emergency Personnel*, also presented at REAC/TS. This is a somewhat shorter (3.5 day) course for physicians, nurses, and physician assistants who may be called on to provide EMS to radiation accident victims. The focus of the 3.5-day course is somewhat more

practical in terms of handling contaminated victims, detection, and prevention of contamination. In addition to the lectures, hands-on laboratory exercises and a radiation accident drill are included. However, similar to the *Medical Planning and Care in Radiation Accidents* course, it is limited to 20 people, five times a year.

For this course to be adapted in meeting WMD training needs of our audience groups, it would have to be shortened considerably. New case scenarios would need to be developed surrounding terrorist-mediated events rather than industrial ones or criticality incidents. Greater emphasis would need to be placed on decontamination and initial monitoring, rather than on the later treatment of various radiation syndromes. One possibility would be a hybrid of the Domestic Preparedness Nuclear Section, combined with some clinical aspects of this course, and videos demonstrating decontamination and monitoring of victims.

The course, as it stands, cannot be adapted for use at the local level. It will not allow for the training of large numbers of people, given the limited expertise surrounding radiation accidents (i.e., all experts are at REAC/TS and they are funded to train only approximately 100 persons per year). However, it could be used to train new experts, who would then go on to present a hybrid course targeted at WMD, as outlined above.

To use this course for continuing training would be a significant challenge. Its format would have to be modified to videotape or CD-ROM. Expertise in this content area is limited and, for the most part, restricted to the REAC/TS instructors. This precludes wide dissemination of this material through participation in the course at the REAC/TS site.

**Course #4**
***Domestic Preparedness for Hospital Providers***
Sponsoring Organization

The Domestic Preparedness initiative was formed under FY 1997 Defense Authorization Bill, commonly called the Nunn-Lugar-Domenici legislation. The bill provides funding for the Department of Defense (DOD) to enhance the capability of federal, state, and local emergency responders in incidents involving nuclear, biological, and chemical terrorism.

The federal interagency team responsible for arranging the training includes representatives from the following groups:

- Federal Bureau of Investigation (FBI)
- Federal Emergency Management Agency (FEMA)
- Department of Energy (DOE)
- Environmental Protection Agency (EPA)
- Department of Health and Human Services (HHS)
- DOD

The Domestic Preparedness program is designed as a train-the-trainer effort to prepare city trainers to provide similar instruction to their emergency responder communities. The program uses a team teaching approach by combining the skills and expertise of recognized NBC specialists with those of emergency response experts.

At this time, the Domestic Preparedness Hospital Provider course is available only to the 120 cities targeted for this effort.

Target Audience

The Hospital Provider course provides instruction to trainers of ED physicians and nurses. (This course includes the same subjects as the EMT course but at a more advanced level.)

Proficiency Level and Evaluation Techniques

The proficiency level expected for the participants in this course is to "know" or to "become aware of" information related to WMD incidents. However, subsequent tabletop exercises that are part of the overall domestic preparedness training process provide a way in a realistic simulation to use some of the knowledge gained through actual training.

Format and Material

The Hospital Provider course is an 8-hour instructor-led course. The format is primarily classroom lecture that includes some demonstrations and case studies.

The course is organized into five modules:

- Introduction to the Hospital Provider Course
- Management of Nuclear Casualties
- Management of Chemical Casualties
- Management of Biological Casualties
- Special Hospital Considerations in a Mass Casualty Incident

The materials provided to participants of the Hospital Provider train-the-trainer course include a copy of the student and trainer notebook, reproducible masters of either 35-mm slides or PowerPoint media, and reproducible masters of video presentations.

Content Description

This course presents a wide range of topics of concern to hospital-based health care providers in the event of a biological, chemical, radiological, or mixed terrorist event. Topics include management, decontamination, diagnosis, and treatment of victims of a WMD incident, as well as prevention of cross-contamination through the use of personal protective measures and associated public health guidelines. This initial train-the-trainer course seeks to inform participants of critical facts, dangers, and planning needs related to WMD incidents.

Some of the Hospital Provider course content is similar to the content represented by the task force objectives, as it applies to emergency physicians and emergency nurses. Similar content areas include treatment, event recognition, safety and equipment, elements of response support, decontamination principles, triage principles, fatality management, communication, recovery operations, and psychological effects. However, the perspective in which the content is presented is primarily that of planning.

In addition, more emphasis seems to be placed throughout the course on the chemical incident response approach rather than on the biological approach.

The training course by itself is not designed to test or ensure that participants can demonstrate that knowledge; however, knowledge and skills are discussed in terms of real actions and needs, and the material raises important issues and suggests action steps.

Potential Use for Contract Audience Groups

In many ways, the course is appropriate for the hospital providers that compose this contract's audience groups. For example, many of the topics covered would also correspond with the objectives developed by the task force. In addition, the course focuses on needs unique to the hospital setting.

However, as stated earlier, much emphasis is placed on planning tasks, as opposed to preparing the emergency physician and nurse to perform specific tasks in the event of an incident.

The Hospital Provider course is already organized into modules, and these modules could be used to begin the development of various other training components and versions presented in a variety of delivery mediums. Alternate delivery methods would meet the need for training that is delivered in smaller amounts and can be accessed whenever convenient rather than being limited to a specific classroom setting.

This course illustrates a model of using a widely distributed instructor-led course to address the need to train additional instructors for future WMD courses. Because the purpose is to provide a train-the-trainer course to a limited number of cities, it is by definition meant to be adapted for use at the local level. The basic material given to future trainers in the form of a notebook and slides could easily be added to or modified for particular audiences.

**Course #5**
***Domestic Preparedness for EMTs***
Sponsoring Organization

The Domestic Preparedness initiative was formed under FY 1997 Defense Authorization Bill, commonly called the Nunn-Lugar-Domenici legislation. The bill provides funding for the DOD to enhance the capability of federal, state, and local emergency responders in incidents involving nuclear, biological, and chemical terrorism.

The federal interagency team responsible for arranging the training includes representatives from the following groups:

- Federal Bureau of Investigation (FBI)
- Federal Emergency Management Agency (FEMA)
- Department of Energy (DOE)
- Environmental Protection Agency (EPA)
- Department of Health and Human Services (HHS)
- DOD

The Domestic Preparedness program is designed as a train-the-trainer effort to prepare city trainers to provide similar instruction to their own emergency responder communities. The program uses a team teaching approach by combining the skills and expertise of recognized NBC specialists with those of emergency response experts.

At this time, the Domestic Preparedness Hospital Provider course is available only to the 120 cities targeted for this effort.

Target Audience

The EMT course provides instruction to trainers of EMS providers. (This course includes the same subjects as the Hospital Provider course but at a less advanced level.)

Proficiency Level and Evaluation Techniques

The proficiency level expected for the participants in this course is to “know” or to “become aware of” information related to WMD incidents. However, subsequent tabletop exercises that are part of the overall domestic preparedness training process provide a way in a realistic simulation to use some of the knowledge gained through actual training.

The emergency responder awareness course is a prerequisite for this course. It is recommended that participants also have a basic understanding of HazMat.

Format and Material

The EMT course is an 8-hour instructor-led course. The format is primarily classroom lecture that includes some demonstrations and case studies.

The course is organized into five modules:

- Introduction to the Hospital Provider Course
- Management of Nuclear Casualties
- Management of Chemical Casualties
- Management of Biological Casualties
- Special Hospital Considerations in a Mass Casualty Incident

The materials provided to participants of the EMT train-the-trainer course include a copy of the student and trainer notebook, reproducible masters of either 35-mm slides or PowerPoint media, and reproducible masters of video presentations.

Content Description

This course presents a wide range of topics of concern to EMS providers in the event of a biological, chemical, radiological, or mixed terrorist incident. Topics include recognizing NBC exposure, characteristics of specific events, safe and legal antidote information, mass casualty and emergency medical field treatment demands, and treatment of special needs victims. Demonstrations and field exercises are also included on personal protection techniques, detection equipment, decontamination procedures, and triage procedures.

As a prerequisite, the emergency responder awareness course provides a foundation of knowledge for the EMT course. The awareness course seeks to teach emergency responders about how to recognize an NBC incident, protect themselves, and notify others as needed. Topics include an introduction to the threat of NBC terrorism; weapons and agents specific to chemical, biological, and radiological events; methods of disseminating NBC agents; and the role of an emergency responder.

Some of the ET course content is similar to the content represented by the task force objectives, as it applies to EMS providers. Similar content includes treatment, event recognition, response support, safety and PPE, decontamination, triage, containment and isolation, communication, and psychological effects. However, the perspective in which the content is presented is primarily that of planning.

In addition, more emphasis seems to be placed throughout the course on the chemical incident response approach rather than on the biological approach.

The training course by itself is not designed to test or ensure that participants can demonstrate that knowledge; however, knowledge and skills are discussed in terms of real actions and needs, and the material raises important issues and suggests action steps.

Potential Appropriateness or Use for Contract Audience Groups

In many ways the course is appropriate for the EMS provider group specified by this contract. For example, many of the topics covered would also correspond with the objectives developed by the task force. However, as stated earlier, much emphasis seems to be placed on planning tasks and learning about issues rather than on learning to perform specific skills.

The EMT course is already organized into modules, and these modules could be used to help develop various other training components and versions presented in a variety of delivery mediums. Alternate delivery methods would meet the need for training that is delivered in smaller amounts to be accessed whenever convenient rather than being limited to a specific classroom setting.

This course illustrates a model of using a widely distributed instructor-led course to address the need to train additional instructors for future WMD courses. Because the purpose is to provide a train-the-trainer course to a limited number of cities, it is by definition meant to be adapted for use at the local level. The basic material given to future trainers in the form of a notebook and slides could easily be added to or modified for particular audiences.

**Course #6**
***Emergency Response to Terrorism: Basic Concepts***
Sponsoring Organization

This course provided by the Bureau of Justice Assistance (BJA), a group within the Department of Justice that coordinates training in the 120 largest metropolitan jurisdictions. The course curriculum was coordinated with the National Fire Academy (NFA) and conforms to guidelines established by the National Fire Protection Association (NFPA).

Community Research Associates (CRA) coordinates delivery of this curriculum in the 120 targeted jurisdictions on behalf of the BJA. CRA provides the following functions in the delivery of this course:

- Arranges train-the-trainer visits
- Supports on-site training with logistical support (e.g., audio and visual equipment, materials)
- Fulfills requests for student manuals
- Coordinates the validation of student training certification through BJA
- Conducts an evaluation of each training session

Training services and curriculum are provided free of charge, and participants may receive an NFA certificate after training is completed.

Target Audience

The primary target audience for this course includes three groups, preferably already trained to the operations level in HazMat response. These include fire personnel, EMS responders, and HazMat responders.

In addition, this course is designed to benefit the following audiences:

- Law enforcement personnel
- Emergency communications personnel
- Emergency management personnel
- Public works management
- Public health workers
- Armed forces, reserves, National Guard
- Disaster response agencies

Proficiency Level and Evaluation Techniques

The proficiency level expected is that of understanding and remembering and is assessed by performance on the test and case studies. Participants are provided with a 25-item multiple choice quiz at the end of the course.

Format and Material

The Basics Concepts course is available in two formats: a 2-day instructor-led course and a self-study option. Both contain the following five modules:

- Understanding and recognizing terrorism
- Implementing self-protective measures

- Scene control
- Tactical consideration
- Incident command overview

Guided activities are provided for both large group and small groups of four to six individuals. Scenarios, questions, and time frames are provided for all activities.

The overall program includes a train-the-trainer component, the instructor-led course, and a self-study course. Materials provided for the instructor-led course include slides numbered for association with the respective module, instructor guide, student manual, and examinations.

The instructor guide contains specific directions regarding supplies and materials, how to use the materials, course schedule (time allocation for each module over a 2-day period), directive statements for use in training, discussion questions to encourage interaction, background information for reference and added discussion, and directions for all course activities.

Content Description

This course provides information about terrorism and the presentation of terrorism, in addition to the multiagency roles required in responding to an attack. The course also includes personal safety needs and rules, tactical considerations, and scene control. However, it does not cover medical management of events.

The overall stated goal of this training program is to assist those who respond to the scene of a possible terrorist incident to:

- Effectively protect themselves from a variety of potential dangers
- Effectively perform responder tasks in a situation that combines the elements of a HazMat materials an incident and a crime scene
- Notify and respond to appropriate authorities from local, state, and federal jurisdictions

Because this course targets first responders from the fire and emergency services perspective, only a limited portion of the course content corresponds with that represented by the objectives detailed by this task force. Content topics are shared primarily with the awareness objectives and include portions of event recognition, personal safety, decontamination, unified incident management, and communications and interagency interaction.

Potential Use for Contract Audience Groups

As indicated by the audiences targeted, this course assumes a traditional first-responder perspective. Therefore, although some content is shared, little knowledge and few skills related to patient care are included. Emphasis is placed on the events themselves and corresponding management issues, not on victim health care following the event. For example, some information about biological and chemical agents is presented but only a minimal amount that would establish a context for learning the appropriate personal safety behaviors. The associated discussion centers on tactical considerations and corresponding procedures rather than on victim symptoms and treatment.

Although content topics are shared, the overall perspective is different than the medical management perspective. However, EMS providers, particularly those who work in first responder-based employment settings, would benefit from this course.

Although this course is appropriate for EMS providers, its purpose does not correspond to the challenge dealt with by this task force. However, the course could provide an excellent reference and source of content in developing a future course. By using alternate forms of delivery—self-study and

instructor-led—the format of this course addresses the need for flexibility of delivery and multiple learning preferences.

**EMS Providers**

| Numbers and Locations | Primary Levels of Education and Certification | Barriers to WMD Training |
|---|---|---|
| 711,472 EMS providers primarily clustered around urban areas | 76% EMT-Basic<br>8% EMT-Intermediate<br>16% EMT-Paramedic<br><br>Background education ranges from GED to associates or bachelor's degree.<br><br>***EMT-Basic (EMT-B)***<br>To become certified at the basic level, one must complete a 110-hour didactic course and a minimum of 10 practice hours.<br><br>***EMT-Intermediate (EMT-I)***<br>The intermediate level was developed primarily to provide a higher level of training compared with the basic level without incurring the time, money and resources, and depth of training required to reach the level of paramedic. This category of providers particularly serves rural communities and others for whom the paramedic training would be prohibitive, due to cost and time constraints. | Barrier Group 1<br>*The first group of barriers are those that would either prevent or make difficult the integration of WMD-specific content into primary EMT education.*<br><br>• No single source of authority to require that WMD knowledge and skills become a part of EMT training<br>• Excessive time required to complete the process of revising US DOT national standard curricula<br>• EMT curricula would have to expand to include new content, which increases training costs<br>• No "approved" body of content or curriculum exists on which to base course development<br><br>Barrier Group 2<br>*The second group of barriers includes those that would prevent or significantly hinder the development and maintenance of effective WMD training materials for EMS providers.*<br><br>• Funding for the development of comprehensive WMD content for EMT training programs or for CE courses, which includes research, writing, material development, procurement of equipment/supplies, faculty development, and pilot testing<br>• Lack of sponsoring organization to develop, deliver, and maintain WMD training<br><br>Barrier Group 3<br>*A third group of barriers for EMS providers involves those that will (1) prevent the acquisition of WMD skills and knowledge by those* |

| | | |
|---|---|---|
| | ***EMT-Paramedic***<br>EMT-P is the most advanced level of formalized out-of-hospital training. The length of training ranges from 850 to 1,000 hours of practical and didactic training, with many college-based programs awarding associate's degrees. | *currently in practice, or (2) limit the ability to sustain WMD skills and knowledge for EMS providers through CE, practice, and drills or exercise.*<br><br>• Lack of perception by those currently practicing that this type of training is a priority for CE<br>• Lack of perception by employers that this type of training is a priority, which results in lack of employer support<br>• High turnover among EMS providers<br>• Inadequate funding to cover attendance costs (e.g., time off, tuition, travel) |

**Emergency Physicians**

| Numbers and Locations | Primary Levels of Education and Certification | Barriers to WMD Training |
|---|---|---|
| 32,000 emergency physicians primarily working in urban settings | Medical school programs are typically 4 years in length.<br><br>Emergency medicine residency programs are required to offer 36 months of curriculum.<br><br>Each emergency medicine residency program must teach the skills and knowledge that compose the fundamentals of the practice of emergency medicine. Additionally, residency programs must provide increasing responsibility for and experience in the application of these principles to the management of clinical problems. Each residency program is to be designed so that residents have the opportunity with appropriate guidance and supervision to attain a satisfactory level of clinical maturity, judgment, and technical skill. In general, after completing a residency program, residents should be capable of practicing emergency medicine and incorporating new skills and | <u>Barrier Group 1</u><br>*The first group of barriers are those that would either prevent or make difficult the integration of WMD-specific content into medical school curricula or into emergency medicine residency programs.*<br><br>• Existing medical school and emergency medicine residency program curricula are full and time is limited<br>• No "approved" body of content or curriculum exists on which to base WMD course or content development<br>• The need for training in knowledge and skills related to WMD response has not been broadly articulated and emphasized by national organizations<br>• No advocates have currently been identified (and equipped) to lobby for or influence the acceptance of WMD content as a priority for integration into existing medical school curriculum<br><br><u>Barrier Group 2</u><br>*The second group of barriers includes those that would prevent or significantly hinder the development and maintenance of effective curriculum materials for integration into initial medical school/emergency residency education or CE.*<br><br>• Lack of funding for the development of comprehensive WMD content for medical school/emergency residency programs or for continuing medical education courses, which includes research, writing, material development, procurement of equipment/supplies, faculty development, and pilot testing<br>• Lack of a national clearinghouse or repository for the collection of related knowledge and skills to ensure consistency and quality, and |

| | | |
|---|---|---|
| | knowledge during their careers. | minimize redundancy of effort<br>• Lack of established standard content literature, which increases the time required to develop curricula and course materials<br>• Difficulty of procuring adequate expertise to work on the development of curricula and course materials and to oversee content development, management, and revision of curricula and course materials<br>• Lack of an oversight group designated to assist in the development, management, and revision of curricula and course material<br><br><u>Barrier Group 3</u><br>*A third group of barriers for emergency physicians involves those barriers that will (1) prevent the acquisition of WMD skills and knowledge by those emergency physicians currently in practice, or (2) limit the ability to sustain WMD skills and knowledge for emergency physicians through continuing medical education, practice, and drills or exercises.*<br><br>• Inadequate funding to cover attendance costs (e.g., time off, tuition, travel)<br>• Lack of perception by hospital administrators that this type of training is a top priority, which results in lack of broad hospital support<br>• Personnel shortages that make it impossible to cover positions open while people are being trained (issue of back-fill requires adequate personnel)<br>• Lack of perception by emergency physicians that there is a need for WMD education, particularly that this type of training is a top priority |

**Emergency Nurses**

| Numbers and Locations | Primary Levels of Education and Certification | Barriers to WMD Training |
|---|---|---|
| Approximately 90,000 emergency nurses in the US; approximately 26,000 are members of ENA and 26,000 have certification as a CEN. | All nurses have completed at minimum one of the following paths of education:<br>• Nursing diploma – 2- or 3-year hospital-based nursing program<br>• Associates degree in nursing (community college)<br>• Bachelor's degree in nursing<br>• Masters or PhD in nursing or other professional degree | Barrier Group 1<br>*The first group of barriers are those that would either prevent or make difficult the integration of WMD-specific content into nursing school curricula or into emergency nursing education, including certification requirements.*<br><br>• Existing nursing school curriculum is full and time is limited<br>• No "approved" body of content or curriculum exists on which to base course or content development<br>• No formal acceptance exists at the national level of the need to integrate information into standard nursing curriculum or to develop a CE course<br>• WMD response knowledge and skills have not been acknowledged by nursing school curriculum committees as a priority over other areas within nursing that are also needed<br><br>Barrier Group 2<br>*The second group of barriers includes those that would prevent or significantly hinder the development and maintenance of effective curriculum materials for integration into initial nursing education or CE.*<br><br>• Funding for the development of comprehensive WMD content for nursing school or for CE materials/courses, which includes research, writing, material development, faculty development, and pilot testing<br>• Lack of national clearinghouse or repository for collection of related knowledge and skills currently being developed to ensure consistency and quality, and minimize redundancy of effort |

| | | |
|---|---|---|
| | | • Lack of established standard content literature, which increases the time required to develop curricula and course materials specific to the nursing role<br>• Difficulty of procuring adequate expertise to work on the development of curricula and course materials and to oversee content development, management, and revision<br>• Lack of oversight group designated to assist in the development, management, and revision of curricula and course materials<br><br><u>Barriers Group 3</u><br>*A third group of barriers for emergency nurses involves those barriers that will (1) prevent the acquisition of WMD skills and knowledge by those emergency nurses currently in practice, or (2) limit the ability to sustain WMD skills and knowledge for emergency nurses through continuing medical education, practice, and drills or exercises.*<br><br>• Inadequate funding to cover attendance costs (e.g., time off, tuition, travel)<br>• Lack of perception by hospital administrators that this type of training is a top priority, which results in lack of broad hospital support<br>• Personnel shortages that make it impossible to cover positions open while people are being trained – issue of back-fill that requires adequate personnel<br>• Lack of perception by nurses that there is a need for WMD education, particularly that this type of training is a top priority |

# Levels of Proficiency

## BACKGROUND – SPECIFICATIONS OF OBJECTIVES

Objectives convey the desired outcomes or results of a learning experience. In other words, objectives are used to specify the behaviors learners are to exhibit before they are considered competent. They correspond closely to real-world performance or work requirements and specify the actions learners should be able to perform after training. The relationship between objectives and other components of training experiences, such as practice activities and evaluation, should be consistent.

**The objectives are based on the needs analysis and content analysis accomplished during Phase I. As a first step, content outlines were developed, and then specific objectives were written based on the required content. The objectives were written by task force members who include representatives of each target audience group and subject matter experts in the areas of nuclear, biological, and chemical terrorism. After several rounds of review and revision, the objectives represent the knowledge and skills required for learners to be prepared to respond effectively to terrorist events that incorporate weapons of mass effect. The performance level objectives incorporate a significant amount of content and are complex. Therefore, each end-of-instruction objective is further explained by enabling objectives that delineate more specifically the knowledge and skills on which the end-of-instruction objectives are built.**

Behavioral objectives are written in measurable and observable terms. The verb used to describe the performance should be concrete and action oriented to clearly indicate a behavior that can be observed and measured. For this reason, ambiguous language such as "understand," "demonstrate familiarity with," and "know" is avoided. By stating them in clear, measurable terms, objectives establish accountability for learners, focus attention on the expected results of instruction, and provide indicators of success (both of the learners and the instruction itself).[41,53]

There have been many prescriptions for writing objectives for instruction. Most have been modeled on Robert Mager's classic work and have included at least three components for an adequately stated objective: conditions, behavior, and criterion/standard.

The objectives developed by the task force identify the required behaviors with verbs that facilitate measuring a learner's proficiency. Conditions under which the objective performance will be performed are generally understood to be during a simulated and ultimately, if necessary, an actual terrorist event involving WMD. Specific and detailed conditions are identified and incorporated into the objectives during the development phase of the instructional design process. At that time, more specific conditions, such as type of equipment or operating procedures, are delineated.

The criterion for each objective is based on the level of proficiency required. *Criterion* refers to the level of performance or the accuracy of a learner's response in practice or testing. The criterion for each objective provided for WMD training should reflect the accuracy required by the real-world use of the knowledge and procedures. It is expected that accuracy levels would range from 100% to 80%, depending on the difficulty of the performance required and the demands of real-world application of the knowledge or skill. (Accuracy levels for this content would be determined in the course development phase.)

Gagne and Briggs (1979), Merrill (1994), and Clark (1989) all state that objectives should also include a classification based on the type of learning involved, since each type of learning requires a unique set of conditions to promote optimal acquisition of the abilities specified by the

objective.[39, 53, 55] More specifically, the categories for the types of learning represented are "remember" and "apply" or "use." These categories correspond to the levels of proficiency described in the next section.

At the "remember" level, the learner is required only to recall or recognize information (as in a written text). "Apply" or "use" objectives, on the other hand, require learners to actually use or apply skills in a realistic situation. That situation may be a simulation of an event or an actual event, but the point is to have learners actually demonstrate their proficiency in a real-world setting rather than simply pass a test about what they would do in a real situation. Classifying objectives by type of learning helps to clarify the behavior or performance, as well as the conditions and criteria that are acceptable in demonstrating one's proficiency.

## LEVELS OF PROFICIENCY

Levels of proficiency are variously described by different educators, each having a specific purpose and audience in mind. During the process of writing performance objectives, the WMD content was organized into three proficiency categories. Each category was defined by the level of performance or proficiency expected after mastery of the objectives. Three categories—*awareness*, *performance*, and *planning*—encompassed all of the content (as identified by the taskforce) required to respond effectively to a WMD event.

**The awareness level of proficiency provides an overview of and introduction to the issues and challenges related to preparing for and responding to WMD incidents. The purpose of this component is to increase the three audience groups' motivation, as well as to provide an introduction to terms and issues, and to furnish very basic domain knowledge, such as critical differences between biological and chemical weapons. Remembering information is the key goal for learners at the awareness level of proficiency.**

**The performance component will provide in-depth performance-based or application-oriented training and will be designed to ensure that each audience group gains the skills and knowledge required to perform effectively during WMD-related incidents. The planning component provides a list of issues and topics to be considered by planning and management personnel who need to understand and be involved in devising cooperative plans for responding to WMD incidents. The emphasis for this component is on developing plans, guidelines, processes, and/or procedures to be prepared for an effective response to WMD. Behavioral objectives were not developed for the planning level, since planning is not included as part of the scope of this contract. However, thorough planning across local services/agencies and health care providers is viewed by this task force as the foundation on which effective WMD response training should be built.**

In surveying current HazMat training offered by various sources, it became obvious that the concept of levels of proficiency is well established. This subject area provides an illustrative example of the use of proficiency levels. The beginning level of the HazMat training is awareness, which is recommended on a broad scale, whereas other levels target specific roles and functions.

For example, most fire rescue units offer HazMat certification and recertification courses at three levels: *awareness*, *operations*, and *technician*. The courses at the awareness level correspond with the proposed awareness level of proficiency in this contract, and the operations and technician levels correspond to the performance level of proficiency, targeting specific roles and functions (e.g., first responders and EMS responders).

To make the comparison more specific between awareness- and performance-based levels of proficiency, note an example that requires learners at the awareness (or general information) level only to "list the four major clues that signal the presence of hazardous materials." If the course were offered at the performance level of proficiency, learners likely would be required to recognize, in a simulated situation, the presence of hazardous materials, based on the four major clues. While the difference at first may seem subtle between these two objectives, the implications are critical. On the one hand, learners may be able to *list* (in the comfort and nonstressful environment of a classroom) the four major clues to the presence of hazardous materials but not be able to identify the actual presence of such materials in a simulated or real environment. Clearly then, the awareness level of proficiency is foundational and necessary but not a substitute for the performance level of proficiency.

Because the audiences for this contract cover not only those providing out-of-hospital care but also hospital-based emergency nurses and emergency physicians, the performance proficiency

level requires participants to be able to apply the knowledge and skills gained. Even though, at a future time, a higher level of specialization may be desirable, the task force focused on the proficiency levels that would promote practical preparedness among the targeted audience groups. Because incident command training is currently available, it was not considered necessary to add this level of proficiency in this plan. However, the task force recognized the need for another level of proficiency intended for those who have planning and management responsibility. The planning and management level is extremely important but beyond the scope of the contract. Given specific definitions, two levels of proficiency appear to meet the needs of the audience and the specifications of the content and objectives identified by the task force: awareness and performance. Each of these is described below.

Training at the Awareness Level of Proficiency

**Training at the awareness level of proficiency will be designed to provide all three audiences with a basic overview of the most important issues and challenges related to an effective response to a WMD incident. The objectives and pertinent content will cover a limited number of topics from the initial outline developed by the task force as part of the needs analysis. For example, a number of topics might be presented at a high level by using a scenario-based approach. The emphasis would not be on learning to do but on developing an understanding of critical issues and challenges. A primary goal for awareness proficiency is to ensure that each participant becomes alert to the signs that might indicate a WMD event.**

Appropriate topics for the awareness experience include an explanation of terrorism and WMD event types, event recognition, response systems, personal safety, medical response techniques, and communication. Objectives are taught at a "remember knowledge" level, not at a "use" or "apply" level. The remember level requires the learner to search memory to reproduce or recognize some previously stored item of information. Topics identified for the awareness level will be tested with an objective-type test (probably paper and pencil). The awareness content is a prerequisite for the performance proficiency level.

Awareness content is approached in three different ways: (1) integration into initial training/educational programs (e.g., nursing or medical school curricula), (2) presentation as a separate experience (e.g., CE course or self-instructional, technology-based experience), and (3) incorporation as the introductory portion of a performance-level CE course. Integrating the audiences for the presentation of awareness-level content, where appropriate and possible, would facilitate developing shared perspectives and understanding of the need for team and agency interaction.

Training at the Performance Level of Proficiency

**The focus of this proficiency level is on teaching the training participants how to respond effectively to the use of WMD. These objectives are performance based and, if appropriate, are tailored so that each target audience group learns to perform the tasks they would be required to do in a real incident. Performance-level objectives reflect the core content outline developed by the task force. The goals for the performance level emphasize application of the knowledge and skills required for responding effectively to a WMD terrorist incident. The performance level corresponds to Merrill's (1994) and Clark's (1989) "use level" and is defined as the level that requires the learner to apply some abstraction to a specific case.[55, 58]**

This level of proficiency emphasizes learning how to respond to an incident and can be integrated into the core curriculum of graduate training such as emergency medicine residency training and offered as a performance-based, CE course or series of courses for emergency physicians, emergency nurses, and EMTs and paramedics. As topics at the performance level of proficiency, the content is designed for delivery as performance-based experiences. For example, the ACLS and ATLS course model might be appropriate. To ensure that the necessary skills are taught,

the instructional experience or course(s) should include hands-on table-top or simulated, technology-based scenarios or even real-life disaster simulations with a high degree of fidelity rather than the paper and pencil tests used at the awareness level of proficiency.

Because most training should be targeted toward the performance or application level that requires the learner to use the information the way it will be used on the job, the bulk of the WMD content is presented at the performance level. The awareness level is used to provide introductory information, domain familiarization, and motivation.

## AWARENESS AND PERFORMANCE OBJECTIVES

The order of presentation of the following objectives is not intended as a recommendation for instructional presentation. The sections merely served as organizational units for creating a comprehensive list of objectives.

The task force acknowledges that the objectives do not apply equally to all emergency physicians, emergency nurses, and EMS providers. For example, some of the objectives will fall completely outside the scope of an audience member based on whether the corresponding setting is out-of-hospital or hospital. Other objectives will apply to specific audience members based on locally determined assignments and expectations. Subsequent course development will require a thorough front-end analysis that will delineate the appropriate content and level for the targeted audience group. At that point, content related to each objective will be tailored appropriately to meet specified learning needs.

**Because of the dynamic nature of WMD knowledge and skills, specific content associated with these objectives will change rapidly. The task force recognizes that new elements, circumstances, and challenges will continue to emerge. In fact, even over the course of this contract, practices have changed, such as the recommendations for decontamination. This group of objectives is meant to provide a framework into which new WMD-related issues and answers can be inserted.**

**Most importantly, even though these objectives were purposely written in generic terms, the overarching intent and recommendation of this task force are that the objectives be customized to the local setting, where needs, resources, and procedures will vary.**

### Awareness Objectives – Competency Level 1

Terrorism

1. Define terrorism.

2. Define terminology (e.g., NBC, WMD).

3. Describe the current threat posed by terrorists using WMD, including potential casualties, impact on the general public and on EMS and the health care community.

4. Describe the current level of preparedness as evidenced by the private, local, state, public health, and federal efforts.

Event Types

1. Recognize the general characteristics and effects of various classes of agents for each type of event—biological, chemical, radiological (dispersion methods, signs and symptoms, possibility of secondary casualties, self-protection required, treatment).

2. Describe a possible scenario that includes the appearance of effects for each of the following unannounced event types: (a) biological, (b) chemical, and (c) radiological.

Index of Suspicion and Event Recognition

1. Describe some general indications of a terrorist attack.

2. Compare the characteristics of an intentional biological attack with those of an endemic disease outbreak.

3. Describe the roles of epidemiology and surveillance in the recognition of a terrorist event, particularly a biological event.

4. Explain the importance of identification and reporting as part of event recognition.

5. Describe how intelligence information, such as information about local terrorist group capability or intent, threat, agent, or device, can be accessed and used as part of event recognition.

6. Explain how health care personnel contact appropriate public agencies to assist with identification and containment.

Response Systems and Communication

1. Explain how EMS providers, ED personnel, clinical staff, and ancillary personnel, such as respiratory therapy or pharmacy personnel, should work together during a WMD event.

2. Recognize the roles that federal, state, and local agencies will have during a WMD event.

3. Explain how specific federal, state, and local agencies may interact during a WMD incident.

4. Describe the need for a unified command system among response groups.

5. Explain how poor communication during a WMD response could undermine the response effectiveness.

Key Elements of a WMD Response

1. Compare and contrast a WMD event response with that of a traditional mass casualty incident, including differences in resources, roles, protocols, and other issues.

2. Explain how treatment in-place and use of alternative care facilities might be used.

3. Recognize the elements of self and scene safety as related to a WMD event.

4. Recognize the issues related to contamination, security, and containment during a WMD response.

5. Explain the process of decontamination and how it should be modified or not used based on the type of event or agent used.

6. Describe how the psychological impact of a WMD event may affect the health care response efforts.

7. Describe the elements of an effective response to a WMD incident, including ideal response scenarios for each of the following event types:
   a. Biological
   b. Chemical
   c. Radiological

8. State the issues and challenges related to mass patient care.

9. State the issues and challenges related to fatality management, including religious, public health, or other issues that may surround mass fatality situations.

10. Recognize the challenges related to continuing regular health care services.

Personal Protection and Safety

1. Explain the importance of practicing safety first to avoid becoming a victim.

2. Describe how the potential of secondary devices and threats presents unique risks and requires specific precautions during a WMD event.

3. Identify the types of PPE that may be necessary for responding to and treating specific types of agents during a WMD event.

4. List the procedures and behaviors that enhance personal protection.

Note: Supporting materials would include a glossary and job aids, including one that provides general descriptions of each type of agent—nuclear, biological, and chemical.

**Performance Objectives – Competency Level 2**

1.0 Event Recognition

***Use surveillance systems.***

1. Explain why epidemiology is a critical element of response in a WMD event, particularly a biological event.

2. Describe the WMD event recognition roles of out-of-hospital and ED and hospital personnel.

3. Explain the use of surveillance systems (technological and organizational) and their limitations. *Organizational* refers to formally established lines of communication within and across an organization to capture information, as well as how information is shared across and among various agencies or groups. *Technological* refers to various devices, detectors, and information systems that can receive, organize, and send reported information, as well as verification of data using laboratory results and epidemiological, analysis.

***Recognize a possible terrorist attack.***

4. Describe signs and signals that could indicate a WMD incident, including large numbers of victims with similar signs and signals that are not naturally occurring close in time or are not naturally occurring or the presence of suspicious and out-of-place objects.

5. Describe the indications of a possible biological terrorist attack as opposed to an endemic disease outbreak.

6. Explain how specific indicators for each type of WMD event would differ.

7. Describe syndromes and signs and symptoms for the following types of exposures:
   a. Chemical
   b. Biological
   c. Radiological
   d. Mixed

***Report WMD-related information to the appropriate person(s).***

8. Recognize the triggers that precipitate reporting and investigation of suspected terrorist events.

9. Explain the types of information that should be reported for a suspected WMD incident and the process of reporting the information.

10. Explain the importance of information sharing at the federal, state, and local level among key groups, including public health departments, law enforcement, fire departments, and the medical community.

2.0 Unified Incident Command/Management Structure

***Use a unified system of command***

1. Define an incident command/management structure or system.

2. Describe the application and need for a unified system of command in a WMD response.

3.0 Response Support

***Provide the necessary logistical support for victim care, responders, and the response as a whole.***

1. Explain the importance of responder needs during a WMD incident response, including need for shelter, nourishment, and information.

2. Identify security issues related to potentially large numbers of victims, contamination risks, and ongoing terrorist threats, and describe how to maintain security of equipment, supplies, vehicles, treatment areas, and facilities.

3. List actions to be performed at the hospital in response to early notification of each type of WMD event, including staffing, equipment, pharmaceuticals, and supplies.

4. Explain how to obtain additional information and resources, including personnel, equipment, pharmaceuticals, and supplies, as well as specialized resources, such as ventilators, decontamination facilities, and isolation facilities, and information from specialized facilities such as poison control centers, that are needed for the following types of events:
   a. Chemical
   b. Biological
   c. Radiological
   d. Mixed/unknown

5. Describe appropriate techniques for handling patient records and patient belongings, including tagging and tracking, with concerns over large numbers of victims, contamination risks, and need for evidence preservation.

4.0 Safety and Protection

***Select and work effectively in PPE.***

1. Identify the possible routes of exposure for different types of WMD events (NBC) and explain how the route of exposure may vary from agent to agent.

2. Select appropriate personal protective equipment for each type of WMD incident, including guidelines to use when agent is unknown and when the situation does not warrant its use.

3. Demonstrate the proper use of PPE.

4. Perform triage, decontamination, and treatment of victims while wearing appropriate PPE gear.

5. Describe the potential adverse health and performance effects of wearing PPE and explain the need for medical monitoring and rehabilitation for responders wearing PPE.

***Demonstrate behaviors that help ensure personal safety.***

6. Explain the importance of practicing safety first to avoid becoming a victim.

7. Describe procedures and behaviors for specific event types that enhance safety.

8. Identify the vaccinations and pharmaceuticals that are required for preexposure self-protection and for postexposure care (option: DELETE postexposure care).

9. Describe how the potential of secondary devices and threats presents unique risks and requires specific precautions.

10. Identify detection devices that are available to warn of the presence of WMD devices or agents.

5.0 Decontamination

***Decontaminate victims at an incident site, medical facility, or other areas as needed.***

1. Distinguish between the types of victims requiring decontamination and those who do not.

2. Describe the facilities and equipment needed for appropriate effective decontamination specific to site, type of incident, and agent, if known.

3. Demonstrate appropriate and effective decontamination procedures for all types of victims.

4. Explain the issues surrounding the process of decontaminating emergency responders and health care providers, including the need for continued use of PPE after decontamination and the importance of not assuming someone is "clean."

5. Identify the issues related to determining that a person or item is "clean."

6. Explain how the decontamination process is affected by the following types of circumstances: availability of resources and personnel, variations in weather, need for privacy, security and media, and evidence collection.

7. Describe the issues surrounding the process of decontaminating the following items: buildings and facilities, vehicles, personal belongings, animals (pets), and equipment.

8. Describe the issues surrounding the disposal and containment of hazardous materials and run-off resulting from decontamination, including risks of secondary contamination of humans or the environment, accessible resources to guide or perform clean-up, and preservation of these materials as evidence.

6.0 Isolation and Containment

***Appropriately isolate and contain victims of each type of WMD event.***

(*Isolation refers to infectious disease, and containment refers to keeping patients in or out of a particular area. Isolation [e.g., because of smallpox] is one way to contain the disease. The terms have important differences but are still often used somewhat interchangeably*.)

1. Describe how containment and isolation should be used as part of the response to specific events, including the following:
   a. Chemical—by agent
   b. Biological—contagious and noncontagious diseases
   c. Radiological

2. Explain the issues and challenges related to managing victim movement when containment or isolation is required, including victims who exhibit symptoms and those exposed who must undergo observation.

3. Explain the use of "hot," "warm," and "cold" zones, including the potential need for several sites and identifiable and moveable boundaries.

4. Describe the process for managing personnel (responder) entry into and exit from a containment or isolation area, including exposure control and exposure time management.

5. Describe the use of infection control measures and quarantine during a transmissible biological agent response.

6. Explain security issues and management techniques related to the entrance or exit of nonexposed groups, such as volunteers, family members, and media.

7.0 Evidence Preservation

***Use appropriate techniques for preserving possible evidence at an incident site or medical facility.***

1. Explain the importance of evidence preservation.

2. Describe techniques for handling evidence during decontamination.

3. Explain chain of custody requirements and challenges during a WMD response.

4. Demonstrate techniques for handling evidence during a WMD response, including decontamination and treatment.

8.0 Psychological Effects

***Prepare for, recognize, and treat the psychological impact of a WMD event on victims and health care professionals.***

1. Describe the range of psychological and psychosocial effects experienced by WMD victims.

2. Explain how the emotional psychological and psychosocial effects of a WMD incident can affect health care professionals and undermine effective care and treatment.

3. Identify the acute psychologically induced symptoms likely to be seen following a WMD incident and explain their differentiation from illness caused by agent exposure.

4. Explain the steps that can be taken to minimize psychosocial effects of a WMD incident, including clear consistent information, effective triage, adequate training and response preparation, and cooperation among responding agencies.

9.0 Communication and Agency Interaction

***Maintain and help facilitate effective communication during a WMD incident response.***

1. Explain why communication is a critical element in the success of a WMD response, particularly consistent public information, communication among all health care response groups, and communication among local, state, and federal agencies.

2. Describe strategies for enhancing communication related to a WMD response, including specific techniques for developing a working partnership with the media, building communication

channels among local response groups, participating in community-level drills, and meeting local agency and response group leaders.

***Interact effectively with appropriate agencies and organizations involved in responding to an incident.***

3. Describe the effective interaction among the agencies and organizations that might be involved in a WMD response.

4. Explain the benefits and barriers to working effectively with local, state, and federal agencies, international agencies, private organizations, and nongovernmental agencies.

5. Describe how to access local and state assets and request additional federal support.

10.0 Triage

***Perform effective triage of victims of specific types of WMD incidents involving a variety of agents.***

1. Describe and demonstrate initial assessment, triage, and stabilization for the following event types:
   a. Biological
   b. Chemical
   c. Radiological
   d. Mixed or unknown

2. Explain how the above initial assessment, triage, and stabilization processes change in the face of contaminated or contagious patients.

3. Explain how the above initial assessment, triage, and stabilization processes change in the face of limited resources.

11.0 Treatment

***Perform effective assessment, stabilization, diagnosis, and treatment of victims of specific types of WMD incidents involving a variety of agents.***

1. Identify the pharmaceuticals and vaccinations that are required for postexposure care.

2. Describe the indications, contra indications, and complications for specialized pharmaceuticals and vaccines.

3. Explain the unique considerations for mass patient care, including limited resources and mass prophylaxis.

4. Recognize symptoms and disease patterns that indicate exposure to a particular agent for each of the following incident types:
   a. Chemical
   b. Biological
   c. Radiological
   d. Mixed or unknown

5. Determine treatment for symptoms and condition related to the following incident types:
   a. Chemical
   b. Biological
   c. Radiological
   d. Mixed or unknown

6. Explain the appropriate use of diagnostic testing, clinical indicators, and laboratory testing.

7. Recognize the treatment differences and concerns for special needs patients, including immunocompromised, elderly, pregnant, and pediatric patients.

8. Make appropriate patient disposition decisions.

9. Explain the need for and issues related to short-term care, including continued assessment, monitoring and treatment for any exposed or potentially exposed victims of radiological, chemical, and biological exposure.

10. Explain the need for and issues related to long-term care and health surveillance for victims and responders in WMD incidents.

11. Explain treatment-in-place plans and the use of alternate care facilities.

12.0 Transportation

***Transport victims as required, considering potential contamination risks, resource shortages, and communication needs.***

1. Explain how citizen transport, such as with buses and cars, may be used during a WMD incident, and discuss the implications and problems of citizen transport of victims.

2. Explain the issues and challenges of transporting victims of a WMD incident, both out-of-hospital and in-hospital.

3. Explain the contamination and decontamination issues as they relate to vehicles, supplies, and equipment used for transporting WMD victims.

4. Explain the uses of and problems with different modes of transport, including air versus ground.

5. Explain the uses of and problems with intra and interhospital transport, local and regional facility use (e.g., designating a hospital for contaminated patients), and hospital evacuation.

13.0 Recovery Operations

***Complete recovery operations, including reports and debriefings.***

1. Explain the importance of comparing performance with plan.

2. Describe the need for (and goals of) Critical Incident Stress Management (CISM) after a WMD response.

14.0 Fatality Management

***Appropriately handle human remains, addressing safety, psychosocial, and forensic needs.***

1. Explain the risks and challenges associated with fatality management and evidence preservation, as well as the social and religious issues related to mass fatality management.

2. Describe appropriate techniques for handling the deceased, considering potentially large numbers, contamination risks, storage and transportation of remains, and evidence preservation.

## Specifications for Ensuring Continuing Proficiencies

**Ensuring continuing proficiencies in the knowledge and skills required to effectively respond to WMD events relates to three specific areas—initial acquisition, transfer, and retention. These three areas represent a process that results in effective changes of behavior that can be maintained over time despite the lack of daily application. A variety of techniques and strategies must be incorporated at various points to ensure that the process produces the desired results—continuing proficiencies.**

### Techniques Used to Facilitate Acquisition and Transfer

The concept of transfer of learning from the instructional environment to the job context is complex. It is not a single phenomenon but is affected by a variety of variables, including the: (1) quality of the basic instructional design, (2) motivation of the learners, and (3) support by management of the behaviors being learned.[57]

To begin the process of transfer, a learner must first acquire the knowledge and skills required to produce the expected performance outcomes. That is, effective learning must take place for the expected behaviors to be demonstrated. Successful acquisition of knowledge and skills requires that sound instruction be provided for the learners. Thus, an effective instructional design process is a necessity. A reliable analysis must be performed to determine appropriate performance requirements and audience characteristics. Well-stated objectives based on the analysis should be used to guide the design of the learning experience, including the appropriate use of media and delivery systems, inclusion of effective instructional strategies and techniques, and evaluation techniques that assess learners' competencies.

### Instructional Strategies That Increase Acquisition and Transfer

- Variety and novelty in problem-solving tasks that teach how and when to apply principles and procedures taught.
- Mindful learning or awareness; knowing exactly when to apply the new knowledge and skills.
- Variety of real-life or real-workplace scenarios and cases that immediately immerse the learner into simulated job situations and provide meaningful contexts for learning.
- Many different examples that provide various contexts in which learners might use the knowledge and skills learned.
- Analogies that show how important principles can apply in various situations (understanding the principles applicable to their performance can facilitate moving participants from a novice performer to proficient performer by giving them broader and deeper knowledge and more tools for problem solving).
- Simulations that help participants respond appropriately to variable practice conditions by first applying principles to choose the best procedure for the circumstances and then modifying the chosen procedure to fit the situation.
- Advance organizers that provide ways for learners to structure new knowledge, especially in relationship to what they already know and can do.
- Realistic drill and practice exercises that vary conditions to help learners achieve an appropriate mastery of the skills taught.

- Job aids to support the performance of complex or seldom executed tasks.[58-61]

The design considerations discussed as a part of each instructional recommendation within the report rely heavily on the above techniques. Courses and programs should be designed to facilitate transfer by incorporating a wide variety of examples, cases, scenarios, or simulations to provide learners with resources to build their own knowledge structures and practice their new competencies under varying conditions. Realistic exercises, as well as job aids, should be incorporated when appropriate for the objectives and delivery modes.

**Evaluation Strategies**

Another integral component of an effective instructional design process that is related to acquisition and transfer of new knowledge and skills is evaluation. Clearly, if learners are to transfer performance to their job situations, they must have achieved a reasonable level of competence. Evaluation is conducted not only to determine learners have achieved the stated performance objectives but also to decide whether the course or program was effective. The most common evaluation model used in education is Kirkpatrick's four-level approach, which recommends assessing reaction, learning, behavior, and results.[62]

- Level 1 focuses on the learner's reaction to the course or program. Reaction data are typically gathered by the use of postcourse questions related to satisfaction with the experience. These data provide immediate feedback that can be used to improve future presentations.

- Level 2 determines the level of learning that has occurred. These data are most often gathered from tests. However, while using traditional written tests containing multiple choice items may be appropriate for evaluating knowledge, they are not effective for measuring actual performance. Performance-based program effectiveness is linked to competent performance and requires criterion-referenced performance tests that use actual equipment under real or closely simulated work conditions.

- Level 3 assesses job performance and application of the learning to real-life situations. This is the evaluation of transfer. Most often, this involves behavioral evaluations to determine whether a learner is applying the new knowledge and skills on the job.

- Level 4 focuses on ultimate outcomes: "Has the training had a positive effect on patient outcomes?" This is the most difficult level to evaluate, especially in a situation related to a WMD event that would occur, hopefully, only rarely. In addition, there are many variables that would be involved in assessing patient outcomes.

Kirkpatrick's model describes the techniques that can be used as part of a summative evaluation to assess the effectiveness of instruction after it has been developed and delivered. However, the instructional design process also incorporates formative evaluation, which focuses on reviewing the output of each phase in relationship to the objectives, learner characteristics, identified strategies, and design specifications. Formative evaluation includes the use of field tests or pilot studies to verify the instructional integrity and effectiveness in terms of learner performance and satisfaction of the program.

Both formative and summative evaluation techniques are proposed as part of the design and development process. Formative evaluation or, more specifically, pilot tests with associated revision cycles should be carried out for each of the instructional courses or programs. This would help to ensure that each product is as effective as possible before it is implemented with the target audiences. Summative evaluation plans should be developed as part of the implementation strategy. This would

ensure that the types of data required to sufficiently evaluate and revise products would be identified prior to implementation. Summative evaluation information would be based on the four levels of evaluation discussed above.

**Motivation Issues**

Motivation is another variable that significantly affects the acquisition and transfer of knowledge and skills.[63] Learners must be motivated to learn and apply new behavior. They must recognize the need for training and the resulting new competency in on-the-job performance. In general, during the course or instructional program, learners should be shown how the training addresses their personal and/or organizational goals. In addition, recognition, rewards, and incentives can be used to increase motivation among learners.

Motivation is a concern related to WMD education. Learning how to respond to WMD events is not a top priority for many individual health care providers or for their managers or the administrators of the institutions where they are employed. Much of this lack of motivation may be fostered by the feeling that a WMD event is not likely to happen at all or not in their geographic location. This lack of motivation can be addressed by a number of the recommendations suggested in this report, such as CE credit and promotion of the critical need by national organizations. Additionally, motivation can be increased by the use of effective design techniques that demonstrate how the new knowledge and skills can be used in a real-life situation and how learning these skills is a matter of survival.

Support Issues

Support is a necessary condition for effective transfer.[63] When learners return to their jobs, they must return to a situation that supports the new behaviors—the new skills and knowledge—that have been acquired. Several issues related to support should be addressed. There must be real commitment by the organization's leaders for learners to use what they have been taught. Supervisors and managers should perceive the new knowledge as a priority. Policies and procedures should help rather than hinder the transfer of the new competencies. Roadblocks, including the lack of tools, proper equipment, and other materials, should be minimized. Importantly, well-planned processes must be in place to support the transfer to the real-job situation.

Lack of support in terms of both administrative encouragement and assistance and the absence of proper equipment has been recognized as a barrier to the acquisition and transfer of WMD-specific content. Suggestions have been made that include promoting the importance of WMD training to administrators and others and the use of existing resources such as those available through HazMat facilities. However, this issue must be addressed to ensure transfer of learning and, thus, continuing proficiencies.

Continuing proficiency must be built on the use of techniques that facilitate transfer of WMD skills and knowledge to the workplace. These include techniques that ensure effective instructional design, increase motivation, and provide support from managers, administrators, and institutions.

**Techniques Used to Facilitate Retention**

Transfer and retention are closely related. In fact, retention can be seen as a type of transfer. It relates to the transfer of knowledge and skills to specific tasks over a period of time. Importantly, instruction should produce competent performance not only immediately after the training event, but also after a period of no practice. In the situations related to response to WMD events, the extent to which competent performance is retained can be a matter of life or death to the performer and/or to patients. Since retention varies significantly based on the nature of the task, it is difficult to make generalizations about retention; however, the following three basic generalizations are agreed upon:

- The level of retention is positively related to the level of learning at the end of the instructional event. This appears to be the best predictor of retention. This relates to the quality of the instructional design and the resulting courses or programs. However, an important point is that performance on objectives should be robust and sufficiently versatile to ensure transfer and retention in the less predictable real-job situation. In other words, performance should not just reach an acceptable level but should be practiced until it is solid and cannot be easily disrupted. This is sometimes called "overlearning," but the point for WMD training is that learners should learn the performances to the level of being able to teach them to another person; this is a more rigorous criterion than just being able to complete an errorless performance once.

- Retention decreases as the interval or layoff period increases. In other words, the longer knowledge and skills are not used, the more learners and trainees forget. For WMD training, this means that refresher courses or practice exercises should be held at regular intervals. More investigation may be needed to identify appropriate intervals, but at least once a year seems to be a common suggested interval.

- Rehearsal of the competencies moderates skill loss during a layoff. Practice or opportunities to perform or rehearse skills will reduce the amount of skill loss that would normally occur. Benefits, of course, depend on how practice is implemented and on the type of skill being practiced. Practice or rehearsal is used for retaining procedural skills, especially those that are complex and composed of a number of steps. Importantly for WMD training, simulations can be effectively used for practice or refresher training.

Each of these techniques relates to suggestions made by the task force in terms of sustainment of the levels of proficiency. Using the performance level of proficiency provides a standard for determining "overlearning" or robust performance. Regular refresher opportunities that result in CE credit provide ways of decreasing skill loss and improving retention by using structures appropriate for the target audiences. As mentioned previously, feedback and support from supervisors, managers, administrators, and institutions are also needed to ensure retention.

**Specific Techniques for Ensuring Continuing Proficiencies**

**Although the task force recognized that how communities respond to WMD events are of most significance, the suggestions for this report focus on individual competencies. Performance-level training with associated refresher training coupled with appropriate evaluation of individual learners and courses, as well as participation in exercises and drills, is recommended. To ensure that these approaches facilitate transfer and retention of knowledge and skills, the following suggestions are presented.**

Initial training courses both instructor-led and self-study should be developed for various groups within the target audiences. Content would be based on the levels of proficiency and associated objectives developed by the task force. Each course or program should incorporate those techniques that facilitate transfer and retention. Specifically, courses should be application oriented and provide varied examples and practice opportunities. To assess proficiency, knowledge and performance evaluation tools would be used. Proficiency on specific performances could be evaluated through the use of table-top exercises, simulated drills, and other types of exercises. Some of these courses, such as those for postgraduate nurses or certified EMTs, would be designed to meet the criteria for CE credit. Formative and summative evaluation procedures should be implemented to ensure the quality of the course offerings.

Refresher training opportunities, including instructor-led and self-study formats, should be developed and delivered on a regular schedule that would be determined after more thorough research on appropriate intervals. For example, the volatility of WMD content would need to be assessed to

determine how often it must be updated. Courses and programs should incorporate techniques such as application-oriented instruction and sufficient drill and practice where necessary. Evaluation tools should be incorporated into these experiences. In addition, if refresher training could be coupled with hospital disaster drills or exercises, CE criteria would be met.

As part of the requirements for ensuring continuing proficiencies or retention of competencies, the task force would like to see JCAHO recommend that one hospital drill each year be a biological exercise. This would provide sorely needed practice and learning opportunities for emergency health care providers.

Based on the characteristics and preferences of the audience groups, testing of proficiency would be made through the postexercise debriefings and capturing of lessons learned during exercises and drills, as well as through the evaluation tools incorporated in refresher training. A formal, separate testing program for WMD knowledge and skill proficiency outside of the courses, CE, and exercises and drills is not recommended.

As recommended in this report, a multidisciplinary oversight panel composed of content experts, educational specialists, and representatives of major professional organizations should be tasked with the responsibility for the quality, consistency, and currency of the training.

By implementing techniques and suggestions that facilitate transfer and retention, the goal of maintaining or continuing proficiencies in WMD knowledge and skills can be realized.

## Recommendations for WMD Training and Sustainment

This section of the report provides a description of the recommended strategies for integrating NBC-specific and WMD-specific content into both the didactic and experience-based training and credentialling programs of each of the three audiences—emergency physicians, emergency nurses, and EMS providers. Additionally, strategies for sustaining appropriate levels of proficiency in WMD knowledge and skills are presented. Each strategy is based on the results of the needs analysis and review of existing courses and curricula related to the targeted audiences. Recommendations are supplemented with a discussion of advantages and disadvantages of the recommended strategies, as well as suggestions for implementation. The importance of advocates for the recommended strategies and possible time frames is also discussed.

**It is suggested that recommended strategies be implemented by a multidisciplinary oversight panel of content experts, educational specialists, and representatives of major professional organizations from each of the three audience groups. The oversight panel would be given the responsibility for the consistency, quality, and updating of the products developed. Additionally, the oversight group would work to establish partnerships with organizations and institutions to assist with the implementation of the recommendations discussed in this report. To support the work of the oversight group, a national clearinghouse or repository should be established to collect relevant information, including articles, books, reports, research, instructional materials, and other media. The multidisciplinary oversight group is discussed as an integral part of each development recommendation for each of the target audiences.**

As an integral part of the process of designing and developing WMD training materials, a formal plan for evaluating each product should be established and managed by the oversight panel. The formative evaluation process will consist of regular reviews of content materials and methods by subject matter experts, educational specialists, and representatives of the target audience groups to make certain that each course or program meets the identified objectives, content requirements, audience needs, and methodology. Pilot tests should be held and revisions made based on the findings. Before the final implementation of each product, a summative evaluation process should be planned. This would provide a means for assessing the courses, programs, and other recommendations after specific periods of time or after specific goals have been met. The summative evaluation would collect and analyze participant and faculty feedback as well as scores from assessments and other pertinent data. Evaluation would be based on documented training outcomes as well as subjective assessments. This process would be an important part of determining the effectiveness and success of each effort with the emphasis on providing practical and high-quality training to all members of the target audiences.

An important overarching strategy to support the proposed recommendations is to work with national organizations and associated groups to increase all health care professionals' understanding of the necessity of WMD education. It is necessary for national, state, and local organizations or institutions to incorporate WMD topics as part of their research, publications, and conference agendas. Only by communicating through multiple channels the message that WMD education is necessary will this topic gain the level of importance needed to ensure that all health care professionals are well prepared.

To ensure that all emergency health care providers are prepared to effectively respond to a WMD event, WMD content should be incorporated into all levels of training, including initial or undergraduate education and credentialling or certification. Training opportunities should encompass both awareness and performance levels of proficiency. Because WMD knowledge is rapidly changing, additional opportunities or activities need to be provided so that health care providers can

maintain their levels of proficiency. Refresher courses coupled with participation in regular drills or exercises should help keep the target audiences prepared to respond effectively to a WMD event.

Each audience group needs a specific approach to achieve the appropriate levels of proficiency. For example, greater or less content detail will be provided depending on identified learning requirements. Although there is some overlap among the solutions offered, the recommendations are based on each audience group's specific characteristics, professional needs, and training environments. By recommending solutions or approaches tailored for each of the target audiences, training is more likely to result in the acquisition and sustainment of the knowledge and skills needed to respond effectively to WMD events.

## INTEGRATION OF WMD CONTENT INTO TRAINING FOR EMS PROVIDERS

### WMD Education for All Levels of EMT Trainees

**The need to train all EMS providers is so important because every EMT will be responsible for his or her own safety and that of others. This means that all EMS providers should be trained at the performance level of proficiency. The performance-level objectives emphasize learning how to respond to an incident and are written to ensure that learners gain the skills and knowledge required to perform effectively during WMD-related events.**

Recommendations

1. Develop course materials (including both instructor and learner resources) covering the WMD awareness and performance objectives that could be delivered as an instructor-led course and distributed free, or at minimal cost, to state EMS directors, state emergency management directors, state chiefs of police associations, state ENA, state ACEP, and state hospital associations.

2. Work with NASEMSD, NAEMSP, ACEP, ACS, and other organizations to promote the acceptance of the WMD awareness- and performance-level courses as part of state educational programs for all EMTs.

3. Work with NASEMT, NREMT, NAEMSD, IAFF, NASEMSP, ACEP, and associated groups to promote direct integration of the WMD content into the US DOT/NHSTA National Standard Curriculum for all EMTs (EMT-B, EMT-I, and EMT-P).

*Recommendation #1: Develop WMD Course Materials for Awareness and Performance Training*

Specifically, the recommendation is to develop a set of teaching and learning materials that would be used by EMS faculty to teach awareness and performance objectives. This would be similar to the approach used for ACLS courses, where all of the materials are provided to the local faculty, including a textbook for students. The WMD course materials would compose a nationally recognized standard of care course developed as a collaborative effort among organizations such as NAEMSD, NAEMSP, NREMT, and ACEP and would, if possible, be developed in conjunction with efforts aimed at developing WMD materials for emergency physicians and emergency nurses. The intent is to provide the course materials free, or at minimal cost, to each state EMS office. Course materials also would be provided to other organizations such as state ENA and state ACEP chapters because physicians and nurses often participate in the training of EMS personnel and even more often provide remote medical direction. Thus, it is important that physicians and nurses who interact with EMS personnel have a complete understanding of the level of training and the skill sets those EMS personnel bring to the scene. Once course materials are available, textbooks will be published to support these materials. In fact, several are currently in development.

A prerequisite to the performance-level course would be the ability to demonstrate the knowledge covered by the awareness objectives. Instructional materials for teaching the awareness objectives would be included as part of the performance course for EMTs. Additionally, the technology-based self-study program developed for initial training of medical students and nursing students would be distributed with the performance-level course so that instructors could use or require the use of this program to meet the awareness objective component. (The awareness-level CD-ROM would also be appropriate for other first responders.)

***Design Considerations***

Primarily, the course materials would be designed for presentation as an instructor-based course since that is the most acceptable delivery format for this audience. The course materials would include a content syllabus, lectures, slides, case presentations, simulations, tabletop exercises, and assessment tools. Interactive scenarios and cases that accompany the course would facilitate the

delivery of an application-oriented instructional experience appropriate for the mastery of performance-level objectives. A number of interactive, self-paced cases or scenarios using a variety of multimedia elements such as audio, sophisticated visuals, and text could also be designed as a part of the course. These cases or scenarios could be used by faculty as group exercises but would be designed primarily as individualized learning activities.

An important feature of the course would be the inclusion of a variety of assessment tools, including tests, exercises, and cases, for use by faculty to evaluate students' mastery of the objectives, as well as to evaluate the effectiveness of the course.

The WMD-specific content presented in the course materials would be closely related to the EMT standard curricula so the content would be realistic and practical. For example, WMD objectives relate to topics such as scene safety, personal protection, scene size-up, communications, patient assessment, pharmacology, hazardous materials, mass casualty situations, and triage. The content areas that require specific equipment (substance analysis, protective equipment, and decontamination) for hands-on training could be handled by a local HazMat group with expertise in that type of training. EMTs would need to be trained only with the equipment that local or regional areas will be using.

A modular approach would be used to design the materials so the content is presented in reasonably sized chunks and so the course can be offered in a number of time frames, such as several evenings, a weekend, or over longer period of time such as a semester. A modular approach would also facilitate tailoring the course for different audience levels (EMT-B, EMT-I, EMT-P). Modules and scenarios could be developed for learners with varying levels of experience and knowledge. This would enable instructors to choose appropriate modules and activities or scenarios based on their learners.

***Faculty Development***

A set of faculty development or train-the-trainer materials would also need to be developed, and sessions would need to be offered so that EMT faculty could be trained to teach the WMD content related to the awareness and performance objectives. National experts could be identified to serve as leaders for these faculty development sessions. Train-the-trainer sessions could be offered at national and state conferences and meetings, as well as at other locations that are identified as appropriate. In addition, satellite or distance learning facilities could be used to deliver faculty development sessions to large numbers of instructors in a cost-effective manner.

***Oversight Panel***

Ongoing oversight of the course should be managed by an interdisciplinary group of content experts, educational specialists, and representatives of major professional organizations representing each of the three audience groups. The oversight group would be given the responsibility for the consistency, quality, and updating of the products developed. Additionally, the oversight group would work to establish partnerships with organizations and institutions to assist with the implementation of the recommendations discussed in this report. To support the work of the oversight group, a national clearinghouse or repository should be established to collect relevant information, including articles, books, reports, research, instructional materials, and other media.

***Course Maintenance***

Using either CD-ROM or the Web to deliver the print-based course materials would provide a cost-effective distribution method so the materials could be provided relatively inexpensively, at no cost to the provider. Importantly, incorporating a Web component would facilitate updating and maintaining the WMD content, which is changing rapidly and will need to be updated frequently. However, if necessary, the course materials could also be produced and delivered as a paper-based

instructional resource kit. The intent would be to provide materials free or at minimal cost to faculty within each state.

***Advantages and Disadvantages***

The advantages and disadvantages of this recommendation to develop and distribute a free or minimal-cost comprehensive set of course materials also relate to many of the barriers identified during the training needs analysis.

Advantages to this approach include the following:

- Standardized content based on the objectives and content specified by the task force
- Collaboration among professional groups to ensure courses are based on appropriate levels of practice within the EMS community and promoted throughout the medical community
- Interactive teaching techniques and application-based instruction encouraged by the inclusion of cases and scenarios
- Free, or low-cost, course materials
- Reference materials that accompany teaching and learning materials
- Integration of WMD content into overall EMS educational experiences facilitated by local EMS instructors
- Cost-effective distribution and maintenance of the course materials if CD-ROM or the Web is used

Disadvantages to this approach center around the need to provide faculty development or train-the-trainer programs to help instructors gain the WMD knowledge needed to effectively teach WMD content. The cost of attending train-the-trainer programs could be provided by state Offices of Emergency Management using federal funding available to enhance state and local response to WMD event or by the state EMS office or could be provided under the auspices of the WMD course oversight group. In 2000, there is approximately $600 million in federal funding to upgrade state and local terrorism response capabilities. There would also be costs associated with the distribution and promotion of the materials. Hopefully, these costs could be assumed by the state EMS offices. Because WMD training is a matter of survival, state EMS directors can not afford to *not* absorb the cost of distributing WMD training materials. To facilitate distribution, each state can use the network currently used for distributing new material.

In addition, adding more content to EMS training programs may increase the chances that the course will not be used or might be used at a superficial level only, not requiring EMTs to master content at a performance level. Related to this concern is the fact that WMD content has not been formally included in the standard EMS curriculum and, thus, some individual instructors at different training sites, regions, or states may not feel it is necessary to spend time to teach this material.

On the whole, a well-designed set of course materials provided free, or at minimal cost, to all state EMS programs is the most effective approach for integrating WMD content into EMT training. Appropriate publicity and marketing by professional organizations and institutions, combined with train-the-trainer sessions, will help to ensure successful implementation. Most importantly, developing the WMD course is necessary to ensure that EMTs are gaining life-saving knowledge and skills as quickly as possible, but it also is a first step to integrating the WMD content into the standard curricula.

*Recommendation #2: Acceptance of the WMD Course for Integration into State Educational Programs*

An important strategy emphasizes the need of NASEMSD, NAEMSP, ACEP, ACS, and other organizations to promote the acceptance of the WMD performance-level course as part of the

educational programs for the initial training of all levels of EMTs. Representatives of these groups should concentrate on ensuring that the WMD course is perceived as a necessary educational experience by their organizations, state EMS directors, state training coordinators, EMT instructors, and EMTs themselves. Because licensure is the purview of the state EMS director, professional groups should encourage state EMS offices to recognize the need for this training as an essential component of the education of out-of-hospital providers. This is essentially a self-preservation program for individuals who may be exposed to these job site risks without appropriate knowledge or training. Presentations to state EMS directors and the state EMS training coordinators outlining the progress made by this task force, establishing the rationale for instituting the WMD training into educational programs, and seeking their support in getting NHTSA to adopt the WMD materials into existing curricula within the shortest time-frame possible should be made. Support for this recommendation by NHTSA and the EMS-C program at the Bureau of Maternal and Children's Health (DHHS) would enhance both the speed and completeness of WMD content integration.

In the earliest of stages, we can expect state EMS directors who are well informed about the threat of WMD to be more willing to quickly approve WMD material for integration into their CE hours. However, many of them will have to go before their legislatures to have this material added to the list of licensure requirements. This makes the inclusion of WMD content into the US DOT/NHSTA National Standard Curriculum important.

Most important is the work that national professional organizations such as those mentioned above can do to promote the acceptance of the WMD course into the initial training programs for all EMTs.

***Advantages and Disadvantages***

Working with diverse national organizations would enable groups to build partnerships and work together to influence a wide number of people across the country. For WMD training to be accepted as a necessary part of EMT training, the leaders in all state EMS offices will need to be convinced of the criticality of WMD training.

An important disadvantage to address is that this will be time consuming and will require a concentrated effort by a number of individuals within the various organizations. Some state directors may feel that they cannot provide WMD training—based on their state budgets and content time commitments. However, working with the professional organizations and developing a dialogue where opponents can have their say and concerns can be alleviated will help to smooth the way for eventual planning and acceptance of WMD training.

*Recommendation #3: Integration of WMD Content into US DOT/NHSTA National Standard Curriculum*

Another recommended strategy is the formal integration of WMD-specific content into the US DOT/NHSTA standard curriculum. This could be accomplished by identifying and inserting WMD content into appropriate topics currently in the curriculum for each level of EMT training. For example, WMD content could be presented in scene size-up, scene safety, personal safety, patient assessment, and communications. Medical incident command, rescue awareness, hazardous materials, and crime scene awareness could be expanded to include some of the WMD content objectives.

Another way that formal integration could be accomplished is by adding a specific WMD section to the curriculum, in addition to integrating WMD content into existing topics. In this way, WMD content would be included as a shorter, dedicated presentation, and extra content would be placed in specific topics. However, the fully integrated approach is the preferred approach.

The process for adding the WMD content to the US DOT/NHSTA National Standard Curriculum would require that organizations such as NAEMT, NREMT, NASEMSD, IAFF, NAEMSP, and ACEP would have to work with the Administrator of NHSTA and the Director of the EMS Division (Jeff Michael, EdD) to communicate the criticality of incorporating this content as a component of the EMT-B, EMT-I, and EMT-P curricula. This can best be accomplished by each national EMS organization sending a written request to Dr. Michael seeking inclusion of the defined body of knowledge in the various EMT curricula. He has already expressed an interest in following up on this request.

The NREMT, which bases its examinations on the core curricula content, would then include WMD content in its item writing sessions. This would result in valid, defensible, curriculum-based test questions, which would be included in new versions of the EMT-B, EMT-I, and EMT-P level written examinations.

***Advantages and Disadvantages***

One advantage of formal integration is that WMD content would be viewed as a credible area for EMT training and would no longer be treated as an add-on element of the curriculum. Closely associated to this advantage is the fact that formally incorporating WMD content ensures that all EMTs will receive training in responding to WMD events as states adopt the standard curriculum and incorporate the content into their requirements.

The disadvantages to this approach include:

- Additional course time will be required to teach the additional WMD content.
- Currently, there are a limited number of instructors with expertise to teach WMD topics.

The lack of experienced instructors could be addressed by offering train-the-trainer sessions. The quality of instructors would be maintained by using EMS instructors and other subject matter experts who have already established their credentials in WMD content. Further, they will be provided with clear learning objectives, structured and well-developed curricula, and teaching resources. However, the method in which WMD content can be added to the curriculum without adding significant additional time to the training program is a disadvantage that must be discussed. Integration into the standard curriculum will be more easily accomplished after the WMD stand-alone course has been successful and WMD is accepted as a necessary component of EMT training. Providing the stand-alone course helps to facilitate acceptance, since there are subject matter experts who can begin to train to this WMD curriculum as soon as it is made public. EMT instructors will likely include these components in their initial, recertification, and CE programs using those experts while they gear up to teach these topics themselves.

<u>Overcoming Barriers Related to Integration of WMD Content into Initial EMT Training</u>

The recommendations discussed include a number of strategies for overcoming the barriers identified during the training needs analysis. Developing WMD course materials based on the objectives identified by the task force and providing it free, or at minimal cost, to state EMS offices should help to alleviate the concerns related to the development and maintenance of curriculum materials, such as funding for development of simulations, lack of comprehensive standardized training objectives and course, and a lack of sponsoring organization to develop, deliver, and maintain WMD training. Providing the technology-based awareness program and including a limited number of technology-based case scenarios with the performance course materials should help EMT instructors gain more experience in using new methods.

Barriers related to integration of WMD content into EMT curricula requirements include the lack of an approved body of content. This barrier should be overcome by the completion of the work of this task force and the implementation of course development. Those concerns related to the time

required to complete the process of revising the US DOT/NHSTA National Standard Curriculum and the diversity of state requirements are issues that must be addressed by organizations, such as NAEMSD, NAEMSP, NAEMT, and ACEP, with support from the WMD content oversight group.

Advocates for Integration of WMD Content into Initial EMT Training

Active involvement by a number of organizations that are influential in the area of EMS training is crucial to the success of the recommendations. Collaboration and partnerships among NAEMT, NREMT, NASEMSD, IAFF, IAFC, NAEMSP, NAEMSE, and ACEP will help to ensure that EMTs are prepared to respond effectively to WMD events. Start early to solicit the support of individual members and the societies at large to have sufficient impetus behind the effort as plans are made to integrate this content into state requirements and the standard US DOT/NHSTA curriculum.

Time Frames for Implementation of WMD Content into Initial EMT Training

The design and development of course materials for WMD-specific content will take approximately 12 to 24 months to accomplish. Gaining acceptance for integrating WMD content into state training opportunities and into the US DOT/NHSTA National Standard Curriculum will also take time to accomplish. It could take 2 to 4 years to get this content required by the states and to get it incorporated formally as part of the standard curricula. (As a reference mark, it took 4 years for all of the states to adopt the new 1994 EMT-B curriculum.)

**Sustainment of WMD Education for EMTs**

EMT training is structured so students begin their training by completing the EMT-B curriculum and certification requirements. They can then move to one of two more advanced levels: either EMT-I or EMT-P. WMD training cannot be effectively and efficiently provided to all levels of EMTs—both in training and practicing—until WMD content is fully integrated into the EMT curricula by the development of a stand-alone course. Thus, the same course developed for use in initial training would also be used for practicing EMTs who have completed initial training and certification. That suggestion is discussed below along with a recommendation for providing refresher training for sustainment of WMD knowledge and skills.

Recommendations

4. Offer the course developed for initial training of all EMT students as CE so that practicing EMTs who have not completed the course could gain WMD performance-level knowledge and skills.

5. Develop a regularly updated refresher course, using both self-study and instructor-led formats, for CE and reverification of WMD knowledge and skills.

*Recommendation #4: Offer WMD CE Course for Practicing EMTs*

The course designed and developed for training all EMT students as part of the initial training requirements should be used to provide training in the awareness and performance objectives for all EMTs who are already certified and working as health care providers. The intent would be to provide the course as CE to practicing EMTs for little or no cost. This approach would ensure that as many EMTs as possible are trained without the delays caused by lack of course materials and cost.

Providing a CE course for practicing EMTs is an appropriate strategy for this audience as CE is required, and most EMTs take advantage of opportunities provided to increase their knowledge and skills in this way.

Because previously trained EMS personnel already possess knowledge of PPE, infectious disease processes, and HazMat, the focus of the CE course would be the delta between the knowledge and skills previously mastered and the new knowledge and skills related to WMD performance objectives.

Recommendation #4 and Recommendation #5 share design considerations, oversight panel and course maintenance issues, and advantages and disadvantages.

*Recommendation #5: Develop Refresher Course for Continuing Education and Reverification of WMD Knowledge and Skills*

To ensure that all EMTs sustain proficiency in WMD skills and knowledge, a regularly updated refresher course should be taken every 2 years. (A 2-year interval was chosen because it is consistent with NREMT recertification requirements.) The refresher training could be provided through several delivery mechanisms, including lecture, interactive CD-ROM, and paper-based self-study. The course should be offered for CE credit or as a component of a state EMS refresher training program.

***Design Considerations***

The CE course would have the same features as the course described earlier, including:

- Course syllabus, lectures, slides, cases, simulations, and table-top or similar types of exercises
- Assessment tools
- Application-oriented and modular design approaches
- Interactive, self-paced scenarios
- CD-ROM, or Web-based delivery of teaching materials as well as paper-based delivery where needed

A refresher course should be designed to be comprehensive but not a complete repeat of the WMD initial and CE course. It should be realistic and use a modular, scenario- or case-based approach to maintain interest. To decrease the cost of developing and maintaining a refresher course, templates could be used in the development process so that specific content components could be easily replaced with more current information or cases and essential skills would remain consistent with current practice.

As part of a comprehensive program to sustain skills and ensure that knowledge and techniques are current, a Web site could be developed and maintained to provide to all state EMS offices and other groups the most recent developments related to effectively respond to WMD events. This site could be an important communication tool that would provide new information and knowledge about WMD. The purpose of the site would be to provide an easily accessible single source for current information in this rapidly changing content area. The maintenance of such a site would need to become the responsibility of a specific group, possibly one of the groups represented on the task force or by a federal agency. A Web site could also be used to distribute materials and to provide didactic training as acceptance and availability of the technology evolve.

***Oversight Panel and Course Maintenance***

Because the same course and training process recommended for the initial training of EMTs would be used for those EMTs already licensed during the phase-in of WMD content into the EMT curriculum, faculty development issues and course maintenance and oversight decisions would be handled in the same way as previously discussed. This process would also be used for the refresher course. A multi-disciplinary group of content experts (including such organizations as APIC, SHEA, and IDSA), educational specialists, and representatives of major professional organizations from each of the three audience groups would be given initially the responsibility for the consistency, quality, and updating of the products developed. However, if the WMD content is integrated into the US DOT/NHSTA National Standard Curriculum, the responsibility for keeping the content current for both performance training and refresher training would rest with the US DOT in coordination with the oversight panel and other federal agencies, such as NDPO, DHHS, DOE, and EPA.

The programs, once developed, should be submitted to the CE Coordinating Board for Emergency Medical Services (CECBEMS). CECBEMS is composed of a representative and alternates from ACEP, NAEMSP, NREMT, NAEMT, NAESME, NASEMSD, and NCSEMSTC. Within 6 weeks, the course could be reviewed and approved for CE hours, which would be recognized by each state EMS director and the NREMT. After a course is approved for CE credit and state EMS offices accept it as a training component, the course would be maintained by the state offices with the assistance of the oversight panel.

For both of these courses, CE and refresher training, the cost for highly specialized equipment would be kept to a minimum, since EMTs would need to be trained only with the equipment that local or regional organizations will be using. Initiatives currently under way at the federal level may increase the amount of equipment available at the local level. Additionally, some practical or hands-on training could be offered through local HazMat resources.

EMTs must be trained in accordance with the role they will have in an actual event. Related to this, they must be trained with the equipment that they will deploy in the field, and they must practice to maintain proficiency.

***Advantages and Disadvantages***

The advantages and disadvantages of these recommendations to develop and distribute CE and refresher courses are similar to those of the courses discussed for initial training. The advantages include the following:

- Can be developed in conjunction with courses for emergency medicine residents, physicians, and nurses. Standardized content is based on the objectives and content specified by the task force.
- CE credit
- Collaboration among professional groups to ensure courses are based on appropriate levels of practice within the EMS community and are promoted throughout the medical community
- Application-based instruction encouraged by inclusion of cases and scenarios
- Inexpensive or free course materials
- Cost-effective distribution and maintenance if CD-ROM or Web-based delivery is used

The main disadvantages are: (1) the need to provide faculty development or train-the-trainer programs to help EMT instructors gain the WMD knowledge needed to effectively teach WMD content and (2) the large number of existing CE courses available for certified EMTs. Because WMD content has not been formally included in the US DOT/NHSTA national standard EMS curriculum, some individual instructors at training sites, regions, or states may not see the importance of providing CE training and refresher courses covering WMD topics. Also, if publicity does not maintain interest in a high level of preparedness to respond to WMD events, refresher training may not interest a large number of EMTs.

Based on task force opinion, another significant disadvantage to using the consensus or nonmandated method of program implementation is that while many medical professionals are expecting an increase in terrorist activity, very few state EMS directors actually believe that their jurisdictions are likely targets. They feel there are other more compelling issues confronting EMS providers, such as domestic violence, threats and assaults against EMS providers, burnout, workplace violence, and substance abuse.

A well-designed, performance-level training course, as well as refresher opportunities provided free of charge to all state EMS programs, is the most promising method for ensuring that

EMTs acquire and sustain WMD knowledge and skills. Publicity and marketing by professional organizations and institutions combined with train-the-trainer sessions will help to ensure successful implementation.

Because 41 states use the NREMT at some level for initial and/or continuing certification and many providers from the other nine states maintain their NREMT status, the CE requirement for NREMT re-registration will provide many individuals with the necessary motivation for completing a WMD course. In addition, while many providers complain that recertification requirements place a hardship on the provider, they also regularly complain that there is not sufficient CE available. This WMD program, which concentrates on protecting the life of the individual provider, is likely to be well accepted by the EMS community.

Overcoming Barriers to Providing CE and Refresher (Sustainment) Training for EMTs

Ensuring sustainment by first training practicing EMTs and then providing regular refresher courses at minimal or no cost overcomes barriers related to the lack of funding to cover the development of courses, especially case- or scenario-based materials and inadequate funding to cover attendance costs. Development of these courses using an interdisciplinary group representing major professional organizations and groups and using the objectives recommended by this report also will help to overcome barriers related to the lack of comprehensive, standardized training objectives and course materials and the lack of sponsoring organizations to develop, deliver, and maintain WMD training. The recommendation discussed earlier related to increasing awareness among national organizations and institutions focuses on helping employers and practicing EMTs view WMD training as a priority.

Advocates for Providing CE and Refresher (Sustainment) Training for EMTs

Professional organizations, such as NAEMT, NREMT, NASEMSD, NCSEMSTC, IAFF, IAFC, NAEMSP, NAEMSE, and ACEP, should promote the WMD courses, both training for practicing EMTs and refresher opportunities, to state EMS directors, EMT instructors, and individuals. The courses could be promoted at national, state, and regional meetings of these organizations, as well as publicized in journals and other publications. Efforts by all of these groups will help to ensure that the courses are readily available and that certified EMTs are motivated to participate in WMD training. To ensure that the process of involving professional organizations is started soon, plans should be made to get the message explaining the need for WMD training and a report about the task force work presented at the National Council of State EMS Training Coordinators meeting in September 1999, the National Association of EMS Educators meeting in September 1999, and the National Association of State EMS Directors Annual Conference in October 1999.

Time Frames for Implementing CE and Refresher Training for EMTs

Because the same course used for initial training will be used for CME, the design and development time will be the same, approximately 12 to 24 months. Gaining acceptance for integrating WMD content into state recommendations for CE will take time to accomplish. CECBEMS can do the job in 6 weeks, but the actual implementation by state EMS directors may be longer. CECBEMS approval will allow recognition by NREMT and will relieve each state of the burden of reviewing the program. Ideally, acceptance should not take longer than 12 months.

**Summary of Recommendations for EMT Training**

1. Develop course materials (including both instructor and learner resources) covering the WMD awareness and performance objectives that could be delivered as an instructor-led course and distributed free of charge, or at minimal cost, to state EMS directors, state emergency

management directors, state chiefs of police associations, state ENA, state ACEP, and state hospital associations.

2. Work with NASEMSD, NAEMSP, ACEP, ACS, and other organizations to promote the acceptance of the WMD awareness- and performance-level course as part of state educational programs for all EMTs.

3. Work with NASEMT, NREMT, NAEMSD, IAFF, NASEMSP, ACEP, and associated groups to promote direct integration of the WMD content into the US DOT/NHSTA National Standard Curriculum for all EMTs (EMT-B, EMT-I, and EMT-P).

4. Offer the course developed for initial training of all EMT students as CE so that practicing EMTs who have not completed the course could gain WMD performance-level knowledge and skills.

5. Develop a regularly updated refresher course using self-study and instructor-led formats for CE and reverification of WMD knowledge and skills

## INTEGRATION OF WMD CONTENT INTO TRAINING FOR EMERGENCY PHYSICIANS

### WMD Training for Medical Students

**The intent of introducing WMD-specific training materials into the curricula of the nation's medical schools is to provide an introduction and overview of the topics to all medical students regardless of the specialty they ultimately choose for residency training and practice. The typical medical school curriculum includes basic science or preclinical instruction during the first 2 years of training and clinical instruction (clerkships and rotations) during the third and fourth years. During this initial educational experience, most medical students are focused predominantly on gaining the basic competencies required to become a physician and to enter medical specialty training. Considering the substantial educational responsibilities of undergraduate medical students, the most appropriate approach for WMD training is to provide students with instruction at the awareness level of proficiency.**

Appropriate content to be introduced (at an awareness level) during undergraduate medical education—ideally, within the standard medical school curriculum—includes:

- Definition and explanation of terrorism and the use of WMD
- Recognition of a terrorist event involving WMD
- Personal safety measures
- Individual responsibilities (reporting of suspected event, being alert)
- NBC agents and their actions and methods of transmission
- Resources for help

Recommendations

1. Develop a technology-based, self-study program covering the awareness objectives and distribute it free of charge to all medical students and medical schools. (All nursing students and out-of-hospital providers are also included as target audiences for this self-study program.)

2. Work with the AAMC and associated groups to promote direct integration of the WMD awareness objectives into appropriate courses or clerkships within medical school curricula.

*Recommendation #1: Develop Technology-Based Self-Study Program*

The most effective strategy for providing WMD-specific training at the medical school level is to develop a technology-based program that is distributed free of charge to all medical students (and medical schools), as well as to all nursing schools and state EMS offices. This program could be provided as a CD-ROM-based or Web-based course to be used as a self-study, enrichment instructional opportunity outside of the standard curriculum. Even though the intent is for the course to be used as a voluntary, extracurricular course, it also could be designed to be integrated into a course or clerkship at the discretion of medical school faculty.

***Design Considerations***

This technology-based, self-study course should be designed as a creative, interactive program that incorporates a case-based or scenario-based approach using a variety of multimedia elements including audio, sophisticated visuals, and text. WMD-specific content presented in the program should be closely related to the medical school curricula so that the content is both credible and functional. The program should be designed so that the relationship is apparent between the WMD content topics and content covered in the medical school curriculum (e.g., microbiology, pharmacology, and emergency medicine).

A well-designed, interactive, technology-based program that provides practical application of the WMD content topics would be effective since most medical students would be likely to use the CD-ROM or Web program to gain new medical knowledge in a cutting edge topic. The likelihood of their using the program would be enhanced if some additional impetus or motivation could be

provided by the individual school, the AAMC, or other pertinent organizations or groups. Additionally, since all of the instructional materials would be provided within the program, it would be simple for faculty to use the program as part of a course requirement. The inclusion of assessment activities within the program would facilitate faculty evaluation of each student's success in mastering the awareness objectives. The assessment sections could also be used by students for self-evaluation purposes. The addition of reference material, such as articles, bibliography, and glossary, would provide background information for faculty members as well as students.

Currently, some medical schools require educational programs such as ACLS, PALS, and ATLS to be completed outside of the standard curriculum. Thus, there is a precedent for requiring an enrichment program such as this. However, even if the program remained a voluntary activity, it is anticipated that the quality of the program and its connection with current events would generate and maintain medical student interest.

Capitalizing on the use of technology, either CD-ROM or the Web, would allow the use of highly interactive instructional elements, optional assessment of student knowledge, and the distribution of print-based reference materials.

***Oversight Panel***

Ongoing course oversight of this program should be managed by an interdisciplinary group of content experts, educational specialists, and representatives of major professional organizations from each of the three audience groups. The oversight group would be given the responsibility for the consistency, quality, and updating of all products recommended in this report. Additionally, the oversight group would work to establish partnerships with organizations and institutions to assist with the implementation of the recommendations discussed in this report. To support the work of the oversight group, a national clearinghouse or repository should be established to collect relevant information, including articles, books, reports, research, instructional materials, and other media.

***Course Maintenance***

Using either CD-ROM or the Web to deliver the self-study awareness program would provide a cost-effective distribution method so that the materials could be provided at no cost to medical students. Importantly, incorporating a Web component would facilitate updating and maintaining the WMD content, which is changing rapidly and will have to be updated frequently. Also, building the awareness self-study program so it can be used by all three target audience groups (physicians, nurses, and EMTs) would facilitate keeping the awareness component current.

An issue that must be considered as part of this recommendation is that the actual plans and channels for distributing the program to all medical students would have to be delineated so that all students would receive the program. Questions such as how students would receive the program and how often the program would be sent have to be answered.

***Advantages and Disadvantages***

A major advantage of this approach is that medical schools would not be responsible for the development and integration of the WMD content into existing medical school curricula, which are already extremely crowded. The program would be used by students during "free time" rather than during traditional course time, but the content would still be presented. Additional advantages include the following:

- Use of an interactive, technology-based program with application-based cases would capture the interest of most medical students.
- Distribution of the technology-based WMD program free to all medical students (and medical schools) overcomes a barrier related to the cost of attending a course or buying a book.

- Use of a technology-based program would provide students with a source of materials that they would be able to use as a reference tool in the future.
- Development of a technology-based program provides an efficient method for updating and maintaining the content. Because WMD content is rapidly changing, the ease of updating is a significant advantage, especially if there is a Web component to the program.
- Use of either CD-ROM or Web-based delivery ensures cost-effective distribution of WMD content.

There are several disadvantages to this approach, including the following:

- Medical students have little "free time" to begin with, especially if they take one or more of the current proprietary enrichment courses such as ACLS. To burden them with an additional course outside of the standard curriculum increases the chances that the course might not be used or might be used only at a superficial level.
- If the course is optional, the use of the course and the mastery of the content are dependent on student motivation.

Overall, a well-designed, highly interactive course delivered by either CD-ROM or the Web and provided free to all medical students is believed to be the most effective approach with which to begin the process of integrating WMD content into the medical school curriculum. Most of the barriers or disadvantages can be overcome by effective course design and appropriate publicity and marketing by professional organizations and institutions.

*Recommendation #2: Direct Integration of WMD Content into Medical School Curriculum*

A second recommendation involves assimilating the various components of the WMD content into appropriate courses currently offered in medical school curricula. For instance, an introduction to biological weapons could be presented during the microbiology component of medical school training and chemical weapons during pharmacology. The basics provided in these two basic science and preclinical courses could be reinforced with follow-up education during clinical rotations such as internal medicine, pediatrics, and emergency medicine, which could provide more detailed information about clinical presentation and patient management relative to WMD events. Other content areas that might be recipients of WMD-specific material include microbiology, infectious disease, and hematology. Additionally, for those medical schools that have required emergency medicine clerkships or have medical students rotate through the ED, WMD content could be integrated naturally into the existing content.

To implement the approach of assimilating WMD content, medical school faculty could be encouraged to develop and/or use independently developed, problem-based learning cases, rather than simply adding new material for didactic lectures. Cases could be modular so they could be used in a variety of situations and courses.

The intent of this approach is to use the existing, central curriculum of each medical school as the framework for incorporating the WMD-specific content. The advantages of totally integrating WMD-specific content into the medical school curriculum include the fact that students' interest in the area can be aroused early in their training, enabling them to begin constructing their cognitive schema about this content topic. As additional knowledge and skills are presented throughout the curriculum, their knowledge base will be broadened. Practical applications of basic science content will also serve as a motivating factor for students as, for instance, the focus is on the potential of the various agents and chemicals as WMD rather than just as another microbial or chemical discussed in a didactic presentation.

The oversight panel would be available to assist medical schools in integrating WMD content into their curricula by providing subject matter expertise to assist with the development of teaching materials.

***Advantages and Disadvantages***

The advantages of formally integrating WMD-specific content into medical school curricula include:

- WMD content would be treated as a focus for teaching and not as an add-on component.
- All medical students would be taught WMD content.

The primary disadvantages to this approach—integrating WMD-specific content into the existing curricula—include:

- Additional time required to incorporate topics, such as WMD agents and chemicals, not usually covered in medical school courses
- Difficulty in incorporating change at a course topic level, since the content of most medical school courses is determined at a local level
- Lack of faculty who are knowledgeable in WMD content

Even though course directors or lecturers might be challenged to find existing content and/or examples of biological and chemical phenomena for which WMD content could be substituted without either losing the objective of the content topic or diluting the existing course, curriculum time is being demanded for many other content areas, and increasing medical knowledge continues to put time burdens on medical school faculty. Because of the independent nature of medical school curriculum committees, the content of courses is not specified or mandated by accrediting bodies. Thus, integrating WMD content into specific course topics would require that faculty, such as pharmacologists and microbiologists, be convinced of the value of such integration and be trained in the topic areas.

These disadvantages, coupled with a current deficit of standard WMD content and literature, the limited number of faculty with expertise in WMD topics, and the lack of funding for the development of course materials for integration into a wide variety of content areas, would require significant time, energy, and funding to overcome. To overcome the lack of knowledgeable faculty, a variety of faculty development options, such as seminars or workshops at national conferences or meetings, a traveling group of experts to provide local training, or the use of materials being developed for CE, should be evaluated. Considering the barriers and the demands placed on medical students during their undergraduate medical education, this approach is suggested as a secondary, long-term approach. This long-term approach might be accomplished after the primary approach is successful and the WMD content area is better developed and recognized as a necessary element of physician training.

An alternative approach for direct integration is to incorporate a course in the medical school curriculum that is specifically focused on teaching WMD content. Such a stand-alone course, covering the awareness objectives, could be integrated into either the third or fourth year of medical school. To facilitate this approach, a set of standard course materials, such as a course syllabus, lectures, slides, cases, table-top exercises, and student booklets, could be developed and provided free to each US medical school. However, even though providing free materials to medical schools would provide an incentive, an overloaded curriculum for medical education and the lack of faculty expertise are still significant barriers that would have to be overcome.

Direct integration into preclinical courses and clinical clerkships and rotations is an ultimate goal to ensure that WMD content is included as part of a medical student's initial training. Realizing this goal will take a long-term approach that involves a variety of organizations and institutions, as

well as the enhancement of the programs provided by the first recommendation. The fundamental result of direct integration is that WMD content will be incorporated into appropriate areas of the curricula and will be considered legitimate and credible subject matter for medical student training.

Overcoming Barriers Related to Integration of WMD Content into Undergraduate Medical Education

The addition of more material to the already crowded medical school curriculum will no doubt produce concern on the part of medical educators about where and how to implement such content. The lack of existing content, including teaching and learning materials, research literature, and content experts, is also a concern to most medical school faculty.

Both of these concerns can be overcome by providing WMD-specific content as an enrichment, extracurricular, and voluntary program to medical students. As mentioned previously, this strategy does have disadvantages, but it provides the most effective starting point for the integration of WMD objectives into the initial educational experiences of medical students. Once the program is distributed and is successful in a stand-alone mode, medical school curriculum committees and faculty may be willing to integrate the materials in a more formal way into their curricula.

As part of the longer-term strategy to integrate WMD content into formal medical school curricula, the barriers related to the lack of materials and expertise would have to be overcome. One approach would be to enhance the technology-based program provided to medical students with additional training materials, such as a course syllabus, lectures, slides, cases, table-top exercises, articles, and bibliography, designed specifically for faculty use. Additionally, to overcome the lack of qualified individuals to teach this material, a group of experts or visiting professors could be engaged to provide "train-the-facilitator" instruction for existing medical school faculty who would take responsibility for teaching the subjects in their courses. Faculty support is critical, since they are able to effectively quench any initiative that they perceive to negatively affect their courses in particular, the curriculum as a whole, or the students' experiences while under their tutelage. (The visiting experts could also offer training as extracurricular experiences for students. This would help to augment the students' learning experiences and motivate them to use the technology-based program provided to them as part of the initial integration effort.)

Based on the existing political climate within individual medical schools and within the medical education community at large, support for the WMD-content initiative must be approached both from "top down" as well as "bottom up" perspectives. That is, national organizations must support the idea and be willing to carry the flag of WMD training to every national meeting and even make their concerns, especially those related to funding, known in Washington. In addition, grass roots victories must be gained by winning over individual faculty and course directors so they are willing to advocate the integration to their curriculum committees and then be willing to follow through and add materials to their courses.

Advocates for Integration of WMD Content into Undergraduate Medical Education

The involvement of several organizations or institutions could facilitate the successful implementation of the recommended strategy. The LCME, AAMC and the AMA could push for the use of the program and the importance of integrating WMD content into medical school curriculum. Additionally, professional organizations, such as ACEP, NAEMSP, and SAEM, could independently promote the program both to students and to medical school faculty by emphasizing the importance of the WMD content as part of a medical student's education. (An example strategy would be to publish a paper in *Academic Medicine*, the official journal of the AAMC that outlines the ideas recommended in this report. An associated strategy would be to get Jordan Cohen, President of AAMC, to support WMD education in his editorial in the journal.)

In addition to the advocacy of such groups, this initiative will need the support of specialties including family medicine, internal medicine, surgery, pediatrics, and emergency medicine. Because all medical students must be trained, it is advantageous to have many specialties' support and see the value in the use of the WMD program.

In the long term, as more medical schools integrate WMD content into their curricula, questions covering the awareness objectives might be included on the National Board examinations. However, this is most likely to occur several years in the future and would require significant collaboration with and influence on a variety of organizations, including the LCME, AAMC, AMA, and USMLE.

Time Frames for Implementing WMD Content into Undergraduate Medical Education

Given the time required to design and develop a sophisticated, interactive technology-based program to provide WMD-specific content to medical students, the time-frame for implementation of a technology-based, self-study, enrichment program would be approximately 12 to 24 months.

Another part of the initiative involves garnering and focusing support for the WMD training initiative; this may also take between 1 and 2 years to accomplish in a thorough manner. As noted above, numerous organizations should be part of the effort, and it will take time for their members to be apprised of the situation and to begin making an impact on the medical community. This effort should be undertaken simultaneously as the instructional materials are being designed and developed.

A time frame to accomplish formal integration of WMD content into medical school curriculum is difficult to estimate. However, it would most likely take several years for formal integration to become a reality.

**WMD Training for Emergency Medicine Residents**

The most appropriate approach for WMD training within emergency medicine residency programs is to provide residents with instruction at the performance level of proficiency. The performance level objectives, which emphasize learning how to respond to an incident, are written to ensure that learners gain the skills and knowledge required to perform effectively during WMD-related events.

Recommendations

3. Develop a set of teaching and learning materials covering the performance objectives that include both instructor and learner materials and are distributed free, or at minimal cost, to all emergency medicine residency programs.

4. Work with ACEP, SAEM, ABEM, RRC, and associated groups to promote direct integration of the WMD performance objectives into appropriate content areas of the emergency medicine core content.

*Recommendation #3: Develop a Teaching Resource Kit for Emergency Medicine Residency Programs*

Much like the plan to present WMD-specific content to undergraduate medical students, WMD teaching and learning resources would be provided free, or at minimal cost, to all emergency medicine residency programs and faculty using either CD-ROM or Web distribution. Specifically, the recommendation is to develop a technology-based set of teaching and learning materials, called a teaching resource kit, that would include a content syllabus, lectures, slides, cases, simulations, table-top exercises, assessment tools, and a student textbook. This would be similar to the approach used for a course like ACLS where all of the materials are provided to the local faculty, including a textbook for students.

***Design Considerations***

This teaching resource kit would include a variety of well-designed and creative components that could be used by faculty to develop a set of lectures or a stand-alone course. It would also include a limited number of interactive, self-paced cases or scenarios using a variety of multimedia elements such as audio, sophisticated visuals, and text. Additionally, the resource kit would include a self-study program or text for learners and assessment tools for use by faculty to evaluate residents' achievement and to evaluate the effectiveness of the program. Self-assessment tools for residents would also be provided. WMD-specific content presented in the resource materials would be closely related to the emergency medicine core curriculum so that the content is realistic and practical.

The content areas that require specific equipment (substance analysis, protective, and decontamination) for hands-on training could be handled by a local HazMat group that has expertise in that type of training. Residents would need to be trained only with the equipment that local or regional areas will be using.

Before participating in the performance-level instruction, residents would be directed to complete the awareness objectives, if they had not done so during their medical school experience. To ensure that residents begin the study of the performance-level content, faculty could require that they complete an assessment to verify that they have mastered the awareness objectives.

***Oversight Panel***

The oversight panel of content experts, educational specialists, and representatives of major professional organizations from each of the three audience groups would be responsible for updating the teaching and learning materials provided to the emergency medicine residency programs. To support the work of the oversight group, a national clearinghouse or repository should be established to collect relevant information, including articles, books, reports, research, instructional materials, and other media.

***Course Maintenance***

Using either CD-ROM or the Web to deliver the teaching and learning materials to each emergency medicine residency program would provide a cost-effective distribution. Using a Web component would facilitate updating and maintaining the WMD content, which is changing rapidly and will need to be updated frequently. The panel would also need to work with ACEP, SAEM, ABEM, and the RRC for emergency medicine to facilitate the distribution, as well as the promotion, of materials to the residency programs.

***Advantages and Disadvantages***

The advantages and disadvantages of such an approach are similar to those associated with the recommendation to develop and distribute a technology-based program for medical students.

A major advantage to this approach is that emergency medicine residency programs would not be responsible for the design and development of teaching and learning materials.

Another advantage to this approach is that the content would be taught or at least supervised by local residency faculty. By supporting local faculty, this method facilitates the integration of the WMD content into the overall residency educational program. The WMD materials provided to residency programs would be designed to help faculty relate the objectives to content topics that already exist as part of the core curriculum. For example, WMD objectives can relate to topics such as disaster medicine, clinical pharmacology, toxicological disorders, systemic infectious diseases, and thoracic respiratory disorders.

The flexibility that is made possible by this approach is an additional benefit. The distribution of a comprehensive set of WMD teaching and learning materials allows faculty and residency programs the flexibility to present and incorporate this content in a way that is effective for their individual situations. Some may choose to use the technology-based materials as a basis for preparing lectures as part of the didactic portion of their residency program. On the other hand, residencies may choose to use a complete self-study approach requiring residents to read the text materials, work through the cases, and complete the evaluation.

Additional advantages to this recommended strategy include:

- Distributing a technology-based WMD program free to all emergency medicine residency programs overcomes a barrier related to the cost of producing materials.
- Using a technology-based teaching and learning resource provides faculty and residents with a source of materials they would be able to use as reference tools in the future.
- Developing a technology-based program provides an efficient method for updating and maintaining the content. (Because WMD content is rapidly changing, the ease of updating is a significant advantage, especially if there is a Web component to the program.)
- Using either CD-ROM or Web-based delivery is a cost-effective distribution method.

There are several disadvantages to this approach, including the following:

- Emergency residency programs have a significant amount of content to cover. To burden them with additional content increases the chances that the teaching and learning resources might not be used or might be used only at a superficial level.
- Faculty in many emergency medicine residency programs do not have the experience or expertise to teach WMD content.

On the whole, well-designed teaching and learning materials delivered by either CD-ROM or the Web and provided free to all emergency medicine residency programs is the most effective approach for integrating WMD content into residency training. Most of the disadvantages can be overcome by including sufficient, well-designed, applicable materials to faculty and residents. Additionally, appropriate publicity and marketing by professional organizations and institutions, combined with train-the-faculty sessions provided at national conferences and meetings, will help to ensure successful implementation.

*Recommendation #4: Integration of WMD Content into Emergency Medicine Core Content and Curriculum*

Another recommended strategy is the formal integration of WMD-specific content into the emergency medicine core content and curriculum. This could be accomplished by identifying and incorporating WMD content into appropriate topics currently in the residency curriculum. For example, WMD content could be presented in clinical pharmacology, toxicological disorders, systemic infectious disorders, and thoracic respiratory disorders. The disaster medicine section of the core content could also be expanded to include a number of WMD content objectives.

Another way that formal integration could be accomplished is by adding a specific WMD section to the core content outline. Instead of attempting to integrate WMD content into existing topics, it would be included as a separate topic. This approach might give WMD content more visibility but would then require a specific method within the residency program for addressing the knowledge and skills requirement.

***Advantages and Disadvantages***

The advantages of formally integrating WMD-specific content into the emergency medicine core curriculum and content include the fact that formal integration provides credibility to this content

area. It would no longer be treated as an add-on element of the curriculum. Additionally, formally incorporating WMD content ensures that all emergency medicine residents will receive training in responding to WMD events, because residency programs are required to cover all of the core content during a resident's tenure in the program.

The disadvantages to this approach—integrating WMD content into the core curriculum—include:

- Additional time required to incorporate WMD content
- Current shortage of standard WMD content and literature
- Limited number of faculty members with expertise in WMD topics
- Lack of funding for the development of course materials

These disadvantages could be at least partially overcome by the primary recommendation, that is, providing free, or low cost, teaching and learning resource materials to residency programs. However, the long-term strategy of ensuring that the WMD content is taught in all residency programs and is considered as a necessary component of residency training can be ensured only when WMD content is formally accepted as part of the emergency residency core curriculum.

Overcoming Barriers to Integrating WMD Content into Emergency Medicine Residency Training

The addition of more material to the emergency residency curriculum could produce concern or even resistance on the part of residency faculty about where and how to implement such content. The lack of existing content, including teaching and learning materials, research literature, and content experts, is also a concern to many residency faculty. Both of these concerns can be overcome by providing WMD teaching materials.

To overcome the lack of qualified faculty members to teach this material, a group of experts or visiting professors might be engaged to provide faculty development courses for faculty who would teach WMD objectives in their programs. These courses could be presented at national and state conferences and meetings and at other appropriate venues. Faculty support is critical, and the free distribution of content materials should help them prepare to teach this content. In addition, the promotion of the importance of incorporating WMD content into residency training should also help convince faculty to use the teaching resource kit.

Providing free, or low cost, teaching and learning materials should overcome the lack of funding for the development and maintenance of curriculum materials. Funding for equipment, such as PPE and detectors, has been discussed as another possible barrier. However, since the objectives are designed so that residents are required to learn to use the equipment appropriate for their tasks at their local institution, programs are not being required to teach residents how to use complicated suits or other equipment unless it is available at the local institution. (Separate federal initiatives and requirements, not within the scope of the task force, may increase the amount of equipment available to hospitals.)

The recommended strategies overcome most of the barriers identified during the needs analysis by providing free to all residency programs a substantial amount of WMD-specific content material for teaching and learning.

Advocates for Integrating WMD Content into Emergency Medicine Residency Training

The involvement of several organizations or institutions could facilitate the successful implementation of the recommended strategy. The ACGME and the RRC in Emergency Medicine, AMA, and AAMS could push for the incorporation of WMD content into residency programs and into the core curriculum. Additionally, professional organizations, such as ACEP, NAEMSP, and SAEM, could independently promote the inclusion of WMD content to residency faculty.

It is expected that support and advocacy from many, if not all, of the groups mentioned in the discussion of advocacy in the undergraduate medical environment will be required. It is important to start early in soliciting the support of individual members and the societies at large to have sufficient impetus behind the effort as plans are made to integrate this content into residency programs.

Time Frames for Implementing WMD Content into Emergency Medicine Residency Training

Given the time required to design and develop a teaching and learning resource for WMD-specific content, this primary recommendation will take approximately 12 to 24 months to accomplish.

The secondary recommendation of integrating the WMD content into the emergency medicine core curriculum will also take time to accomplish. It is estimated that it could take 2 to 4 years to get this content incorporated formally as part of the core curriculum.

As part of both of the aforementioned recommendations, the support of numerous organizations for the effort is important. This will take time as the message is communicated to their members and for publicity and support to begin having an impact on the medical community. This effort should be undertaken simultaneously with the development of the instructional materials.

**Sustainment of WMD Education for Practicing Emergency Physicians**

Two issues are related to suggestions for maintaining current skills and knowledge in this content area. First, the emergency physicians currently in practice must have opportunities to gain skills and knowledge related to effectively responding to WMD events. Second, since integration of WMD-related knowledge and skills will take several years and the level of integration will vary throughout the country, supplementary experiences and courses that provide initial awareness and performance training may be needed until medical students and residents complete their training programs with the desired levels of proficiency. The strategies suggested for sustaining skills and knowledge in WMD-specific content take these issues into consideration.

Each section below reflects the types of strategies that could be effective for broad sustainment of WMD-specific training, groups that might serve as advocates for the process, the role of professional boards, the barriers that must be overcome to effect integration, and time frames that seem reasonable to develop programs for sustainment.

Recommendations

5. Develop a self-study program for CME credit that includes both the awareness and performance objectives for emergency physicians who are currently in practice.

6. Develop regularly updated self-study refresher programs for CME credit.

7. Develop instructor-led materials (based on the self-study program) so courses could be presented at national, regional, and state conferences and meetings for CME credit.

*Recommendation #5: Develop a Self-Study, CME Program for Practicing Emergency Physicians*

To reach the largest possible number of practicing emergency physicians, a self-study CME program should be developed and distributed at no or minimal cost to all emergency physicians. Both awareness and performance levels of proficiency using the objectives developed by the task force should be presented in a challenging, application-oriented program. The objectives provided by this task force provide the specific basis from which CME courses could be built.

***Design Considerations***

The self-study course should have a variety of features that would motivate emergency physicians to use it, including:

- Self-paced and user-controlled presentation of content
- Interactive, creative case or scenario-based instruction
- Effective use of multimedia elements, audio, graphics, etc.
- Self-evaluation tools, mainly case based
- Application-oriented so that the content is practical and realistic
- Modular design for use in limited periods of time (e.g., 10- to 15-minute sessions)
- CD-ROM or Web-based distribution
- CME credit

*Recommendation #6: Develop a Self-Study Refresher CME Program for Maintaining Current WMD Knowledge and Skills*

Another strategy that could be successful for broad national sustainment would be to develop self-study refresher programs using a technology-based (CD-ROM or Web) format. A paper-based version of the refresher program could be produced as a spin-off, if necessary. The technology-based approach would provide a more cost-effective way of maintaining and delivering up-to-date content, however. The refresher program should be offered for CME credit and should incorporate scenario- or problem-based experiences to maximize situational awareness, patient diagnosis and treatment, and skills acquisition. As part of the refresher materials, a manual or workbook for disaster could be developed. This would include exercises for use by hospital disaster committees and could provide added value to the self-study materials.

Developing self-study materials for this audience is an appropriate strategy, since self-study materials capitalize on adult learning principles, allowing a physician to learn at his or her pace in the work location. In addition, the cost to individual physicians can be kept low, and there is no need for "back-fill" while the physician is attending training. Self-study materials for the awareness objectives could be inexpensively disseminated to physicians in *all* specialties. Performance-level training could be made available to any physician on request.

The refresher self-study program would have to be taken every 1 to 3 years. Participation in hospital, citywide, regional, or national WMD-related drills or exercises, in combination with evaluation and self-study, could be used by emergency physicians to help evaluate their knowledge and skills in responding to WMD events on a regular basis after having received the refresher material.

One method that might help encourage emergency physicians to obtain refresher courses on a regular basis would be to offer CME credit for the educational effort. If the refresher and CME credit courses were offered at minimal or no cost and the program could be completed at the physician's own pace, there might be significant incentive to continually update the physician's knowledge base.

The self-study refresher program would have the same design features as the self-study CME course for practicing physicians described earlier. Important features are that the program would be self-paced and user controlled, have CME credit, use interactive cases, and include self-assessment tools.

***Oversight Panel for the CME Courses***

An interdisciplinary group of content experts, educational specialists, and representatives of major professional organizations from each of the three audience groups would be given initially the responsibility for the consistency, quality, and updating of the products developed. Because the refresher training course must be a true refresher and not just a repeat of the initial training course, the

panel would have to identify changes or updates frequently to ensure that the material in the refresher is the most current information available. It is absolutely necessary that the refresher course include the latest techniques, treatments, and agents. After incorporation into the refresher training, these current topics would be added to all other programs as part of the regularly scheduled maintenance.

***Maintenance***

Using CD-ROM and the Web, especially a combination, would greatly facilitate the distribution and the updating of the self-study programs. Because WMD content is likely to change rapidly, CME self-study courses would have to include regularly planned updating cycles.

***Advantages and Disadvantages***

One of the main advantages for developing these CME programs is that they can be developed in conjunction with the programs recommended for emergency medicine residents, nurses, and EMTs. These programs use a delivery strategy—technology-based self-study—that is becoming widely accepted in the physician community. In addition, advantages to this approach include:

- Can be developed in conjunction with the programs recommended for emergency medicine residents, nurses, and EMTs
- Interactive, case-based instruction providing practice information and maintains interest
- CME credit
- Standardized content based on the objectives and content specified by the task force
- Materials used as reference after self-study CME completed
- Collaboration among professional groups to ensure courses are based on appropriate levels of practice and promoted throughout the medical community
- Efficient updating and maintaining of the content and cost-effective delivery with the use of CD-ROM and the Web

A major disadvantage to these programs is that practicing emergency physicians have limited amounts of "free time," so the acceptance of the self-study module may be dependent on individual physician motivation and the promotion of the criticality of the content by professional organizations. Additional disadvantages might be the lack of participants' ability to ask questions. Even though, this could be overcome by the development of an interactive Web site that included a mechanism for e-mail or chat or discussion groups. The lack of motivation among emergency physicians to take the time to learn this material could also be a disadvantage. Marketing and appropriate publicity could help to overcome this disadvantage, as would making the instruction interactive and enjoyable.

*Recommendation #7: Instructor-Led Course for Presentation at Meetings*

A supporting strategy to the CME courses would be to develop instructor-led materials, based on the content of the self-study programs for presentation at professional meetings. This would enable experts on the oversight panel or other identified experts to present WMD content for CME at national, state, or regional meetings and conferences. Offering WMD courses for CME at meetings and conferences is an effective way to introduce physicians to the WMD content and to help them understand the criticality of the content. It is also a good way to publicize the courses and programs that are available.

As with other instructional materials recommended for development, the instructor-led course would be application oriented, use sound instructional strategies, and be developed and approved by the oversight panel.

***Advantages and Disadvantages***

One important advantage to presenting an instructor-led WMD course at national, state, or regional meetings (such as at ACEP's annual Scientific Assembly meeting) is that it would help to promote the CME course and the refresher course to a broad base of physicians. This course might

also help to disseminate an accepted standard for the content and objectives that should be mastered by practicing emergency physicians.

Disadvantages include the fact that instructor-led courses usually entail significant cost on the part of both those giving the course and those taking the course. In addition, there are significant time commitments for both groups, as well as the need to provide coverage in the ED for those taking the course.

As part of a comprehensive program to sustain skills and ensure that knowledge and techniques are current, a Web site could be developed and maintained to provide the most recent developments related to responding effectively to WMD events. This site could be an important communication tool for managing the knowledge gained over the next few years about WMD events. A Web site could also be used to distribute materials and to provide didactic training as acceptance and availability of the technology evolves.

Overcoming Barriers to Sustainment of WMD Knowledge and Skills

Providing self-study CME programs overcomes barriers related to the lack funding to cover the development of courses and inadequate funding to cover attendance costs. A recommendation discussed earlier related to increasing awareness among national organizations and institutions emphasizes the need to change health care providers' and hospital administrators' perceptions about the need to make WMD training a priority. Using a self-study approach helps to address the lack of time most emergency physicians have for training. Also, collaborating with a diverse interdisciplinary group for course development and oversight and basing the content on the objectives developed by this task force will facilitate development.

Advocates for Programs Designed to Sustain WMD Knowledge and Skill

Broad national sustainment of WMD education and training will require the involvement and support of organizations such as the AMA, the American Hospital Association (AHA), and specialty organizations in all selected specialties, such as ACEP and SAEM for emergency medicine. Several organizations or institutions, such as ACEP, NAEMSP, and SAEM, could facilitate the successful implementation of the recommended strategy. They could help to promote the necessity of gaining knowledge and skills in WMD content, and they could help to market the courses to their members. These organizations could announce and publicize the training opportunities in WMD training. They could promote the necessity of WMD training to hospitals and appropriate government agencies.

Time Frames for Implementing Programs Designed to Sustain WMD Knowledge and Skills

The development of the self-study courses, marketing the courses to emergency physicians, and gaining CME approval would take approximately 12 to 24 months. However, the refresher training might need a quick production time to maintain currency, possibly 6 months. This would depend on delivery methods and CME approval requirements.

**Summary of Recommendations for Emergency Physicians**

1. Develop a technology-based, self-study program covering the awareness objectives and distribute it free of charge to all medical students and medical schools. (All nursing students and out-of-hospital providers are also included as target audiences for this self-study program.)

2. Work with the AAMC and associated groups to promote direct integration of the WMD awareness objectives into appropriate courses or clerkships within medical school curricula.

3. Develop a set of teaching and learning materials covering the performance objectives that include both instructor and learner materials and are distributed free of charge, or at minimal cost, to all emergency medicine residency programs.

4. Work with ACEP, SAEM, ABEM, RRC, and associated groups to promote direct integration of the WMD performance objectives into appropriate content areas of the emergency medicine core content.

5. Develop a self-study program for CME credit that includes both the awareness and performance objectives for emergency physicians who are currently in practice.

6. Develop regularly updated self-study refresher programs for CME credit.

7. Develop instructor-led materials (based on the self-study program) so courses could be presented at national, regional, and state conferences and meetings for CME credit.

## INTEGRATION OF WMD CONTENT INTO TRAINING FOR EMERGENCY NURSES

**Undergraduate Nursing Education**

**An overview of WMD content should be provided to all nursing students regardless of the type of specialty nursing they might choose for further training and/or practice. Formal education for nurses is obtained through a variety of instructional models, including 2 or 3 year hospital-based programs, associate-degree programs provided through local community colleges, and baccalaureate degree programs provided by colleges or universities. This diversity of options for undergraduate preparation necessitates the need for providing training in the most flexible formats possible. Considering the substantial educational responsibilities of undergraduate nursing students, the most appropriate approach for WMD training is to provide these students with instruction at the awareness level of proficiency.**

Appropriate content to be introduced (at an awareness level) during undergraduate nursing education includes:

- Definition and explanation of terrorism and the use of WMD
- Recognition of a terrorist event involving WMD
- Personal safety measures
- Individual responsibilities (reporting of suspected event, being alert)
- NBC agents, their actions and methods of transmission
- Resources for internal and external help.(e.g., infection control departments and local health departments)

Recommendations

1. Develop a technology-based, interactive, self-study program covering the awareness objectives and distribute it free of charge to all nursing schools. (All medical students and out-of-hospital providers are also included as target audiences for this self-study program.)

2. Work with the ANA, NLN, state boards of nursing, and other nursing education organizations to promote direct integration of the WMD awareness objectives into appropriate courses or clinical experiences within nursing education curricula.

*Recommendation #1: Develop a Technology-Based Self-Study Program*

To provide WMD-specific training at the undergraduate nursing level, the task force recommends the development of a technology-based program that is distributed free of charge to all nursing schools, as well as to all medical schools and state EMS offices. The program would be designed as a CD-ROM or Web-based program to be used as a self-study, enrichment or adjunct, instructional opportunity outside of the standard curriculum or as an integral component of a course or clinical experience at the discretion of nursing faculty. However, using the self-study approach facilitates the acquisition of WMD content since students can begin to learn the material immediately and not have to wait for faculty to begin to incorporate it formally into the curriculum.

***Design Considerations***

The technology-based enrichment course would be designed as a creative, interactive course that incorporates a self-paced, case-based or scenario-based approach using a variety of multimedia elements including audio, sophisticated visuals, and text. WMD-specific content presented in the program should be closely related to nursing school curricula (and medical school and out-of-hospital curricula) so the content is both credible and functional.

To ensure that the program is applicable for all of the three target audiences, special sections should be developed highlighting the unique issues, skills, and knowledge for each audience group. Cases or scenarios should be developed that integrate all three audiences, but there should also be cases that emphasize the specific work of each group. The program should be designed so that the

relationship between what is being learned, as part of the curriculum and the WMD content is apparent to the students.

Capitalizing on the use of technology, either CD-ROM or the Web, would allow the use of highly interactive instructional elements, optional assessment of student knowledge, as well as the distribution of print-based reference materials.

A well-designed, interactive, technology-based program that provides practical application of the WMD content topics would be effective since most students would be likely to use the CD-ROM or Web program to gain new knowledge in a cutting edge topic. The likelihood of students using the program would be enhanced if some additional impetus or motivation could be provided by the individual school, AANC, ANA, NLN, NSNA, and other pertinent organizations or groups.

Additionally, since all of the instructional materials would be provided within the program, it would be simple for faculty to use the program as part of a course requirement. The inclusion of assessment activities within the program would facilitate faculty evaluation of each student's success in mastering the awareness objectives. The assessment sections could also be used by students for evaluation purposes. The addition of reference material, such as articles, bibliography, and glossary, would provide background information for faculty members as well as students.

***Oversight Panel***

Oversight of this program, as well as the other courses and initiatives recommended by the task force, should be managed by a multidisciplinary group of content experts, educational specialists, and representatives of major professional organizations from each of the three audience groups. The panel would take responsibility for the consistency, quality, and updating of all products recommended. The oversight panel would establish partnerships with organizations and institutions to assist with the implementation of the recommendations. To support the work of the oversight group, a national clearinghouse or repository should be established to collect relevant information, including articles, books, reports, research, instructional materials, and other media.

***Course Maintenance***

Using either CD-ROM or the Web to deliver the self-study awareness program would provide a cost-effective distribution method, especially when this program would be distributed to all three audience groups. Incorporating a Web component would facilitate updating and maintaining the WMD content, which is changing rapidly and will need to be updated frequently. Also, building the awareness self-study program so it can be used by all three target audience groups would facilitate keeping the awareness component current.

***Advantages and Disadvantages***

A major advantage of this approach is that nursing schools would not be responsible for the development and integration of the WMD content into existing nursing school curricula. The program would be used by students during "free time" rather than during traditional course time, eliminating the need to wait for formal change in curricula. Additional advantages include the following:

- Using an interactive, application-based program with realistic cases would capture the interest of most nursing students.
- Distributing the technology-based WMD program free of charge to all nursing schools overcomes a barrier related to the cost of attending a course or buying a book.
- Using a technology-based program would provide students with a source of materials that they would be able to use as a reference tool in the future.
- Developing a technology-based program provides an efficient method for updating and maintaining the content. Because WMD content is rapidly changing, the ease of updating is a significant advantage, especially if there is a Web component to the program.

- Using either CD-ROM or Web-based delivery ensures cost-effective distribution of WMD content.

There are several disadvantages to this approach, including the following:

- Nursing students have little "free time." To burden them with an additional course outside of the standard curriculum increases the chances that the course might not be used or that it might be used only at a superficial level.
- If the course(s) is optional, the use of the course and the mastery of the content is dependent on student motivation.
- Some nursing schools may not have sufficient computer resources available for students.

Overall, a well-designed, highly interactive course delivered by either CD-ROM or the Web and provided free to all nursing and medical schools, as well as to state EMS offices, is believed to be the most effective approach with which to begin the process of integrating WMD content into the curricula related to the education of the target audiences. Most of the disadvantages can be overcome by effective course design, appropriate publicity, and marketing by professional organizations and institutions.

*Recommendation #2: Direct Integration of WMD Content into Nursing School Curriculum*

A longer-term recommendation to ensure that nurses receive appropriate levels of education in WMD content as part of their undergraduate training is to integrate the various components of WMD awareness content into appropriate courses currently offered as part of nursing school curriculum. For example, WMD content could be integrated into microbiology, pharmacology, critical care, organic and inorganic chemistry, and anatomy and physiology. The psychosocial aspects of WMD events should also be integrated into behavioral sciences and other appropriate areas of the curriculum.

To implement the approach of assimilating WMD content, nursing faculty could be encouraged to develop and/or use independently developed, problem-based learning cases, rather than simply adding new material for didactic lectures. Modular cases could be designed to serve the dual purpose of highlighting a WMD issue within the framework of the current class topic. For example, in an assessment lecture, a WMD-based case scenario could be presented focusing on assessment findings for a patient exposed to a WMD agent. By providing multiple case scenarios with a dual topic, such as WMD/respiratory, WMD/cardiac, WMD/posttraumatic stress, or WMD/nursing diagnoses, nursing education faculty may be more likely to use case scenarios to provide a critical thinking framework for their current curriculum.

The intent of this approach is to use the existing, central curriculum as the framework for incorporating the WMD-specific content. Fully integrating WMD-specific content into the nursing education curricula could stimulate students' interest in the area early in their education, enabling them to begin constructing their cognitive schema about this content topic. As additional knowledge and skills are presented throughout the curriculum, they will be able to relate it more efficiently to the previously learned information.

***Advantages and Disadvantages***

The advantages of formally integrating WMD-specific content into nursing school curricula include:

- WMD content would be treated as a focus for teaching and not as an add-on component.
- All nursing students would be taught WMD content.

The primary disadvantages to this approach-integrating WMD-specific content into the existing curriculum-include:

- Additional instructional time required to incorporate topics not usually covered in the nursing curriculum
- Lack of faculty members who are knowledgeable in WMD content
- Lack of standard WMD content and literature
- Time required to effect change in the formal curriculum
- Perception that this is an added nonessential burden on an already crowded curriculum

Integration into a wide variety of content areas of the standard curriculum would require significant time, energy, and funding to overcome. Considering the barriers and the demands placed on nursing students during their undergraduate education, this approach is suggested as a secondary, long-term approach, which might be accomplished after the primary approach is successful and the WMD content area is more well developed and recognized as a necessary element of nurse education.

Overcoming Barriers Related to Integration of WMD Content into Nursing School Curriculum

The addition of more material into the already crowded nursing school curriculum will no doubt produce concern on the part of faculty about where and how to implement such content. The lack of existing content, including teaching and learning materials, research literature, and content experts, is also a concern.

Both of these concerns can be overcome by providing WMD-specific content as an enrichment, extracurricular, and voluntary program to nursing students. As mentioned above, this strategy does have disadvantages, but it provides an effective starting point for the integration of WMD awareness objectives into the initial educational experiences of nursing students. Once the program is distributed and publicized effectively, curriculum committees and faculty may be more willing to integrate the materials in a more formal way into their curricula.

As part of the longer-term strategy to integrate WMD content into formal nursing school curricula, the barriers related to the lack of materials and expertise would have to be overcome. One approach would be to enhance the technology-based program provided to nursing students with additional training materials, such as a course syllabus, lectures, slides, cases, table-top exercises, articles, and bibliography, designed specifically for faculty use. Additionally, to overcome the lack of qualified individuals to teach this material, a group of experts or visiting professors could be engaged to provide faculty development sessions for nursing school faculty who would take responsibility for teaching the subjects in their courses. (Satellite courses could be used for faculty training and could be offered to the faculty of all three target audiences.)

Faculty support is critical, since they are able to effectively suppress any initiative that they perceive to negatively affect their courses in particular, the curriculum as a whole, or the students' experiences while under their tutelage. (The visiting experts could also offer training as extracurricular experiences for students. This would help to augment the students' learning experiences and motivate them to use the technology-based program provided to them as part of the initial integration effort.)

Based on the existing political climate within individual schools and within the nursing education community at large, support for the WMD-content initiative must be approached from both "top down" as well as "bottom up" perspectives. That is, national organizations must support the idea and be willing to carry the flag of WMD training to every national meeting and even make their opinions known in Washington. In addition, grass roots victories must be gained by winning over individual faculty and course directors so they are willing to advocate the integration to their curriculum committees and then be willing to follow through and add materials to their courses.

Advocates for Integration of WMD Content into Nursing School Curriculum

Organizations such as the AANC, NLN, National Federation of Licensed Practical Nurses, National Organization for Associate Degree Nursing, and ANA would be crucial to the successful implementation of the recommended strategies. These professional organizations could advocate the integration of WMD content into nursing education. They could also promote the use of the free WMD materials to nursing students and nursing educators by stressing the need for education that focuses on effective response to WMD events.

It would also be advantageous to gain the support of nursing specialty organizations, since these recommendations will affect all nurses, not just those working in emergency departments. Organizations such as those representing pediatric nursing, critical care nursing, infection control, and nurse practitioners could be effective in advocating or promoting the value of WMD training.

Importantly, as nursing educational organizations adopt WMD-specific content into their curricula, questions covering the awareness objectives might be included on the National Council Licensing Examination. However, this is most likely to occur several years in the future and would require significant collaboration with and influence from a variety of organizations, including state boards of nursing, ANA, AANC, and NLN.

Time Frames for Implementation of WMD Content into Nursing School Curriculum

Given the time required to design and develop a sophisticated, interactive technology-based program to provide WMD-specific content to nursing students and faculty, the time frame for implementation of the program would be approximately 12 to 24 months.

Another part of the initiative involves garnering and focusing support for the WMD training initiative; this may also take between 1 and 2 years to accomplish in a thorough manner. As noted above, numerous organizations should be part of the effort, and it will take time for their members to be apprised of the situation and to begin making an impact on the health care community. This effort should be undertaken simultaneously as the instructional materials are being designed and developed.

A time frame to accomplish formal integration of WMD content into nursing school curriculum is difficult to estimate. However, it would most likely take several years for formal integration to become a reality.

**Sustainment of WMD Education for Emergency Nurses**

As critical partners in the delivery of emergency care, emergency nurses need not only a basic knowledge of the nature of WMD events but also knowledge and skills relating to the care and treatment of WMD casualties. Thus, it is important that WMD knowledge and skills are provided to emergency nurses at the performance level of proficiency. The performance-level objectives emphasize learning *how to* respond to an incident and are written to ensure that learners gain the skills and knowledge required to function effectively during WMD-related events.

Emergency nursing is considered a critical care, specialty field. Most often, ED management believe that nurses employed there should have experience in areas such as medical or surgical nursing. Staffing patterns in the ED follow national nursing availability patterns. A lack of available nurses equals hiring new and inexperienced nurses in EDs. Most EDs, in recognition of the wide scope of knowledge necessary to adequately function in an emergency setting, require national certifications such as ACLS, PALS, NALS, ENPC, TNCC, TNS, and CATN. There are numerous courses offered locally that are geared toward acclimating the inexperienced nurse to emergency nursing, but courses are not standardized or required as a condition for working in an ED. The burden of the basic education necessary for transition from an inexperienced to an experienced, knowledgeable emergency nurse rests primarily on the nursing management of the individual hospital

or ED. National clinical standards exist, such as the ENA Core Curriculum, which serve to maintain a national standard of emergency nursing care, but ultimately, practice varies from state to state and institution to institution.

Recommendation

3. Develop a CE course covering the WMD performance-level objectives that could be delivered using a variety of formats including instructor-based and paper-based self-study and provided free of charge to all emergency nurses.

*Recommendation #3: Develop a Continuing Education Course for Emergency Nurses*

Specifically, the recommendation is to develop a "gold standard" course that is a product of collaboration among ENA, ANA, APIC, ACEP, and other professional groups. Ideally, the course would be developed in conjunction with other development efforts targeting emergency medicine residents and EMS providers. CME credit would be awarded for completion of the course.

***Design Considerations***

The gold standard course would include a set of teaching and learning materials, including a content syllabus, lecture outlines, slides, cases, simulations, table-top exercises, assessment tools, and a student book. The model for this is the approach used for a course like TNCC where all of the materials are provided, including a textbook for students. Importantly for the emergency nurse audience, a self-study version of the course would be developed using the content from the course materials. (The issue of providing a self-study course should be investigated thoroughly to ensure that this would be an appropriate format to meet the needs of emergency nurses and provide them with an effective educational experience.)

This set of teaching and learning materials could provide all of the resources needed to present the course. Materials would include a variety of well-designed and creative components that could be used by faculty to develop a WMD-specific course. It could also include a number of interactive, self-paced cases or scenarios delivered by video, CD-ROM, or the Web. Assessment tools to be used by course faculty and by nurses using the self-study modules would also be a part of the complete package.

A modular approach would be used to design the materials, especially the self-study materials, so the work could be completed within short time frames. Additionally, the WMD-specific content would be closely related to the emergency nursing core curriculum. This curriculum is being updated in the fifth edition to include WMD (nuclear, biological, and chemical) in the chapter on disaster preparedness and disaster management so that the content is practical for emergency nursing practice. Content should be related to practical applications, JCAHO requirements, and continuous improvement. An additional feature that could be incorporated into the course materials is a workbook that students could bring back to their employers. This book would provide tools for implementing effective preplanning. For example, if the emergency nurse used the workbook in the hospital to coordinate and expand the disaster plan to include WMD issues and then held a disaster drill, this would help to satisfy process improvement and annual disaster drill requirements.

A prerequisite to the performance-level course would be completion of the awareness objectives. Since nurses would have access to the technology-based awareness program, they could complete this as a self-study experience, or the materials from that program could be integrated into the introduction of the performance course.

***Oversight Panel***

The oversight panel of content experts, educational specialists, and representatives of major professional organizations from each of the three audience groups would be responsible for updating

the teaching and learning materials provided to emergency nurses. To support the work of the oversight group, a national clearinghouse or repository should be established to collect relevant information, including articles, books, reports, research, instructional materials, and other media.

***Course Maintenance***

Using either CD-ROM or the Web to deliver the materials would facilitate updating and maintaining the material and would provide a cost-effective distribution method. However, the course materials could also be produced and delivered as a paper-based instructional resource kit. The intent would be to provide materials free to faculty and to students who participate in the course.

After the course materials have been developed, the delivery of the instructor-led course and the distribution and handling of the self-study course should come under the ENA. ENA is recognized as a leader in delivering high-quality courses. They have an existing infrastructure for the delivery and distribution of courses to emergency nurses and other audiences worldwide. ENA could also be responsible for faculty training, because they do this for other courses for emergency nurses. However, since the faculty training and course delivery and distribution are expensive, operational resources would have to be considered.

As part of its role, the ENA would work with an interdisciplinary task force or consortium with the role of updating and maintaining all of the courses recommended.

***Advantages and Disadvantages***

The advantages and disadvantages of this approach are similar to those associated with the recommendation to develop and distribute a course to undergraduate medical and nursing students as well as to emergency medicine residents. The advantages include:

- Can be developed in conjunction with the programs recommended for emergency medicine residents, physicians, and EMTs
- Standardized content based on the task force objectives and content
- Delivery and distribution of the course handled by ENA, if sufficient resources provided
- Collaboration among professional groups to ensure the course is based on national standards of practice
- Instructor-based and self-study delivery satisfies the need of the largest number of nurses
- Free or low cost materials
- CME credit

Disadvantages to this approach center around the need to provide faculty development or train-the-trainer programs to help faculty instructors gain the WMD knowledge needed to effectively teach WMD content. The cost of attending training courses is a disadvantage for many nurses, since they often have to personally bear the cost of additional training. Additionally, there would be significant costs related to material distribution and promotion of the materials.

A well-designed course that includes all the teaching and learning materials needed, provides flexibility of delivery, and is provided free appears to be the most effective approach for conveying WMD content to emergency nurses. Most of the disadvantages can be overcome via this approach. Additionally, appropriate publicity and marketing by professional organizations and institutions, combined with faculty development sessions, will help to ensure successful implementation. It is important to note again that WMD content is being integrated into the emergency nursing core curriculum, so interest and need for courses will be generated with the publication of the new curriculum (fifth edition). Also, the ENA Board has adopted WMD and WME as a topic for a strategic initiative, which officially allows WMD and WME to become a focus of ENA. This will be implemented in forums, journal articles, research grant opportunities, national conference topics, and political initiatives.

An additional recommendation discussed as part of the recommendations for sustaining WMD knowledge and skills would be an important strategy for providing WMD content to emergency nurses. This would be done by integrating WMD content into existing hospital courses, such as annually required safety competencies in infection control, disaster drills, and decontamination procedures, which is a new JCAHO recommendation. For example, the infection control department could incorporate biological agents into infection control orientation programs and annual updates required by JCAHO. They could also integrate them into their annual OSHA-mandated blood-borne pathogens and tuberculosis control programs for emergency nurses.

Overcoming Barriers to Providing WMD CME to Emergency Nurses

The lack of existing content, including teaching and learning materials, equipment, research literature, and content experts, is a concern. In addition, since most nurses cover the cost of additional training themselves, funding for participation in educational programs is an issue with many practicing nurses who desire to become certified emergency nurses. Other barriers include the lack of support by hospital administrators for inclusion of WMD content into training requirements and the lack of perception by hospital administrators as well as practicing nurses that this type of training is a priority.

The lack of existing content should be overcome by the development and distribution of the gold standard course. To overcome the lack of qualified faculty to teach this material, the ENA could be contracted to train teachers. Providing materials free, especially if the self-study program is provided free, should help to alleviate the concern related to the cost of courses.

Funding for equipment, such as PPE, has been discussed as another possible barrier. However, since the objectives are designed so that emergency nurses are required to learn to use the equipment appropriate for their tasks at their local institutions, programs are not being required to teach nurses how to use complicated suits or other equipment unless it is available at the local institution. Additionally, providing a well-designed course with teaching and learning resources should overcome any lack of funding for the development and maintenance of curriculum materials.

Many of the barriers identified during the needs analysis should be overcome by the recommendations described. By providing WMD courses free of charge, or at minimal cost, to nurses—especially those currently working in EDs and desiring to become emergency nurses—the barrier related to the cost of courses should be alleviated.

Advocates for Providing WMD Education to Emergency Nurses

The effective realization of the recommendation would be made possible by the involvement of several organizations or institutions. For example, organizations such as ENA, ANA, APIC, and ACEP could independently promote the necessity of WMD education to nurses and other health care professionals. Organizations like AHA, JCAHO, ANA, ENA, and APIC would need to work together to promote the course related to emergency nursing.

Time Frames for Implementation of WMD CME for Emergency Nurses

To accomplish the recommendation related to the design and development of a course with a variety of teaching materials, as well as self-study and other learning materials, would take approximately 12 to 24 months. Refresher education may need to be produced in a shorter time-frame, possibly 6 months. This would depend on delivery methods and CME requirements.

**Sustainment of WMD Education for Emergency Nurses**

Recommendations

4. Develop self-study and instructor-led refresher programs for CME and reverification of WMD knowledge and skills.

5. Work with AHA, JCAHO, APIC, and associated groups to promote integration of the WMD content into already established hospital training.

*Recommendation #4: Develop Self-Study/Instructor-Led Refresher Programs for Maintaining Emergency Nurses' WMD Knowledge and Skills*

Developing refresher programs that can be delivered both as self-study and as instructor-led courses are strategies designed to reach the largest possible number of practicing emergency nurses. The self-study CE program could be developed and distributed at no, or minimal, cost to all emergency nurses. The instructor-led course would be similar in format to the instructor-led course developed for initial emergency nurse education but would focus entirely on updating WMD knowledge and skills. These courses could be handled similarly to the course developed for emergency nurses, ideally through a relationship with ENA.

It is anticipated that the refresher self-study program would have to be taken every 1 to 4 years. Participation in JCAHO-mandated hospital disaster drills; citywide, regional, or national WMD-related drills table-top drills; or exercises in combination with self-evaluation and self-study would be used by all health care providers in EDs to evaluate their knowledge and skills in responding to WMD events. Participation in drills with nuclear, bioterrorism, or chemical scenarios would be credited as a practical portion of reverification for all participating health care workers (including emergency nurses) by hospital administrators for JCAHO-mandated hospital disaster drills.

***Design Considerations***

The refresher program should have the same design features as the course designed for emergency nurses and described earlier. The self-study program should be self-paced and user controlled. Both programs should include assessment tools and award CME credit. They would incorporate scenario- or problem-based experiences to maximize situational awareness, patient diagnosis and treatment, and skills acquisition. A workbook designed as a prepackaged tool that class participants can take back to their institutions to assist them in developing a response plan for WMD events in their facility could also be included as part of a refresher course.

***Oversight Panel for the Refresher Course***

A multidisciplinary group of content experts from appropriate partnering organizations, including APIC, SHEA, IDSA, educational specialists, and representatives of major professional organizations from each of the 3 audience groups, would be tasked initially with the responsibility for the consistency, quality, and updating of the products developed. Because the refresher training course must be a true refresher and not just a repeat of the initial training course, the panel would have to identify changes or updates frequently to ensure that the material in the refresher is the most current information available. It is absolutely necessary that the refresher course include the latest techniques, treatments, and agents. After incorporation into the refresher training, these current topics would be added to all other programs as part of the regularly scheduled maintenance.

***Course Maintenance***

In CME programs, both initial awareness and performance training and refresher training must be maintained with the most current information available. Consequently, both have to have regularly planned updating cycles. Using a technology-based approach for the distribution of the programs would facilitate updates and delivery. To decrease the cost of developing and maintaining a refresher course, templates could be used in the development process so that specific content components could be easily replaced with more current information or cases.

The delivery of the instructor-led course and the distribution and handling of the self-study course should be administered by the ENA. ENA delivers high-quality courses and has an existing infrastructure for producing courses. Since they are experienced at providing instructor-led courses, ENA could also be responsible for faculty training. Operational resources would, however, have to be considered.

***Advantages and Disadvantages***

An advantage for developing refresher programs as self-study and instructor led is that they can be developed in conjunction with the programs recommended for emergency medicine physicians and EMTs. In addition, advantages to this approach include:

- Delivery strategies that are widely accepted in the nursing community
- Case- or scenario-based instruction that provides practical information and maintains interest
- CME credit
- Standardized content based on the objectives and content specified by the task force and maintained by the oversight panel
- Collaboration among professional groups ensures courses are based on appropriate levels of practice within the nursing community and promoted throughout the medical community

Lack of time may be a major disadvantage. Acceptance of and participation in the refresher education may be dependent on an individual nurse's motivation. Additional disadvantages include lack of administrative support, lack of relevance to nurses or to the local community, and family pressures to avoid the possibility of exposure to high-risk chemicals or diseases.

*Recommendation #5: Work With AHA, JCAHO, APIC, and Associate Groups to Promote Integration of WMD Content into Existing Hospital Courses*

This strategy involves collaborating with AHA, JCAHO, APIC, as well as ANA and ENA, to integrate WMD content into required training courses that exist in most hospitals today. This should include integration into courses such as annually required safety competencies in infection control, disaster drills, and decontamination procedures.

One particular strategy would be to integrate bioterrorism readiness into infection prevention and control orientation and updates as needed for JCAHO compliance. This could be coordinated and/or taught by infection control professionals. Another specific tactic would be for bioterrorism readiness plans to be developed via interdisciplinary task forces as OSHA-mandated blood-borne pathogens and tuberculosis exposure control plans have previously been written. Orientation and annual updates then could be incorporated into OSHA training sessions.

***Advantages and Disadvantages***

Advantages are that JCAHO-required training and OSHA regulations regarding occupation exposures are both part of long-standing and well-known programs that are accepted as required by hospital administrators and staff.

Disadvantages could be a lack of buy-in by hospital administration for this strategy. There also may be a lack of cooperation from agencies that would have to cooperate for this approach to be successful.

Overcoming Barriers to Sustainment of WMD Knowledge and Skills

Providing free or low-cost refresher CME programs overcomes barriers related to the lack of funding to cover the development of courses and inadequate funding to cover attendance costs. A

recommendation discussed earlier related to increasing awareness through national professional organizations and institutions emphasizes the need to change health care providers' and hospital administrators' perceptions about the need to make WMD training a priority. Using a self-study approach helps to address the lack of time many emergency nurses may have for training. Also, collaborating with a diverse interdisciplinary group for course development and oversight and basing the content on the objectives developed by this task force will facilitate development.

Promotion of WMD education by respected, multidisciplinary partnering organizations, such as ACEP, ENA, AID, CDC, APIC, SHEA, IDSA, NOLF, and ANA, may influence emergency health care providers to pursue and update their relevant CME.

There should be integration of WMD into already existing orientation and updates within health care facilities such as infection prevention control updates per JCAHO standards and blood-borne pathogens/tuberculosis exposure control programs mandated by OSHA regulations.

Integrating WMD content into existing hospital courses would integrate the WMD education into their normal schedules. It would be paid for and supported by administration and not depend on individual nurses' motivation and free time.

Advocates for Sustainment Recommendations

Broad national sustainment of WMD education and training will require the involvement and support of organizations such as the ENA, ANA, AHA, APIC, SHEA, IDSA, ASM, and other specialty organizations supportive of emergency nursing. Professional organizations and institutions should work to ensure that initial and refresher education is perceived as necessary. They should work to facilitate the successful implementation of the recommended strategy by promoting the CE and refresher courses to their members. Also, they could promote the necessity of WMD training to hospitals and appropriate government agencies.

Collaborating with organizations to promote WMD education should help to increase hospital administrators' understanding of the necessity of this training. Increasing publicity among professional organizations and within the health care community should help all nurses realize the priority of gaining the knowledge and skills to respond effectively to a WMD event.

Hospital leadership organizations must be convinced of the need for WMD education, planning, and set up of exercises for hospital personnel. A formal approach to these organizations by leaders of professional organizations such as AMA, ACEP, ANA, ENA, and APIC should be accomplished. Also, incentives such as grants for participating hospitals, CME credit for staff, JCAHO requirement packages for disaster drills, and continuous quality improvement and performance improvement processes should be developed at little or no cost to the institution. A community "workbook" for WMD event preplanning to integrate city leaders and fire, police, and hospital personnel should be developed and its use encouraged.

Organizations such as AMA, ACEP, ANA, ENA, and APIC have taken the lead in advocating WMD event preparedness, and they should continue to do so in courses, articles, books, position statements, conferences, etc. An integrated effort of general WMD awareness should have a higher chance of success.

Time Frames to Implementation of Sustainment Recommendations for Emergency Nurses

The development of the self-study and instructor-led programs, marketing the course to emergency nurses, and gaining CME credit approval would take approximately 12 to 24 months. As with all recommendations for course or program development, a formal instructional design process would be followed and would include formative as well as summative evaluation plans.

The secondary recommendation incorporating WMD content into existing hospital training requirements could take even longer. This approach could take 2 to 4 years to get this content incorporated formally as part of required training.

As noted, the support of many diverse organizations will be crucial to the success of these recommended strategies. This effort can take time as partnership and collaborative efforts are established, but all of these efforts can be undertaken simultaneously.

**Summary of Recommendations for Emergency Nurses**

1. Develop a technology-based, interactive, self-study program covering the awareness objectives and distribute it free of charge to all nursing schools. (All medical students and out-of-hospital providers are also included as target audiences for this self-study program.)

2. Work with the ANA, NLN, state boards of nursing, and other nursing education organizations to promote direct integration of the WMD awareness objectives into appropriate courses or clinical experiences within nursing education curricula.

3. Develop a CME course covering the WMD performance objectives that could be delivered using a variety of formats, including instructor-based and paper-based self-study, and provided free of charge to all emergency nurses.

4. Develop self-study and instructor-led refresher programs for CME and reverification of WMD knowledge and skills.

5. Work with AHA, JCAHO, APIC, and associated groups to promote the integration of the WMD content into already established hospital training.

| **WMD Education for EMS Providers: *Initial Training*** | | | |
|---|---|---|---|
| **Recommendations** | ***Advantages*** | ***Disadvantages*** | **Time-Frame** |
| 1. *Develop WMD Course Materials for Awareness and Performance Training* | • Standardized content based on the objectives and content specified by the task force<br>• Collaboration among professional groups to ensure courses based on appropriate levels of practice within the EMS community and promoted throughout the medical community<br>• Interactive and application-based instruction encouraged by inclusion of cases and scenarios<br>• Free, or low-cost, course materials<br>• Reference materials accompany teaching and learning materials<br>• Local EMS instructors facilitate integration of WMD content into overall EMS educational experience<br>• Cost-effective distribution and maintenance if CD-ROM or Web-based delivery is used | • Cost of developing faculty development or train-the-trainer programs to help instructors gain the WMD knowledge needed to effectively teach WMD content<br>• Cost of having faculty attend train-the-trainer programs<br>• Costs associated with the distribution and promotion of the materials<br>• An increase in the chance that the course will not be used or might be used at a superficial level only because of the addition of (WMD) content to EMS initial training<br>• Some individual instructors at training sites, regions, or states may not feel it is necessary to spend time to teach the WMD material because the content has not been formally included in the standard EMS curriculum. | 12 to 24 months |
| 2. *Acceptance of the WMD Course For Integration into State Educational Programs* | • Diverse national organizations would be able to build partnerships and work together to influence a wide number of people across the country.<br>• EMS leaders, in all state EMS offices, will be convinced of the criticality of WMD training. | • The process will be time consuming and will require concentrated effort by a number of individuals within the various organizations.<br>• Some state directors may feel that they cannot provide WMD training—based on their state budgets and content time commitments. | 24 to 48 months |

| **WMD Education for EMS Providers: *Initial Training*** | | | |
|---|---|---|---|
| **Recommendations** | ***Advantages*** | ***Disadvantages*** | **Time-Frame** |
| 3. *Integration of WMD Content into US DOT/NHSTA National Standard Curriculum* | • WMD content would be viewed as a credible area for EMS providers training and would no longer be treated as an add-on element of the curriculum.<br>• Formally incorporating WMD content ensures that all EMS providers will receive training in responding to WMD events.<br>• Providing the standalone course helps to facilitate acceptance, since there are subject matter experts who can begin to train to this WMD curriculum as soon as it is made public. | • Additional course time will be required to teach the additional WMD content.<br>• Limited number of instructors with expertise to teach WMD topics | 24 to 48 months |

| **WMD Education for EMS Providers: *Sustainment Training*** | | | |
|---|---|---|---|
| **Recommendations** | ***Advantages*** | ***Disadvantages*** | **Time-Frame** |
| 4. *Offer WMD CE Course for Practicing EMTs*<br>5. *Develop Refresher Course for CE and Reverification of WMD Knowledge and Skills* | • Can be developed in conjunction with courses for emergency medicine residents, physicians, and nurses<br>• Standardized content based on the objectives and content specified by the task force<br>• CME credit<br>• Collaboration among professional groups to ensure courses are based on appropriate levels of practice within the EMS community and are promoted throughout the medical community<br>• Application-based instruction encouraged by inclusion of cases and scenarios<br>• Inexpensive or free course materials.<br>• Cost-effective distribution and maintenance, if CD-ROM or Web-based delivery is used. | • Need to provide faculty development or train-the-trainer programs to help EMT instructors gain the WMD knowledge necessary to effectively teach WMD content<br>• Large number of existing CME courses available for certified EMS Providers.<br>• Some individual instructors at training sites, regions, or states may not feel the importance of providing CME training and refresher courses covering WMD topics<br>• If publicity does not maintain interest in a high level of preparedness to respond to WMD events, refresher training may not interest a large number of EMS Providers.<br>• Very few state EMS directors actually believe that their jurisdictions are likely WMD targets, so other, more compelling issues may supplant WMD as a critical training topic. | Since the same course used for initial training will be used for CME, the design and development time will be the same, approximately 12 to 24 months.<br><br>CECBEMS approval will allow recognition by NREMT and will relieve each state of the burden of reviewing the program. Ideally, acceptance should not take longer than 12 months. |

| **WMD Education for Emergency Physicians: *Medical Students*** | | | |
|---|---|---|---|
| **Recommendations** | ***Advantages*** | ***Disadvantages*** | **Time-Frame** |
| 1. *Develop Technology-Based Self-Study Program* | • Medical schools would not be responsible for the development and integration of the WMD content into existing medical school curricula.<br>• An interactive, technology-based program with application-based cases would capture the interest of most medical students.<br>• Distributing the technology-based WMD program free to all medical students (and medical schools) overcomes a barrier related to the cost of attending a course or buying a book.<br>• Using a technology-based program would provide students with a source of materials that they would be able to use as a reference tool in the future.<br>• A technology-based program provides an efficient method for updating and maintaining the content. Since WMD content is rapidly changing, the ease of updating is a significant advantage.<br>• Using either CD-ROM or Web-based delivery ensures cost-effective distribution of WMD content. | • Medical students have little "free time." To burden them with an additional course outside of the standard curriculum increases the chances that the course might not be used or might be used only at a superficial level.<br>• If the course is optional, the use of the course and the mastery of the content are dependent on student motivation. | 12 to 24 months |

| **WMD Education for Emergency Physicians: *Medical Students*** | | | |
|---|---|---|---|
| **Recommendations** | ***Advantages*** | ***Disadvantages*** | **Time-Frame** |
| 2. *Direct Integration of WMD Content into Medical School Curriculum* | • WMD content would be treated as a focus for teaching and not as an add-on component.<br>• All medical students would be taught WMD content. | • Additional time required to incorporate topics, such as WMD agents and chemicals, not usually covered in medical school courses.<br>• Difficulty in incorporating change at a course topic level, since the content of most medical school courses is determined at a local level.<br>• Lack of faculty members who are knowledgeable in WMD content.<br>• Course directors or lecturers might be challenged to find existing content and/or examples of biological and chemical phenomena for which WMD content could be substituted.<br>• Faculty, such as pharmacologists and microbiologists, must be convinced of the value of such integration and be trained in the topic areas.<br>• Current deficit of standard WMD content and literature.<br>• Lack of funding for the development of course materials. | A time frame to accomplish formal integration of WMD content into medical school curriculum is difficult to estimate. However, it would most likely take several years for formal integration to become a reality. |

| **WMD Education for Emergency Physicians: *Medical Residents*** | | | |
|---|---|---|---|
| **Recommendations** | ***Advantages*** | ***Disadvantages*** | **Time-Frame** |
| 3. *Develop a Teaching Resource Kit for Emergency Medicine Residency Programs* | • Residency programs would not be responsible for the design and development of materials.<br>• Content would be taught or at least supervised by local residency faculty.<br>• Facilitates the integration of the WMD content into the overall residency educational program.<br>• Distribution of a comprehensive set of WMD teaching and learning materials allows faculty and residency programs the flexibility to present and incorporate this content in a way that is effective for their individual situations.<br>• Distributing the program free to all emergency medicine residency programs overcomes a barrier related to the cost of producing materials.<br>• Provides faculty and residents with materials they could use for reference.<br>• Provides an efficient method for updating and maintaining the content.<br>• CD-ROM or Web-based delivery is a cost effective distribution method. | • To burden emergency residency programs with additional content increases the chances that the teaching and learning resources might not be used or might be used only at a superficial level.<br>• Faculty in many emergency medicine residency programs do not have the experience or expertise to teach WMD content. | 12 to 24 months |

| **WMD Education for Emergency Physicians: *Medical Residents*** | | | |
|---|---|---|---|
| **Recommendations** | ***Advantages*** | ***Disadvantages*** | **Time-Frame** |
| 4. *Integration of WMD Content Into Emergency Medicine Core Content and Curriculum* | • Formal integration provides credibility to this content area.<br>• Formally incorporating WMD content ensures that all emergency medicine residents will receive training in responding to WMD events. | • Additional time required to incorporate WMD content.<br>• Current shortage of standard WMD content and literature.<br>• Limited number of faculty members with expertise in WMD topics.<br>• Lack of funding for the development of course materials. | It could take 2 to 4 years to get this content Incorporated formally as part of the core curriculum. |

| **WMD Education for Emergency Physicians: *Medical Residents*** | | | |
|---|---|---|---|
| **Recommendations** | ***Advantages*** | ***Disadvantages*** | **Time-Frame** |
| 5. *Develop a Self-Study, CME Program for Practicing Emergency Physicians*<br>6. *Develop a Self-Study Refresher CME Program for Maintaining Current WMD Knowledge and Skills* | • Can be developed in conjunction with the programs recommended for emergency medicine residents, nurses, and EMS Physicians.<br>• Interactive, case-based instruction provides practice information and maintains interest.<br>• CME credit.<br>• Standardized content based on the objectives and content specified by the task force.<br>• Materials used as reference after self-study CME completed.<br>• Collaboration among professional groups to ensure courses are based on appropriate levels of practice and promoted throughout the medical community.<br>• Efficient updating and maintaining of the content and cost-effective delivery with the use of CD-ROM and the Web. | • Practicing emergency physicians have limited amounts of "free time".<br>• Acceptance of the self-study module may be dependent on individual physician motivation and the promotion of the criticality of the content by professional organizations.<br>• Lack of participants' ability to ask questions.<br>• Lack of motivation among emergency physicians to take the time to learn this material. | 12 to 24 months<br><br>Refresher CME built after production of #5 but would be built on base content structure; would need a fairly short production cycle to maintain currency--6 months depending on CME requirements and delivery method. |

| **WMD Education for Practicing Emergency Physicians: *Sustainment Training*** | | | |
|---|---|---|---|
| **Recommendations** | ***Advantages*** | ***Disadvantages*** | **Time-Frame** |
| *7. Instructor-Led Course for Presentation at Meetings* | • Would help to promote the continuing medical education course and the refresher course to a broad base of physicians.<br>• Would help to disseminate an accepted standard for the content/objectives that should be mastered by practicing emergency physicians. | • Instructor-led courses usually entail significant cost, on the part of both those giving the course and those taking the course.<br>• Significant time commitments for both groups, as well as the need to provide coverage in the ED for those taking the course. | 12 to 24 months |

| **WMD Education for Emergency Nurses: Initial Training—*Nursing Students*** | | | |
|---|---|---|---|
| **Recommendations** | ***Advantages*** | ***Disadvantages*** | **Time-Frame** |
| 1. *Develop a Technology-Based Self-Study Program* | • Nursing schools would not be responsible for the development and integration of the WMD content into existing nursing school curricula.<br>• An interactive, application-based program with realistic cases would capture the interest of most nursing students.<br>• Distributing the WMD program free of charge to all nursing schools overcomes a barrier related to the cost of attending a course or buying a book.<br>• A technology-based program would provide students with a source of materials that they would be able to use as a reference tool.<br>• A technology-based program provides an efficient method for updating and maintaining the content. Since WMD content is rapidly changing, the ease of updating is a significant advantage.<br>• A CD-ROM or Web-based delivery ensures cost-effective distribution of WMD content. | • Nursing students have little "free time." To burden them with an additional course outside of the standard curriculum increases the chances that the course might not be used or that it might be used only at a superficial level.<br>• If the course(s) is optional, the use of the course and the mastery of the content are dependent on student motivation.<br>• Some nursing schools may not have sufficient computer resources available for students. | 12 to 24 months |

| **WMD Education for Emergency Nurses: Initial Training—*Nursing Students*** | | | |
|---|---|---|---|
| **Recommendations** | ***Advantages*** | ***Disadvantages*** | **Time-Frame** |
| 2. *Direct Integration of WMD Content Into Nursing School Curriculum* | • WMD content would be treated as a focus for teaching and not as an add-on component.<br>• All nursing students would be taught WMD content. | • Additional instructional time required to incorporate topics not usually covered in the nursing curriculum.<br>• Lack of faculty who are knowledgeable in WMD content.<br>• Lack of standard WMD content and literature.<br>• Time required to effect change in the formal curriculum.<br>• Perception that this is an added nonessential burden on an already crowded curriculum. | Garnering and focusing support for the WMD training initiative may also take between 1 and 2 years to accomplish in a thorough manner. |

| **WMD Education for Emergency Nurses: *Sustainment Training*** | | | |
|---|---|---|---|
| **Recommendations** | ***Advantages*** | ***Disadvantages*** | **Time-Frame** |
| 3. *Develop a CME Course for Emergency Nurses* | • Can be developed in conjunction with the programs recommended for emergency medicine residents, physicians, and EMS Providers.<br>• Standardized content based on the task force objectives and content.<br>• Delivery and distribution of the course handled by ENA, if sufficient resources provided.<br>• Collaboration among professional groups to ensure the course is based on national standards of practice.<br>• Instructor-based and self-study delivery satisfies the need of the largest number of nurses.<br>• Free or low cost materials.<br>• CME credit. | • The cost of attending faculty development or train-the-trainer programs is a disadvantage for many nurses, since they often have to bear the cost of additional training personally.<br>• Significant costs related to material distribution and promotion of the materials. | 12 to 24 months |

| **WMD Education for Emergency Nurses: *Sustainment Training*** | | | |
|---|---|---|---|
| **Recommendations** | ***Advantages*** | ***Disadvantages*** | **Time-Frame** |
| 4. *Develop Self-Study/Instructor-Led Refresher Programs for Maintaining Emergency Nurses' WMD Knowledge and Skills* | • Self-study and instructor-led refresher programs can be developed in conjunction with the programs recommended for emergency medicine physicians and EMS Providers.<br>• Delivery strategies that are widely accepted in the nursing community.<br>• Case-or scenario-based instruction that provides practical information and maintains interest.<br>• CME credit.<br>• Standardized content based on the objectives and content specified by the task force and maintained by the oversight panel.<br>• Collaboration among professional groups ensures courses are based on appropriate levels of practice within the nursing community and promoted throughout the medical community. | • Lack of time for training.<br>• Acceptance of and participation in the refresher education may be dependent on an individual nurse's motivation.<br>• Lack of administrative support.<br>• Lack of relevance to nurses or to the local community.<br>• Family pressures to avoid the possibility of exposure to high-risk chemicals or diseases. | Refresher CME built after production of #4 but would be built on base content structure; would need a fairly short production cycle to maintain currency--6 to 12 months depending on CME requirements and delivery method. |

| **WMD Education for Emergency Nurses: *Sustainment Training*** | | | |
|---|---|---|---|
| **Recommendations** | ***Advantages*** | ***Disadvantages*** | **Time-Frame** |
| 5. *Work with AHA, JCAHO, APIC, and Associate Groups to Promote Integration of WMD Content Into Existing Hospital Courses* | • JCAHO-required training and OSHA regulations regarding occupation exposures are both part of long-standing and well known programs that are accepted as required by hospital administrators and staff.<br>• Promotion of WMD education by respected, multidisciplinary partnering organizations, such as ACEP, ENA, AID, CDC, APIC, SHEA, IDSA, NOLF, and ANA, may influence emergency health care providers to pursue and update their relevant CE.<br>• Collaborating with organizations to promote WMD education should help to increase hospital administrator's understanding of the necessity of this training. | • Lack of buy-in by hospital administration for this strategy.<br>• Lack of cooperation from agencies that would need to cooperate for this approach to be successful. | Incorporating WMD content into existing hospital training requirements could take 2 to 4 years. |

# Appendix – Methodology

**Overview**

Phase I of the NBC Training Contract (282-98-0037) focused on the (1) identification of the needs, demands, and feasibility for NBC-related training, (2) determination of the barriers and challenges related to delivering NBC training, and (3) development of high-level educational goals and strategies to attain the identified goals. Phase 2 focused on the (1) review of educational curricula for each of the target audiences and of six existing courses, (2) definition of levels of proficiency and development of associated behavioral objectives, (3) identification of recommendations for integrating WMD content into initial and CE, (4) identification of recommendations for sustainment of WMD knowledge and skills, and (5) specification of techniques to ensure continuing proficiencies. To accomplish these tasks effectively, the project team applied a systematic instructional analysis and design process, combined with a consensus development approach, to ensure that the representatives of each of the target audiences were fully included in the process.

The instructional design methodology, which is a well-documented process, provides a set of guidelines for information gathering and decision making. The purpose of applying instructional design methodology is to ensure that sound instructional solutions are designed and built (assuming the identified concern is a training problem). The instructional design process encompasses several interrelated phases—analysis, design, development, implementation, and evaluation. The process is iterative, emphasizing continuous formative evaluation through the review and use of information gathered or decisions made in previous steps. Application of the instructional design methodology as the structure for accomplishing this contract's objectives is the most effective technique for obtaining the outcomes required.

The first phase of the instructional design methodology—analysis—focuses on defining the problem or concern thoroughly and understanding it sufficiently to recommend solutions for solving it. Therefore, the task force conducted a training needs analysis. This analysis is a crucial part of the process used to design effective training because the information gathered forms the basis for the design and development phases. The outcome of an effective training needs analysis is a thorough explanation of the problem, a description of the target audience/learners, clarification of the barriers related to solving the problem, and a review of existing materials. These elements are used to provide recommendations for solving the problem; the recommended solutions are commonly referred to as high-level design specifications. As a result of the analysis process, the report provided by the task force is an analysis and high-level design specification document.

Effective training needs analysis is built around a set of techniques and tools for examining and understanding performance problems or requirements, as well as any new methodology or content in which persons must be trained.

**Techniques**

The needs analysis process was conducted using four techniques:

- Targeted learner and performer description
- Needs assessment
- Subject matter analysis
- Extant data analysis
- Objective specification

Targeted Learner and Performer Description

To describe the targeted learners, we clearly defined each target audience—EMS providers, emergency physicians, and emergency nurses. Determination of ancillary groups that could benefit from the training were also identified.

To adequately describe the learner and performer, specific methods were used to gather detailed information about the professionals who are targeted for the training. This included looking at relevant distinctions and similarities among the groups to determine numbers, geographic distribution, job responsibilities (shared and unique), current levels of education, types of certification, training opportunities, and motivation and attitudes toward WMD/NBC-related training. As we progressed through the instructional design process, we developed a thorough understanding of who will need to be trained and how the training might be developed. In other words, by gathering information about the targeted learners, we were able to clarify the knowledge and skills needed and thereby determine the training or instructional goals, objectives, and strategies.

Methods for determining descriptions of each group in the targeted audience primarily included group interactions, interviews, and review of/agreement by the task force of the information collected. Information was gathered in stages, answering questions and incorporating new information as one progressed. This process continued at part of the iterative characteristic of the instructional design process until we accumulated the level of detail required to sufficiently describe the audience.

Needs Assessment

The needs assessment technique is an organized effort to gather opinions and ideas from a variety of sources on performance requirements. The focus of the needs assessment was to determine as accurately as possible the performance gap—the difference between the current level of knowledge and skills and the desired or required level of knowledge and skills. During the needs assessment, information was sought in a number of areas, including actuals, optimals, feelings, causes, and solutions.

***Actuals***

In seeking actuals, one examines the current situation, looking at what the targeted groups know and do at this time, with an emphasis on the knowledge, skills, and attitudes that currently exist among typical performers in each group.

***Optimals***

Seeking optimals means looking at the desired knowledge or performance, with an emphasis on the knowledge, skills, and attitudes that trainees and performers must have to get the job done well.

Our aim was to gather the task force members' opinions to identify where we are now and where we need to be. For example, a body of knowledge exists today regarding knowledge and skills related to diagnosis and treatment. Our analysis involved looking at how current knowledge and skills could be augmented to bring them up the level necessary to respond effectively to a WMD/NBC incident. The level of detail gathered included a list of major topics and subtopics related to what must be learned to perform the tasks effectively. This list provided the content for the development of goals and objectives.

A training problem can be solved only when the difference between what is and what should be is defined. Thus, we examined the difference between optimals and actuals to determine the specific training needs: Optimal – Actual = Training Need.

By looking at causes for the gap between what is known and what should be known, we identified barriers and challenges that must be addressed if training is to be successful.

***Feelings***

Another needs assessment step was to determine feelings or the attitudes and opinions held by each targeted group about WMD/NBC training. Understanding the feelings related to the training topic helped us define the training gap and understand why a gap exists. This step also helped to more accurately define the target audience and to determine barriers or challenges that could undermine the successful implementation of WMD/NBC training.

***Causes***

In seeking causes, we tried to determine why a training gap exists and examined the barriers that are present. Because this type of information is often embedded in discussions of the actuals and optimals, we gathered this type of information throughout the process.

***Solutions***

As with causes, ideas about solutions to the training problem often are discussed during the identification of actuals and optimals. We captured ideas about strategies for solving the training gap as we progressed through the needs assessment. These data formed the basis for continuing the process of determining strategies for mastering the objectives through training solutions.

Subject Matter Analysis

As another step in the needs analysis process, we focused on what performers must know to perform the tasks under investigation. In this analysis, we determined what must be covered in training to fill the gap between actual and optimal knowledge and skills. This included confirming that we had identified all of the content topics and subtopics required for WMD/NBC-related training for each target audience.

The subject matter analysis was accomplished through interviews with experts in the various topics identified as necessary for WMD/NBC-related training. Content topic outlines for the target learner/performer groups were then developed. Additional levels of detail were gathered from articles and existing materials and from subject matter experts on the task force.

The analysis of the subject matter resulted in a detailed content outline that listed all of the major content categories and their related subtopics. The content outline was circulated to the task force several times for discussion and delineation.

Extant Data Analysis

Analysis of extant data focuses on outcomes and provides information on *actual* knowledge, skills, and attitudes that are characteristic of the targeted groups. Activities included review of data, research, and information from previous incidents similar to the area under investigation (e.g, disaster simulations or preparation for international events like the Olympics in Atlanta). In this step, we reviewed articles, textbooks, and other related sources of information.

An important part of this extant data analysis involved the review of five courses that are currently available to the target audiences. Each course was examined to determine the intent of the course, course sponsors, topics and objectives covered, types of practical experiences included, instructional and evaluation techniques used, and delivery methods used. This helped the task force understand the types of training currently available and what was needed to fill the training needs identified.

Additionally, curricula for each of the educational programs for medical students, nursing students, EMS providers (EMT-B, EMT-I, EMT-P), emergency medicine residents, and emergency nurses were reviewed. These reviews focused on identifying what topics are included in the current

curricula, what topics might relate to WMD/NBC topics, how programs are accredited, how graduates are licensed, and what barriers exist to integrating WMD/NBC training into the existing curricula.

Objective Specification

The detailed content outline was used to determine the levels of proficiency that are needed by members of the audience. Development of the detailed topic outline, as well as the identification of barriers and challenges, facilitated the definition of levels of proficiency and the writing the instructional goals and objectives by identifying the knowledge and skills that must be included to ensure effective WMD/NBC-related training for the target audience groups. Two levels of proficiency—awareness and performance—were defined. Then, using the content outline and an in-depth understanding of the audience groups, specific behavioral objectives were written.

Since instructional goals usually express only general results (e.g., respond effectively to WMD incidents) and do not clarify precisely what a learner must do or how a learner should perform, behavioral objectives were written as part of the contract requirements. Behavioral objectives communicate instructional intent and are important because they serve as a guide for further development of training by describing precisely what a trainee should know or do after completing a planned instructional experience. Because the task force wanted to focus on developing statements that would identify specifically both the skills and knowledge required, objectives, not goals, were developed.

Objectives convey the outcomes or results of a learning experience. In other words, they are used to specify the behaviors learners are to exhibit before they are considered competent. Objectives correspond closely to real-world performance or work requirements and specify the actions learners should be able to perform after training. The relationship between objectives and other components of training experiences, such as practice activities and evaluation, should be consistent.

After many rounds of review and revision by the task force members, the objectives represent the knowledge and skills required for learners to be prepared to respond effectively to terrorist events that incorporate WMD.

The recommendations resulted from answers to the question of how do we go about building training that ensures that the levels of proficiency can be met within the accepted training models currently being used to educate the target audience groups. For example, when the task force discovered that one challenge was the retention of knowledge and skills that are rarely (if ever) used, this information helped them examine strategies and techniques that would facilitate transfer to the job environment and retention through the use of refresher courses and hospital drills. An important characteristic of the instructional design methodology is the integrated and interdependent process that is used to ensure that instructional objectives and strategies meet the identified training need. Thus, the high-level design strategies discussed in the recommendations were formed after an involved examination of the objectives as well as the other results of the analysis.

**Tools**

A variety of tools were used to gather information during the training needs assessment, including group interactions (e.g., task force meetings) and interviews (task force members and additional experts).

The general questions that were emphasized included, but were not limited to, the following:

- Who are our learners or performers?
- What do they know now?
- What do we want them to know?
- What knowledge and skills are most essential?

- What are the constraints to providing training in the essential knowledge and skills?
- What are the goals that WMD/NBC training must address for each audience?
- What levels of proficiency are required?
- What specific behaviors must training participants exhibit when the training experience is completed?
- How could WMD/NBC content topics be integrated into existing educational curricula?
- What instructional approaches are appropriate for each of the levels of proficiency and for each audience group?
- How can identified barriers be overcome or at least mitigated?

**Communication and Consensus**

The training needs analysis process began at the first task force meeting where representatives from each group provided a baseline of information for their group, as well as a view toward the interactions among the groups through small- and large-group discussions. Continued research to clarify and build on that information was conducted in the form of individual telephone interviews, personal interviews, shared e-mail discussions, and so on. Although formal surveys were not used, specific questions were presented to task force members to fill in details concerning the description of the learners and the training gap.

Subsequent task force meetings provided members with opportunities for identifying and discussing issues relevant to the analysis questions. Each task force meeting addressed specific contract goals and solicited ideas and suggestions, which resulted in the information provided in the final report.

The consensus process was facilitated not only by the face-to-face meeting but also by the use of online discussions and telephone interviews. Additionally, input was actively sought after the initial drafts of products, such as content outlines, lists of objectives, and were circulated. After revisions were completed and revised, each product was presented for further discussion and approval by the task force.

**Outcomes**

The outcomes of the analysis process accomplished as part of the instructional design methodology are:

- Descriptions of the target learners and performers
- List and explanation of barriers and challenges related to providing WMD/NBC training
- Reviews of curricula and existing WMD-related courses
- List of awareness and performance objectives stated in behavioral terms
- Recommendations for integrating WMD training into educational programs and for sustaining WMD knowledge and skills
- Specifications for ensuring continuing proficiencies through increased transfer and retention

The concluding outcome is the Final Report provided as a deliverable for the NBC Training Contract.

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